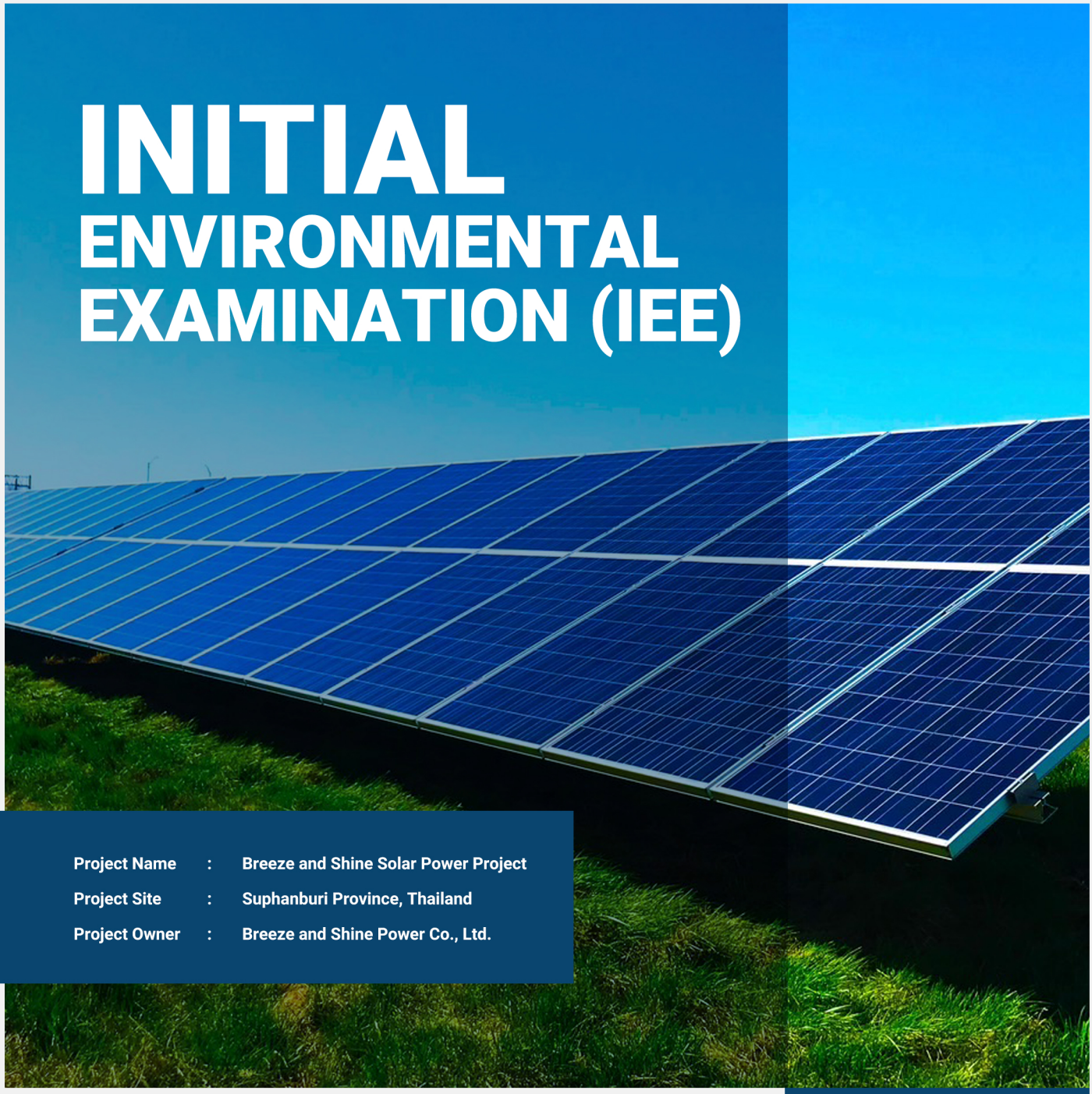
บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

INITIAL ENVIRONMENTAL EXAMINATION (IEE)



Project Name	:	Breeze and Shine Solar Power Project
Project Site	:	Suphanburi Province, Thailand
Project Owner	:	Breeze and Shine Power Co., Ltd.

BREEZE AND SHINE POWER CO., LTD.

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C O T®

Prepared by :
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EXECUTIVE SUMMARY

1. INTRODUCTION

Breeze and Shine Power Company Limited is successfully met the Energy Regulatory Commission for the supply of electricity from renewable sources under the Feed-in Tariff (FiT) program for the period B.E. 2565-2573 (2022-2030) in July 2021. Consequently, it began to execute the project from planning, construction, and operation including taking ownership of a 144.000 MW_{AC} (199.456 MW_P) facility in Suphanburi Province.

2. LEGISLATIVE REQUIREMENT

According to the Regulations of the Energy Regulatory Commission on the Criteria for Preparing a Code of Practice Report and a Report of Compliance with the Code of Practice for the Operation of Electricity Generation B.E. 2565 (2022), the development of the Project is required to conduct the Code of Practice (CoP) Report for non-fuel Power Plants. According to the ADB Safeguard Policy Statement (2019), Equator Principle 4 and IFC, the development of the Project falls under category B and C from an environmental and social point of view respectively.

The Project Developer has appointed Consultants of Technology Co., Ltd. (COT) for preparing the CoP report which was submitted to and was approved by the Energy Regulatory Commission (ERC) on 12 December 2023, this Initial Environmental Examination Report (IEE Report) and the Social Compliant Audit (SCA report) in line with applicable ADB's Safeguard Policy Statement (SPS), International Finance Corporation Performance Standard (IFC-PS), Equator Principles (EP), Asian Infrastructure Investment Bank (AIIB) and other related parties to support financial arrangement with Lender and key stakeholder for further step of project implementation.

3. PROJECT DESCRIPTION

The Project, a ground mounting solar farm, generates electricity from solar power using photovoltaic modules and battery energy storage system (BESS) covering the area of 1,683,133.60 square meters (1,051.96 rais) in Nong Krathum Sub-district, Doem Bang Nang Buat District, Supanburi Province. Main components of the Project consist of photovoltaic (PV) modules, inverter, transformer, 22 kV switchgear, battery energy storage system (BESS), substation, cables, and transmission line. The transmission line belongs to The Provincial Electricity Authority (PEA), which possesses ownership for construction, operation, and maintenance.

4. IMPACT ASSESSMENT

4.1 Air Quality

Construction Phase

The construction activities during this phase that might cause dust dispersion and affected to the ambient air quality include; land clearance and site preparation for building and supporting facilities related to power generation activities. The box model has been adopted to predict the TSP concentration. The predicted TSP-24 hrs is 0.191 mg/m^3, which is within the standard limit, which is set at no more than 0.33 milligrams per cubic meter (National Environmental Committee Announcement No. 24, B.E. 2547 (2000)). There is no ambient air quality standard limit set for TSP in the IFC General EHS Guidelines.

Operation Phase

The project activities during this phase involves electricity generation from solar cells. There will be no equipment or machines that generate particulate matters or pollutants. Therefore, there will be no impact of ambient air quality.

4.2 Noise

Construction Phase

The construction activities during this phase that might cause noise impact include the construction of structures for installing solar panels and building construction using percussion piling method. The impact of noise from construction activities, occurs temporarily and over a short period of time. During the 8-hour construction period, not all machinery operates simultaneously. For the calculation, noise impact from construction activities of the project, which serve as a representative source of noise during the construction phase, have a maximum noise level of 83 dBA at a distance of 15 meters from the source is chose as a reference noise level in this assessment because it is the highest noise level generated from the construction of the Project (U.S. EPA 1971).

Assessment results with national guideline:

- Leq 24 hr: the total noise level at Ban Nong Hin school and farm dwelling is 65.9 and 62.0 dBA, falls within the standard (not exceed 70 dBA).
- Annoyance noise: the annoyance noise levels at both Ban Nong Hin school and the farm dwelling exceed 10 dBA. Therefore, the installation of a noise barrier was proposed to mitigate the noise impacts. Assessments indicate that with a noise barrier in place, annoyance noise drops below 10 dBA during certain hours. However, it's important to note that the surrounding environmental conditions during measurements can greatly influence annoyance noise levels. In some cases, the surroundings may be extremely quiet, leading to very low background noise levels, which can result in annoyance noise being generated even at relatively

low levels from the noise source. Therefore, impact from annoyance noise is considered moderate. However, the construction activities are specified to be conducted during day time, 8 hours per day, from 8 a.m. to 5 p.m. (with a 1-hour break at noon). Therefore, the consideration of the annoyance noise level at the receptor will be limited to day time. If construction during nighttime is unavoidable, the project shall properly inform community leaders 7 days in advance.

Operation Phase

The project activities during this phase involves electricity generation from solar cells. There will be no loudly equipment or machines. Therefore, there will be no noise level impact.

4.3 Reflection and Heat

Construction Phase

The project is designed to use PV panels that are coated with an anti-reflective coating with the lowest light reflection coefficient. Additionally, the project specifies that the solar panels will be installed at an angle of approximately 10 degrees to the ground, which prevents light reflection towards the surrounding area. Therefore, it is anticipated that there will be no significant impact from light reflection and heat generated by the solar panels.

Operation Phase

Current solar panel manufacturing technologies have improved significantly, with external coatings that reduce light reflection. According to the report "PV Systems: Low Levels of Glare and Reflectance vs. Surrounding Environment" by Mark Shields in 2010, which studied light reflection when impacting various materials, it was found that the light reflection coefficient of solar glass is lower than that of other materials. When an Anti-Reflection coating is applied, the light reflection coefficient is further reduced. Therefore, there will be no impact on the community.

4.4 Terrestrial Ecology

Construction Phase

The project area is located in the central region of Thailand, in the Tha Chin River Basin, approximately 30 kilometers away from the Phu Toei National Park. The current condition of the Project area is characterized by an agroecosystem, including sugarcane, and cassava. However, with the opening and construction of the Project area, there will be changes to the existing agroecosystem, leading to the loss of the agricultural system and transformation into an open area with solar panels. Nevertheless, nearby areas still maintain agricultural spaces and water sources. Wildlife in the Project area mainly consists of birds and small animals that can move and disperse to find food in the nearby agroecosystem areas within the study and surrounding areas. The project area is not considered critical habitat. The project will implement measures during construction to mitigate impacts to wildlife in the project area during the construction period.

Operation Phase

The project activities during this phase involves electricity generation from solar cells. There will be no impact on Biodiversity.

4.5 Aquatic Ecology

Construction Phase

Wastewater will be generated from 2 major sources; (1) wastewater from workers consumption (on site and at campsite), the Project will treat wastewater with a septic tanks. If the contractor discharges treated waste or sewage outside into natural water sources or private areas, the contractor must obtain permission from relevant government agencies or landowner to ensuring that the discharged sewage will not have adverse environmental impacts in the future. In addition, the contractor shall provide a retention pond at workers' camp and conduct water quality monitoring once a month to ascertain the water quality before discharging., and (2) Wastewater from construction activities will be generated from equipment cleaning. The wastewater will be collected in onsite drainage gutters and collected in the wastewater collection pond. The water will be reused for dust suppression. The impact shall occur temporarily only if wastewater is discharged into the surrounding environment; hence, the impact on aquatic organisms is considered low.

Operation Phase

Wastewater from employee's consumption (peak consumption at PV cleaning period) which will be treated by a septic tank and no discharging to surrounding environment. For wastewater from PV cell cleaning activity, which is not contaminated with impurities such as oils but it only contains dust will be directly discharged onto the ground. For the runoff that may be contaminated with oil from the transformer area where engine oil is used, it will be sent to an oil sump to separate oil and treat further. The project doesn't discharge wastewater to the environment; thus, it has no impact on surface water quality.

4.6 Socio-economics

Construction Phase

1. Potential Positive Impacts

Employment of Local People: The Project has a policy to be given first priority to be hired local people which qualified to work non-skill and skill labors. However, this employment is temporary only 12 months during construction phase, the positive impact will be low.

Local Economic Promotion: the construction workers will be bought a consumer product from the local shop/stores nearby the construction site and workers' camp. It will increase the cash flow and improve the local economy. However, it will be temporary only 12 months during construction phase, the positive impact will be low.

2. Potential Negative Impacts

Disturbance and annoyance to the community from construction activities: The construction activities, especially the transportation activities may increase the traffic volume and accidents on Rural Highway 4086 temporarily at certain times of each day. This may cause traffic problem, road damage, road obstruction, and accidents. However, the Project has determined the prevention and correction measures to minimized impact during this phase. Therefore, the impact level will be low.

Operation Phase

1. Potential Positive Impacts

Local Development: The local administrative organizations will collect taxes from the Project, such as local maintenance tax, building and land tax, and a share of value-added tax. This revenue can be used for local development. In addition, the Project has several community relations campaigns to establish positive relationships and pay back to the community. The Project will also support local activities throughout the operation phase. Therefore, the positive impact will be moderate.

Employment of Local People: The Project given the first priority to hire the local people who qualified to the work requirements. The employment during this phase comprised 5 permanent employees and approximately 20 part-time employees throughout 25 years of the project operation phase. Therefore, the positive impact will be moderate.

Activities Promoting Community Relations: The Project has public relations campaigns about its operations regularly to establish an accurate understanding and minimize concerns among people living near the Project. The purpose is to establish a good relationship between the Project and the local communities. All activities will be implemented throughout the operation phase. Therefore, the positive impacts will be moderate.

2. Potential Negative Impacts

Concerns over the Project Operation: The communities around the Project area may have concerns about the Project operations. Therefore, the Project has several plans to establish an accurate understanding and assure confidence in the Project development. There are channels to receive complaints and resolve the impacts from the Project development and hear suggestions from relevant parties. Therefore, the impact will be low.

4.7 Gender Related Impact

Construction and Operation Phases

The first priority for labor of construction will be given to local people for both skilled and non-skilled workers. However, a substantial number of workers will come from outside. As such, GBVH risks and issues may arise most specifically from labor influx. To prevent and mitigate GBVH risk, the Project mandates the prevention measures, so the impact will be low.

4.8 Influx Management

Construction Phase

Waste Management: If the contractor discharges treated waste or sewage outside into natural water sources or private areas, the contractor must obtain permission from relevant government agencies or landowner to ensuring that the discharged sewage will not have adverse environmental impacts in the future. In addition, the contractor shall provide a retention pond at workers' camp and conduct water quality monitoring once a month to ascertain the water quality before discharging.

Noise: Noise from workers' camp may disturb the communities at nighttime because of high number of workers. This could cause conflict with local people. The Project and the contractors shall strictly implement preventive and mitigative measures to control and monitor the workers so that they do not create problems to surrounding communities at nighttime.

Transportation: The results showed that the project's transportation activities during the construction phase do not significantly impact the service level of Rural Road No. 4086. The road's level of service remains the same (Level A), allowing vehicles to move freely at free-flow speed, where the driver can select the speed of travel without being influenced by other means of transport in the traffic flow.

Impact on public health service: With a large number of construction workers, if there is a contagious disease or epidemic occurs in the workers' camp, there is a chance that the disease may spread to the surrounding communities. Communicable diseases. Common cold and flu caused by probably new strains are very well possible, as well as respiratory tract diseases. If illness occurs, it will increase the service burden on the local primary health care unit, namely Nong Krathum Sub-district Health Promoting Hospital. It is necessary that the Project and the contractors strictly comply with the relevant laws and regulations.

Conflict with local people: The project has established preventive and mitigative measures to control and monitor these workers so that they do not create problems for surrounding communities. In order to ensure the efficient operation of the project without causing social and environmental impacts or annoyance and conflict problems between the project and surrounding communities, the project has established procedures for handling complaints. When the complaint is corrected are completed, the project will urgently notify the complainant of the results and actions of the project.

Economic impact: Population influx as well as the presence of sizeable outsider workforce can disturb social dynamics, for example with the increased demand or pressure on services and resources such as housing, education, health services. Differences in social norms as well as income levels can create social jealousy. Artificial inflation of prices locally can also create potential tension.

Due to a significant influx of workers from external sources, there is a heightened risk of several impacts emerging as aforementioned, particularly associated with labor migration. To minimize risks, the Project has implemented preventive measures, so the impact is low.

Operation Phase

During the normal operation phase, only 5 permanent employees work in the Project area. Additionally, approximately 20 individuals, who are expected to be local residents, will be hired occasionally for cleaning solar panels. Therefore, the impact is low.

4.9 Occupational Health and Safety

Construction Phase

The construction activities may cause occupational diseases and occupational health risk such as fall of objects, hit on head, electric shock, traffic accident, etc. Therefore, the project determined the prevention and correction measures and adequate training program in occupational health and safety to minimize the occupational health impact. Moreover, the contractor will provide first aid equipment and medical supplies within the construction area, including a medical shuttle, according to the Ministry of Labor Regulations on the provision of welfare in business establishments B.E. 2548 (2005). Therefore, the occupational health impacts on the construction workers will be low.

Dust (Particulate Matter) and noise from the construction activities could be caused adverse health impact to the construction workers. However, the project spraying water at the area with topsoil stripping, material stacking, and entrance of the construction site, and keeping construction materials tidily to minimizes the dust dispersion and provide personal protective equipment (PPE), consisting of safety helmets, safety shoes, goggles, and task-specific personal safety equipment appropriate to working conditions and risks that may arise from work. Therefore, the occupational health impacts on the construction workers will be low.

Operation Phase

The project determined the prevention and correction measures and adequate training program in occupational health and safety associated with the Project's operations include field inspections, safety maintenance, and cleaning of the solar panels. Regularly inspection and safety shall be carried out in accordance with the criteria prescribed by relevant law and guideline to minimize the occupational health impact. Therefore, the occupational health impacts on the project staff will be low.

4.10 Health Impact Assessment

Construction Phase

The Qualitative Risk Assessment approach has adopted to evaluate the health impact assessment with a Health Risk Matrix. Considering the interaction between project activities, environmental and health baseline condition, the identified health risk impact are air pollution, noise, solid waste, transportation, occupational health and safety, and sharing public health services. Therefore, the prevention and correction measures on these issues shall be determined to minimize the impact.

Operation Phase

The identified health risk impacts during this phase are solid waste, transportation, occupational health and safety. Therefore, the prevention and correction measures on these issues shall be determined to minimize the impact.

4.11 History and Cultural Heritage

Construction and Operation Phases

The project is located in the area of Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. Based on the examination of cultural heritage data in the Department of Fine Arts' geographic information system, within a radius of 3 kilometers from the Project boundary, there are no historical sites, archaeological sites, or cultural heritage sites. Therefore, the project's operations will not have any impact on historical and archaeological aspects.

4.12 Land Use

Construction and Operation Phases

The Project site is located in the green zone, which is classified as rural and agricultural land. This type of land allows for business activities in buildings that are not tall or large-sized. However, if there are agreements for purchase or lease involving regional electricity utilities, it is considered a public utility and can be conducted. In any case, the Project does not fall under the category or type of factory that is prohibited from conducting operations

in this area. Therefore, the implementation of the Project does not conflict with the Principal City Plan for Land Use of Suphanburi, B.E. 2560 (2017), and is thus eligible for conducting business activities within the mentioned area. Therefore, the impact will be low.

4.13 Land Transportation

Construction and Operation Phases

The results showed that the project's transportation activities during the both construction and operation phases do not significantly impact the service level of Rural Road No. 4086. The road's level of service remains the same (Level A), allowing vehicles to move freely at free-flow speed, where the driver can select the speed of travel without being influenced by other means of transport in the traffic flow. Therefore, the impact will be low.

4.14 Solid Waste Management

Construction Phase

Waste from construction activities, 4 tons/month. The Project will collect, segregate, and consider reusing these materials, as well as ensuring proper disposal based on the waste type.

Food waste and food container refuse from the consumption of construction workers, estimated at a maximum of approximately 1,276.80 kilograms per day. Containers based on the types of wastes i.e., biodegradable, non-biodegradable and hazardous wastes) with a capacity of 200 liters and tightly sealed lids will be provided at various points to accommodate the waste. These are in place to collect waste until authorized agencies, which typically collect waste 2-3 days per week, can properly dispose of. Therefore, the impact is considered low.

Operation Phase

Consumption waste generated by regular employees, estimated to be around 5 individuals. The Project has prepared waste bins to accommodate three waste types: general waste, recyclable waste, and hazardous waste. The remaining waste after separation at the source will be collected and handed over to authorized agencies for proper disposal.

Waste from the operation activities, specifically broken PV solar. The project will collect and store in waste storage area, with clear labels indicating the type of waste. When there is a significant quantity of waste, the project will arrange for authorized companies to handle the disposal and report to the Office of the Energy Regulatory Commission (ERC) annually in compliance with the Announcement of the Ministry of Industry regarding the management of waste or unused materials in B.E. 2566 (2023). Therefore, there will be moderate significant impact on waste management during the operation phase.

4.15 Wastewater Management

Construction Phase

All wastewater generated during this phase include; wastewater from construction activities about 50.00 m^3/d. and wastewater from workers consumption about 89.38 m^3/d (maximum) will be collected and treated prior to disposal offsite by an agency authorized by government agencies. The wastewater will not be discharged to the outside. Therefore, there is no impact on the surface water quality.

Operation Phase

The wastewater generated during this is quite less, include; wastewater from staff consumption of about 1.40 m^3/d and wastewater from solar panel cleaners of about 8.24 m^3/d. Similar to the construction phase, all generated wastewater will be collected and treated properly and contact an agency authorized by government agencies to disposal. The wastewater will not be discharged to the outside. Therefore, there is no impact on the surface water quality.

4.16 Water Drainage

Construction Phase

Prior to project development, the area was an agricultural area. There will be minor site adjustment to consolidate installation of ground-mounted solar modules and minor land use for building construction, design to minimize changes to ground level and water flow. The water drainage condition during construction phase will remain the same as the existing condition. Therefore, the impact on drainage during the construction phase will be low.

Operation Phase

The Project will prepare a retention pond to collect run-off water, and control the discharging rate not exceeded the existing condition. Therefore, the impact level will be low.

4.17 Major Hazard

Construction and Operation Phases

Risk and Hazard Assessment has adopted the regulations of Department of Industrial Works: Criteria of Hazard Indication, Risk assessment and Risk Management Plan, B.E. 2543 (2000). The results from risk and hazard assessment found that the short circuit and fire in the equipment caused by personnel/equipment being in wet conditions contacts with electrical equipment (Human Error) is a high-risk level and prevention and correction measures are required. The Project determined to arrange appropriate solar

panels washing plan and encourage the staff to strictly follow the prescribed procedures, PPE (e.g., helmets, safety gloves, safety shoes, etc.), must always be used in the operation and must always be kept in ready to use condition, and establish clear operational procedure for panels washing to ensure that the electricity is turned off before panel washing. Therefore, the impact will be low.

4.18 Climate Change Risk Assessment (CCRA)

Construction and Operation Phases

The implementation of the Project is categorized as "Category B" (Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through prevention and correction measures), a CCRA required under EP4 Principle. The results of CCRA can be summarized as following;

GHG Emissions from Project Implementation: the highest GHG emitted is estimated at 9,365.92 tonne CO_2-eq/year during construction phase, while the avoided GHG is estimated at -200,473.53 tonne CO_2-eq/year throughout the operation phase. Therefore, the project caused the positive impact to climate change and the "Transition Risks" is no need to consider.

Results of Physical Risk Assessment

The Project located in Suphanburi Province, Thailand. The Project implementation may encounter several physical climate risks, which are associated with the region's climate patterns and extreme weather events. Some potential physical climate risks that the Project may envisage for example (Climate Risk Country Profile: Thailand, Asian Development Bank 2021); Extreme Temperatures, Cyclone and Storm Surge, and Flood.

4.19 Human Rights Risk Assessment

Construction and Operation Phases

Result of Human Rights Risk and Impact Assessment found that the impact on the occupational health and safety, discrimination, working hours, and community safety & standard of living is medium to high. Prevention and correction measures are required. Therefore, the Project determined the prevention and correction measures such as arranged occupational safety management in a systematical and efficient manner in conformity with the requirements of occupational safety, health and environment law relating to construction, and GBVH, so the impact is low.

5. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND SYSTEM

5.1 Environmental and Social Management Plan

Based on the environmental and social impact assessment, the project development has some impacts during construction and operation phases. Breeze and Shine Power Co., Ltd. will be responsible for implementation of corresponding mitigation measures and monitoring programs in order to ensure that the project development during both phases will have impacts within an acceptable level. The implementation will be under the responsibility of the EPC (Engineering Procurement and Construction) Contractor and the Project owner, Breeze and Shine Power Company Limited.

Measures	Construction Phase	Operation Phase
Prevention and Mitigation	- Air quality - Noise - Water quality and drainage - Reflection and heat - Biodiversity - Socio-economics and public participation - Gender-based violence and harassment - Public health and safety - Occupational health and safety - Transportation - Solid waste management - Major hazard - Land maintenance	- Water quality - Socio-economics and public participation - Occupational health and safety - Solid waste management - Green area and aesthetics - Land access
Monitoring	- Air quality - Noise level - Water use and effluent quality - Socio-economics and public participation - Occupational health and safety - Transportation - Solid waste management	- Water use and effluent quality - Socio-economics and public participation - Occupational health and safety - Solid waste management

5.2 Emergency Preparedness and Response Plan

Emergency Preparedness and Response Plan (ERP) is to be prepared by EPC Contractor for construction phase and submit to the project proponent for concurrence, while ERP for operation phase is to be prepared by Breeze and Shine Power Co., Ltd. ERP shall cover emergency incidents that may occur in the construction sites during the construction of the Project components and in the project area during operation phase. The emergency incidents could have adverse impacts on the environment, and on health and safety of construction workers, project staff, and nearby communities.

6. STAKEHOLDER ENGAGEMENT

Pre-engagement meeting was conducted to gather the information from the public and stakeholders regarding the preparation of an environmental report. This was initiated at the early stage of Project development with the aim of presenting preliminary Project details to gather feedback, concerns, and suggestions from stakeholders regarding the Project. The meeting was held on Tuesday, May 23rd, B.E. 2566 (2023), from 9 a.m. to 12 p.m.

Public hearing was conducted to collect feedback on the draft result of environmental impact assessment and propose preventing, mitigating, and monitoring measures. The aim is to instill confidence in the public and stakeholders regarding the report and its measures. The Project organized a public hearing and engagement session with the community and stakeholders on Wednesday, June 21st, B.E. 2566 (2023), from 08:30 a.m. to 12:00 p.m. at the Multipurpose Building, Nong Krathum Sub-district Municipality, Doem Bang Nang Buat District, Suphanburi Province.

Key informant interview was conducted during December 9th – 10th, B.E. 2566 (2023). In terms of communicating project information, the table detailed the interaction between the project, the community, and the villagers. 87.50% of respondents have received the project's information and particulars, according to the data. This indicates that the project's specifications are known and that the majority of project participants have access to the required information.

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CHAPTER 1

PROJECT BACKGROUND, LEGAL COMPLIANCE, IMPACT SIGNIFICANCE, AND CATEGORIZATION

CHAPTER 1
PROJECT BACKGROUND, LEGAL COMPLIANCE, IMPACT SIGNIFICANCE, AND CATEGORIZATION

1.1 PROJECT BACKGROUND

1.1.1 Project Development Status

Breeze and Shine Power Company Limited has planned to develop the Breeze and Shine Solar Power Plant Project, usually referred to as the "Project", which is a solar power generation project using photovoltaic (PV) solar panel technology that aligns with the policy to support electricity production from alternative or renewable energy sources. The solar panels of the Project shall be installed on the ground and shall be combined with battery energy storage systems for supplying electricity to the government. This Project has an installed capacity of 144.000 MW_{AC} (199.456 MW_P) within the area of 1,683,133.60 square meters (1,051.96 rais). Project location is in Moo 8, Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. The Project has to apply for permits from several government agencies in Thailand, which are listed and described in **Table 1.1.1-1**.

Table 1.1.1-1

List and Status of Licenses from Government Agencies

List of License/Permits	Government Agency	Status of License
Building Construction or Modification License (Aor. 1) for 115 kV substation	Office of Energy Regulatory Commission through the opinion of local government organization	Approved
Power Generation Facility Operation Licenses (Ror. Ngor. 4)	Office of Energy Regulatory Commission Department of Industrial Works	Approved
Electricity Generation License	Office of Energy Regulatory Commission	In process
Regulated Energy Production License (Por. Kor. 2)	Office of the Energy Regulatory Commission through the opinion of the Department of Alternative Energy Development and Efficiency	Under document preparing

At present stage financial arrangement for implementation of the Project is being discussed with Financial Institutions (Lenders). IEE Report is then required during this process. This IEE report is the document that addresses the environmental and social risks and impact associate with any project activities throughout the project lifecycle which could pose any direct, indirect or reputational risks to project developer and subsequently to the financial institutions and other key stakeholders as part of project implementation. Breeze and Shine Power Company Limited, has engaged Consultants of Technology

Company Limited (COT) to prepare this IEE Report for the Breeze and Shine Solar Power Plant Project in line with applicable ADB's Safeguard Policy Statement (SPS), International Finance Corporation Performance Standard (IFC-PS), Equator Principles (EP) and other related parties. This Report will be used to support financial arrangement with lenders and key stakeholders for further step of project implementation.

1.1.2 Project Developers

Gulf Energy Development Public Company Limited ("GED"), as a holding company in the energy and infrastructure sector, including gas-fired and renewable energy, as well as digital ventures. The Company is dedicated to facilitating the shift towards for more sustainability and environmentally-friendly energy sources.

Breeze and Shine Power Company Limited, a subsidiary of GED, successfully met the Energy Regulatory Commission for the supply of electricity from renewable sources under the Feed-in Tariff (FiT) program for the period B.E. 2565-2573 (2022-2030). The company operates renewable power generation business and it headquarter is at 87 M. Thai Tower 26th Floor, All Seasons Place, Wireless Road, Lumpini, Pathumwan Bangkok 10330.

1.1.3 Project Location, Area of Influence and Key Sensitive Receptors

(1) Project Location

The Project is located on the area of 1,683,133.60 square meters or 1,051.96 rais at Moo. 8 (Ban Nong Hin), Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province.

The surrounding environment of the Project area mainly consists of agricultural land (**Figure 1.1.3-1**). It shares boundaries with other areas as follow:

North: Adjacent to agricultural land in Moo 8, Ban Nong Hin, Nong Hin School, and Wat Nong Hin
South: Adjacent to agricultural land in Moo 8, Ban Nong Hin
East: Adjacent to agricultural land in Moo 8, Ban Nong Hin
West: Adjacent to agricultural land in Moo 8, Ban Nong Hin



<u>Figure 1.1.3-1</u> Land Utilization Surrounding the Project

(2) Area of Influence (AoI)

- Communities located within 3-kilometer radius from the Project boundary may be affected by the Project's construction activities, such as noise from building construction; and materials, equipment, and worker transportation to the construction site. This covering some areas in Nong Krathum Sub-district, Bo Kru Sub-district, and Nong Makhamong Sub-district. There are 11 communities and 3 local government organizations in the study area as shown in **Figure 1.1.3-2** and **Table 1.1.3-1**.

- The project will connect to and transmit generated electricity into the Provincial Electricity Authority (PEA) national grid. The PEA will construct a 4.5 km long 115 kV high-voltage transmission line, linking the project to Doem Bang Nang Buat Provincial Electricity Authority Station. The transmission line will be laid within the Right of Way (RoW) of public roads; therefore, it is ideally no acquisition of private lands. AoI of the Project's transmission line extends within 100 meters radius from the route (**Figure 1.1.3-3**) covering 4 villages in Nongkrathum Sub-district (Moo 1 Ban Non Krathum, Moo 2 Ban Non Krathum, Moo 3 Ban Nong Po, and Moo 8 Ban Nong Hin). Land uses on the RoW are as shown in **Figure 1.1.3-4**.

Table 1.1.3-1

List of Communities within the Project's AoI

Province	District	Local Government Organization	Community
Suphanburi	Doem Bang Nang Buat	Nong Krathum Sub-district Municipality	- Moo 1 Ban Non Krathum - Moo 2 Ban Non Krathum - Moo 3 Ban Nong Po - Moo 5 Ban Nong Kok - Moo 6 Ban Nong Na - Moo 7 Ban Nong Ing Phing - Moo 8 Ban Nong Hin
		Bo Kru Sub-district Administrative Organization	- Moo 3 Ban Nong Chanuan - Moo 4 Ban Lad
	Dan Chang	Nong Makhamong Sub-district Administrative Organization	- Moo 1 Ban Nong Makhamong - Moo 7 Ban Sabuakum
1 Province	**2 Districts**	**3 Local Government Organizations**	**11 Communities**

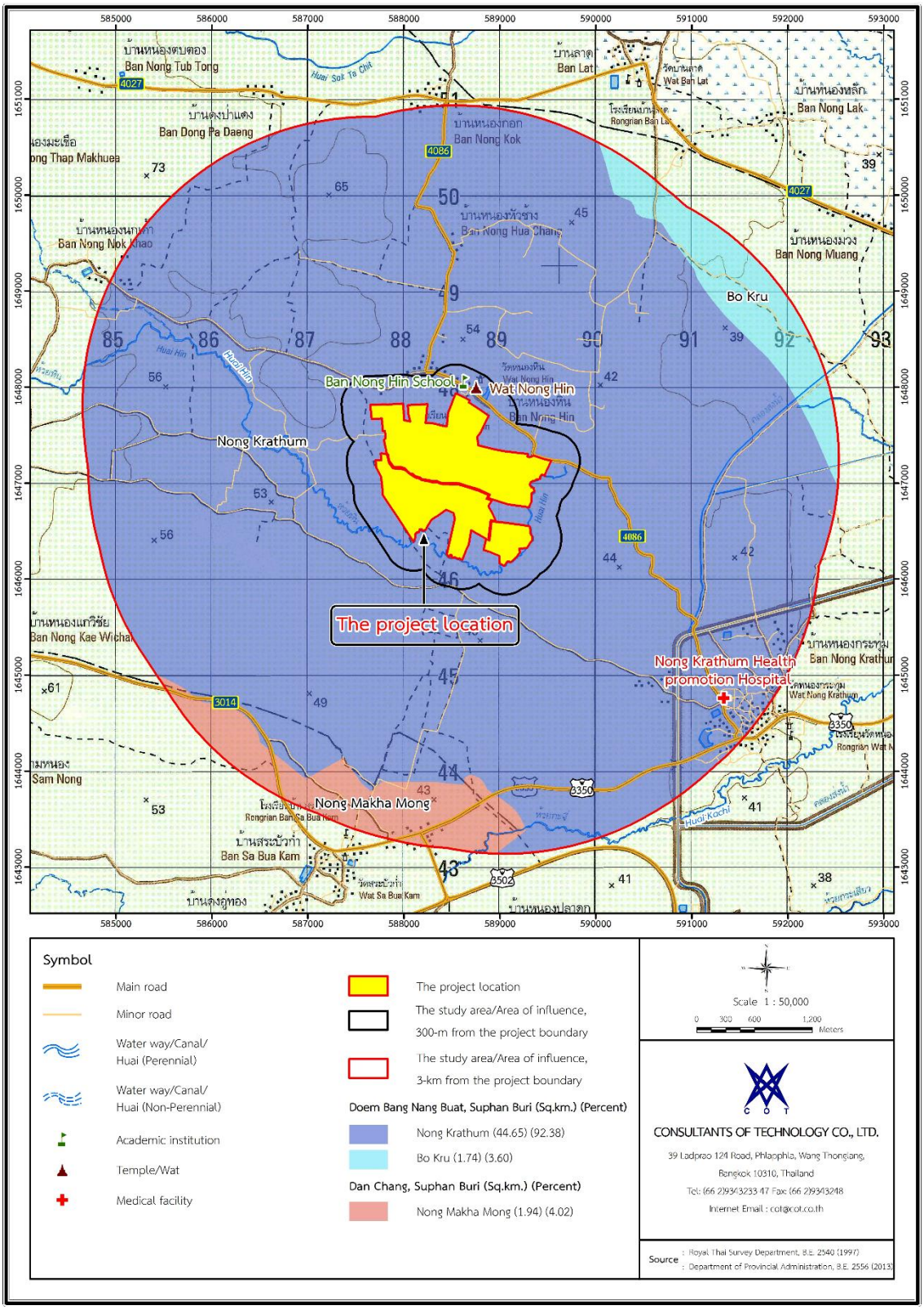


Figure 1.1.3-2 Project Location and Nearby Sensitive Areas within 300-meter and 3-kilometer from the Project Boundary

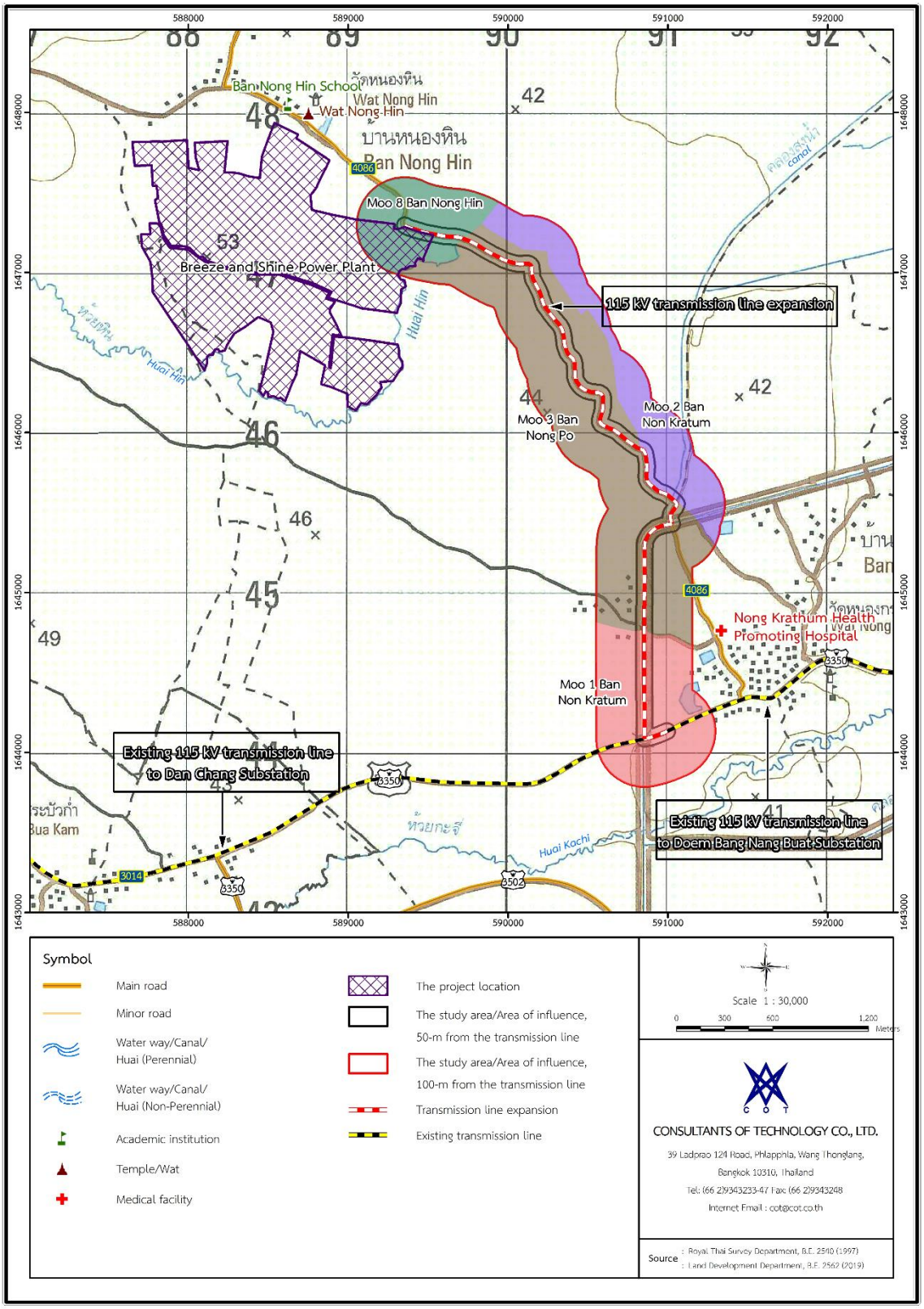
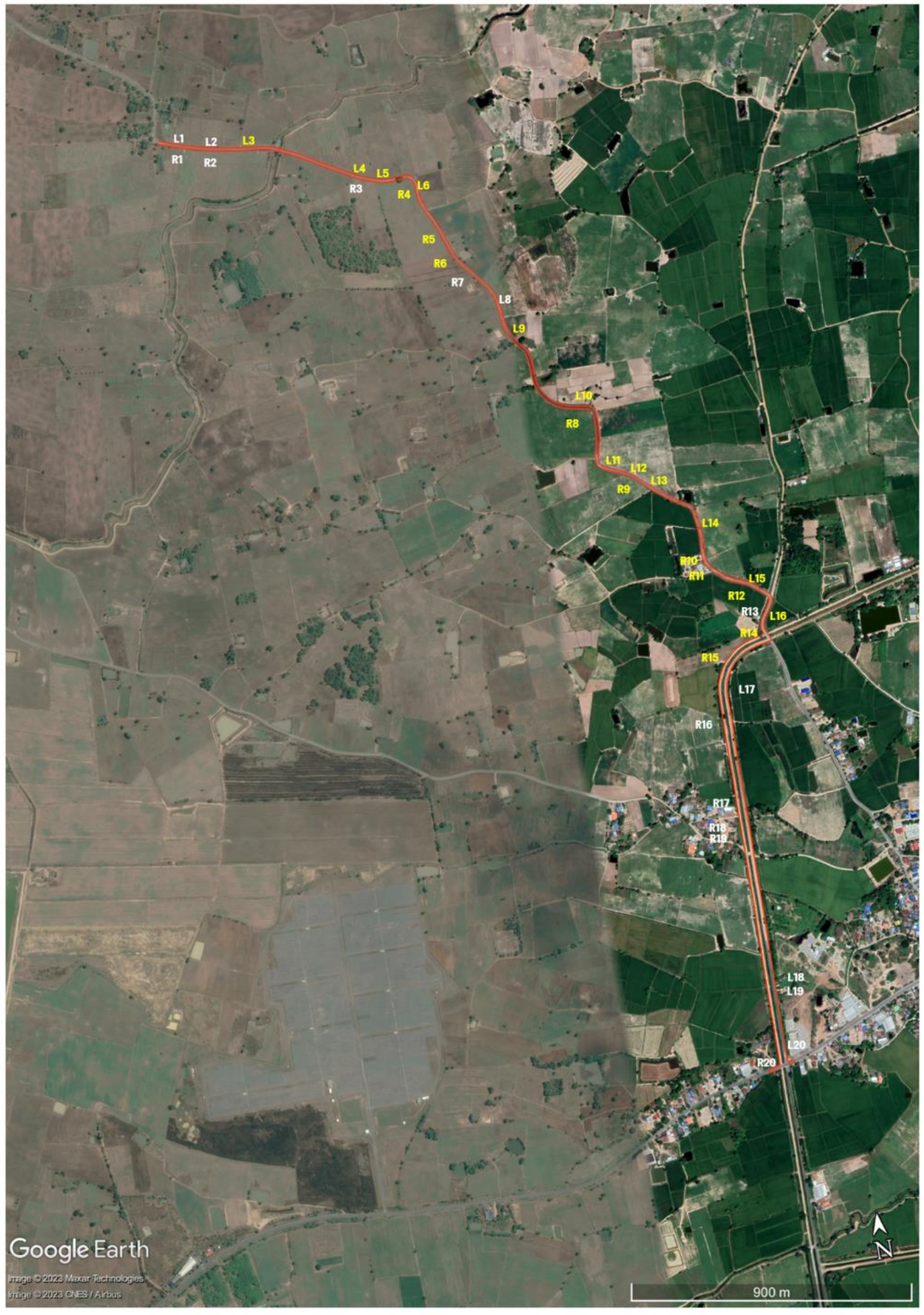


Figure 1.1.3-3 Transmission Line's AoI (100-meters along route)





L3: Agricultural Area (Sugarcane farm)

L4: Agricultural Area (Paddy field)

L5: Agricultural Area (Paddy field)

L6: Agricultural Area (Cassava farm)

R4: Agricultural Area (Cassava farm)

L7: Agricultural Area (Sugarcane farm)

R5: Agricultural Area (Sugarcane farm)

R6: Agricultural Area (Sugarcane farm)

L9: Agricultural Area (Cassava farm)

L10: Agricultural Area (Paddy field)

R8: Agricultural Area (Sugarcane farm)

L11: Agricultural Area (Sugarcane farm)

L12: Infrastructure (Hut)

R9: Agricultural Area (Sugarcane farm)

L14: Agricultural Area (Paddy field)

R10: Infrastructure (Local restaurant)

R11: Infrastructure (Animal stall, Concrete house with zinc roof)

L15: Infrastructure (Water pump)

R12: Agricultural Area (Paddy field)

L16: Agricultural Area (Paddy field)

R14: Infrastructure (Hut)

R15: Agricultural Area (Cassava farm)

L17: Agricultural Area (Paddy field)

<u>Figure 1.1.3-4</u> Examples of Land Use Along Transmission Line

(3) Key Sensitive Receptors

There are 2 key sensitive receptors within the study area; Ban Nong Hin School and Wat Nong Hin; approximately 120 meters and 130 meters, respectively from northern of the project area. Within the radius of 300-meters from the Project's boundary there are 27 households.

There is one sensitive area located within 300 meters - 3 kilometers from the Project boundary, Nong Krathum Sub-district Health Promoting Hospital, which is situated approximately 2,620 meters southeast of the Project boundary as detailed in **Table 1.1.3-2**.

Table 1.1.3-2

Key Sensitive Receptors within the Study Area

Sensitive Receptors	UTM Coordinate			Distance from the Project (m.)
	Zone	E	N	
Ban Nong Hin School	47P	588627	1648053	120
Wat Nong Hin	47P	591334	1644761	130
Nong Krathum Sub-district Health Promoting Hospital	47P	591334	1644761	2,620

1.1.4 Data Sources

During the course of project preparation, several studies were conducted and be used as references for this study as listed below:

(1) References that are collected from other related sources include;

1) Asian Development Bank (ADB)
   - ADB Environmental Assessment Guidelines (December 2003).
   - Safeguard Policy Statement (June 2009).

2) International Finance Corporation (IFC)
   - Environmental, Health, and Safety General Guidelines (April 2007).
   - Stakeholder Engagement: A Good Practice Handbook for Companies, Doing Business in Emerging Markets (2007).
   - Guide to Human Rights Impact Assessment and Management (HRIAM) (September 2011).
   - Performance Standards on Environmental and Social Sustainability (2012).

3) Equator Principles (EP)
   - EP4 (July 2020).

- The Equator Principles Implementation Note, Equator Principles Association (September 2020).
- Guidance Note on Implementation of Human Rights Assessments under the Equator Principles (September 2020).
- Guidance Note to Support Effective Consistent Application of the Equator Principles (July 2022).
- Guidance Note on Climate Change Risk Assessment (May 2023).

(2) Social Compliance Audit report prepared by COT.

(3) Environmental Safety Assessment report and Code of Practice report of Breeze and Shine Solar Power Plant Project prepared by COT. Data sources of baseline information for the preparation of existing environmental conditions for this Project are listed in **Table 1.1.4-1**.

Table 1.1.4-1

Data Sources for the Existing Environmental Conditions

Data	Data Type		Source	Year of Data/ Retrieval
	Primary	Secondary		
Geology		/	Department of Mineral Resources	B.E. 2557
Meteorology		/	Suphanburi Provincial Development Plan	B.E 2566-2570
Air Quality	/		COT's Survey Results	B.E. 2566
Noise Level	/		COT's Survey Results	B.E. 2566
Hydrogeology		/	Suphanburi Provincial Development Plan	B.E. 2566-2570
		/	Watershed Development Plan Report for Suphanburi Province	B.E. 2561
Reflection and Heat		/	Department of Alternative Energy Development and Efficiency	B.E. 2566
Terrestrial Ecology		/	10th Forest Resource Management Office (Ratchaburi)	B.E. 2566
		/	Office of Natural Resources and Environmental Policy and Planning, Suphanburi Province	B.E. 2565
		/	The Forest Industry Organization, Central region	B.E. 2566
	/		COT's Survey Results	B.E. 2566
Aquatic Ecology	/		COT's Survey Results	B.E. 2566
Water Resource Usage		/	Watershed Development Plan Report for Suphanburi Province	B.E. 2561
Transportation		/	Suphanburi Provincial Development Plan	B.E. 2566-2570
	/		COT's Survey Results	B.E. 2566
Agriculture, Fisheries, and Industry		/	Suphanburi Provincial Agriculture Office	B.E. 2566
		/	Suphanburi Provincial Livestock Office	B.E. 2566
		/	Suphanburi Provincial Fisheries Office	B.E. 2566
		/	National Statistical Office of Thailand	B.E. 2566
Water Drainage and Flood Prevention		/	Watershed Development Plan Report for Suphanburi Province	B.E. 2561
Energy and Electricity Usage		/	Doem Bang Nang Buat District Provincial Electricity Authority	B.E. 2566
Waste Management		/	Suphanburi Province's Summary Report	B.E. 2566
Economic and Social Conditions		/	Suphanburi Province's Summary Report	B.E. 2566
Public Health		/	Permanent Secretary Ministry of Public Health	B.E. 2566

1.2 OBJECTIVES OF THE STUDY

(1) To study the project details, encompassing the construction phase and operation phase.

(2) To examine the current environmental and social conditions of the Project area and its surrounding, impacted by the Project. Physical environmental resources, Biological environmental resources, Human use values, and Quality of life values are all included.

(3) To evaluate direct and indirect environment and social impacts of the Project and Project's transmission line throughout the construction phase and operation phase. This involves studying environmental change trends and assessing the Project's impacts to the environment.

(4) To propose general mitigation measures to be implemented as minimum requirements in contracts with contractors. To ensure practical effectiveness, these measures should be strictly followed to ensure practical effectiveness.

(5) To propose environmental and social prevention and mitigation measures, including monitoring of the Project.

(6) To prepare the IEE report for approval from Financial Institutions (Lenders).

1.3 COMPLIANCE WITH LAWS AND REGULATIONS

1.3.1 Applicable Laws and Regulations

The Initial Environmental Examination (IEE) report assesses potential risks and impacts, as well as mitigation measures related to the Project's development. This is to ensure that the Project is carried out responsibly and ethically. In the preparation of the IEE report, the consulting company ("COT") conducts the study in compliance with relevant national and international laws and regulations as prescribed in **Table 1.3.1-1**.

Table 1.3.1-1
List of Relevant Laws and Regulations

Category	Relevant laws and regulations
Asian Development Bank (ADB)	- ADB Safeguard Policy Statement (2009) - ADB Access to Information Policy (2018) - ADB Social Protection Strategy (2001) - ADB Policy on Gender and Development (1998)
World Bank Group	- IFC Performance Standards (2012) - IFC General EHS Guidelines (2007) - IFC EHS Guidelines for Electric Power Transmission and Distribution (2007)
International Conventions	- International Union Conservation of Nature; IUCN (2022) - Convention on International Trade in Endangered Species of Wild Fauna and Flora; CITES - International Labor Organization (ILO) Convention No. 29 - Forced Labor Convention (1930) - International Labor Organization (ILO) Convention No. 100 – Equal Remuneration Convention (1951) - International Labor Organization (ILO) Convention No. 105 – Abolition of Forced Labor Convention (1957) - International Labor Organization (ILO) Convention No. 138 - Minimum Age (1973) - International Labor Organization (ILO) Convention No. 182 – Worst Forms of Child Labor Convention (1999) - International Labor Organization (ILO) Convention No. 167 – Safety and Health in Construction (1988)
Regulations enacted by regulatory agencies	
1. Preparation of the Code of Practice (CoP) report	- Energy Industry Act B.E. 2550 (2007) - Regulation of the Energy Regulatory Commission Re: Criteria for Preparing Code of Practice Report and Monitoring Report for the operation of electricity production, B.E. 2565 (2022) - Regulation of the Energy Regulatory Commission Re: Criteria, Procedure and Condition for Determining the Location and Environmental Conditions of Power Plants for the issuance of a license of electricity production, B.E. 2564 (2021) - Regulation of the Energy Regulatory Commission Re: Opinion Hearing and Understanding with the Public and Stakeholders for the issuance of a license of electricity producer, B.E. 2565 (2022) - Regulation of the Energy Regulatory Commission Re: Standards for Safety, Environment and Sewage Management of Power Plants, B.E. 2564 (2021)
2. Construction of Transmission Line	- Provincial Electricity Authority Act (Version 4) B.E.2542 (1999). - Announcement of the Provincial Electricity Authority Re: Principles of Compensation or Assistance Costs for Humanitarian Purposes to External Individuals B.E. 2564 (2021).
Environmental Quality Standards	
1. Ambient Air Quality	- Announcement of the National Environmental Board No.10 Re: Ambient air quality standards. B.E.2538 (1995)

Category	Relevant laws and regulations
	- Announcement of the National Environmental Board No.24 Re: Ambient air quality standards, B.E.2547 (2004) - Announcement of the National Environmental Board No.28 Re: Ambient air quality standards, B.E.2547 (2004)
2. Noise	- Announcement of the National Environmental Board No.15 Re: Ambient noise level standards, B.E.2540 (1997) - Announcement of the National Environmental Board No.29 Re: Disturbance noise level, B.E.2550 (2007) - Announcement of Pollution Control Department Re: Sampling Procedure for Background noise level and Noise level without any interference, Sampling and Calculation Procedure for Noise level with interference, Calculation Procedure for Disturbance noise level, and Form of Disturbance noise level, B.E.2565 (2022)
3. Surface Water Quality	- Announcement of the National Environment Board No. 8 Re: Surface Water Quality Standards, B.E.2537 (1994)
4. Effluent Water Standard	- Announcement of the Ministry of Natural Resources and Environment Re: Standards for controlling wastewater drainage from power plants, B.E. 2565 (2022) - Announcement of the Ministry of Industry Re: Establishment of Factory Sewage Control Standards, B.E. 2560 (2017) - Ministerial regulations Re: Prescribing rules and forms of statistics and data collection Preparation of detailed records and a summary report of the performance of the wastewater treatment, B.E.2555 (2012) - Ministerial regulations No.63 (B.E.2551 (2008)) Re: based on the enactment of building control, B.E 2522 (1979)
5. Waste Management	- Regulations of the Energy Regulatory Commission Re: Standards for Safety, Environment and Sewage Management of Power Plants, B.E. 2564 (2021) - Notification of the Ministry of Industry Re: Management of Waste or Unusable Materials, B.E. 2566 (2023).
6. Soil Quality	- Announcement of National Environmental Board No.25 Re: Soil quality standards, B.E.2564 (2021)
7. Health and Safety	- National Health Act B.E.2550 (2007) - Occupational Health and Safety and Working Environment Act B.E.2554 (2011) - Hazardous Substances Act B.E 2535 (1992)
8. Labor Welfare	- Ministerial Regulation Re: Labour Welfare Provision in an Establishment B.E. 2548 (2005) - Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment Regarding Fire Prevention and Suppression B.E. 2555 (2012)

1.3.2 Project Developer Policy Statement on Environmental and Social Management, Biodiversity and Human Rights Aspects

As Gulf Energy Development PCL. (GED) environmental and social management (E&S) policy applies to all members of Gulf Group of Companies, Breeze and Shine Power Co., Ltd., a subsidiary of GED, is required to apply the E&S policy which have been posted on GED's website, details as following.

1.3.2.1 Environmental and Social Management

Gulf Energy Development Public Company Limited recognizes the importance of conducting business with environmental and social responsibility while working to reduce negative impacts along the value chain, from project planning and development to operations and maintenance to decommissioning, and including related business and support activities such as supplier selection and procurement, distribution and logistics, mergers and acquisitions, and managerial and administrative activities. The Company shall strive to do so with a focus on the following areas.

(1) General Provisions

1) The Company shall implement and maintain an environmental and social management system (ESMS) covering key issues as outlined in the Company's Sustainability Framework as well as context-specific issues where required, and will work to continuously improve its environmental and social management performance throughout the organization.

2) The ESMS shall cover all businesses under the Company, including any sites under the Company's management, and shall apply to all key business activities including: due diligence and feasibility studies, mergers and acquisitions, project implementation, operations, logistics and transmission/distribution, and decommissioning, as well as goods and services provided to the Company.

3) The Company shall comply with relevant national laws at a minimum, and shall strive to comply with other applicable national and international environmental and social safeguard requirements or other relevant regulations related to environmental and social management.

4) The Company shall collaborate with, and communicate its commitments and expectations to, key counterparties, including contractors, suppliers and business partners, as well as other stakeholders throughout the Company's value chain, to encourage increased awareness of environmental issues, develop greater understanding of the Company's environmental and social management policy, and improve environmental and social management performance within the Company and among its stakeholders.

5) The Company shall ensure appropriate and sufficient training related to environmental and social management for its employees on a regular basis, and collaborate with key counterparties and stakeholders to ensure contractors, suppliers or other individuals under the Company's responsibility receive appropriate and sufficient training on relevant issues.

6) The Company shall incorporate environmental and social issues, including occupational health and safety issues, into its risk management process, and shall strive to develop appropriate risk prevention and mitigation measures including establishing emergency and business continuity plans.

7) The Company shall establish a procedure to investigate any major incidents related to environmental, social or safety issues in order to determine the cause, identify impacts, develop remediation plans, develop prevention and mitigation plans, and communicate lessons learned throughout the organization for future improvement. The Company's Executive Committee shall have the authority to designate the investigation team, consider the findings of the investigation, and, in the event of wrongdoing, determine the appropriate punishment and/or remediation as required.

8) The Company shall monitor and review its environmental and social management performance on a regular basis, and report on the performance to the Company's management and Board of Directors at least quarterly, as well as disclose information about the Company's environmental and social management performance to key stakeholders and/or publicly, where appropriate.

(2) Environmental Management

1) The Company shall comply with applicable local, national and/or international environmental laws at a minimum, and shall strive to operate in accordance with internationally-accepted standards and regulations for environmental management.

2) The Company shall establish clear processes and procedures for environmental management to be implemented within the organization and within its projects, and shall regularly review and revise such processes and procedures at least annually and whenever a major change or event occurs.

3) The Company may set environmental performance targets for specific issues or areas of operation, such as waste and/or emissions reduction targets, and shall regularly monitor its environmental performance with the aim of continuous improvement in environmental management.

4) The Company shall consider key issues such as biodiversity, waste management, greenhouse gas emissions, air emissions, water management, resource

management, and impacts to local communities and/or ecosystems as part of its environmental management.

5) The Company shall establish an environmental monitoring committee or shall designate an environmental team to monitor environmental performance and identify any potential environmental issues for the Company or its projects that need to be managed.

6) The results of the environmental performance monitoring shall be reported to the Company's management and the Board of Directors on a regular basis, and reported to relevant management or Board committees and external entities as required. The Company's environmental performance may also be disclosed through public channels where appropriate.

(3) Social Management

1) The Company shall consider key issues such as human rights, diversity and non- discrimination, labor rights, occupational health and safety, and community relations as part of its social management.

2) The Company shall comply with applicable local, national and/or international laws related to occupational health and safety, labor rights, and other social issues at a minimum, and shall strive to operate in accordance with internationally-accepted standards and regulations for occupational health and safety management, human rights, and labor rights.

3) The Company shall establish clear processes and procedures for occupational health and safety management to be implemented within the organization and within its projects, and shall regularly review and revise such processes and procedures at least annually and whenever a major change or event occurs.

4) The Company may set social performance targets for specific issues or areas of operation, including a zero-accident target in relation to occupational health and safety, and shall regularly monitor its performance with the aim of continuous improvement in social and occupational health and safety management.

5) The Company shall establish an occupational health and safety committee or shall designate a safety team to monitor occupational health and safety performance and identify any potential safety issues that need to be managed for the Company, its projects, its employees, or other individuals under the Company's responsibility. Prioritization of issues, along with management and action plans, shall be developed in consultation with the Company's employees, contractors, workers, and/or their representatives to ensure key issues are addressed.

6) The Company shall provide appropriate and sufficient training and capacity-building related to social and occupational health and safety issues for its employees, contractors, and other individuals under the Company's responsibility.

7) The results of the social and occupational health and safety performance monitoring shall be reported to the Company's management and the Board of Directors on a regular basis, and reported to relevant management or Board committees and external entities as required. The Company's social performance may also be disclosed through public channels where appropriate.

1.3.2.2 Biodiversity

GED will:

(1) Ensure governance of biodiversity at the executive and Board levels.

(2) Provide a framework for the management of biodiversity based on the mitigation hierarchy (avoid, minimize, remediate, offset), taking into account both direct and indirect drivers that result in biodiversity or ecosystem change, covering: a. Objectives and strategy b. Study and research c. Risk assessment d. Action plans e. Monitoring and assessment.

(3) Comply with laws and regulations governing biodiversity conservation areas1, avoiding operational activities in areas with high biodiversity importance where possible and appropriate, and apply the precautionary principle in its decision-making process as appropriate.

(4) Integrate biodiversity management in the Company's environmental and social management system, including ensuring that issues related to biodiversity are monitored and managed throughout the lifespan of projects, from conception to retirement.

(5) Undertake and/or support actions, such as reforestation, to preserve biodiversity with no net loss and no net deforestation, where necessary, appropriate and feasible.

(6) Engage with external parties and relevant stakeholders, including the Ministry of Natural Resources and Environment, to develop appropriate biodiversity action plans for the Company's operations where required

(7) Support education and advocacy related to environmental responsibility:

1) Among all departments and at all levels within the Company.

2) Among external stakeholders including business partners, suppliers, contractors, and the communities in which the Company operates.

1.3.2.3 Human Rights

Gulf Energy Development Public Company Limited is aware of the importance of respecting and upholding the human rights of its stakeholders and the general society, and shall strive to do so with a focus on the following areas.

(1) General Provisions

1) The Company shall support a human rights due diligence process to engage with its stakeholders to identify, assess, manage, and, where applicable, prevent or mitigate human rights risks and related issues in key areas including within the Company, in its projects, and within the local communities where the Company operates.

2) The Company shall ensure fair and equal treatment of stakeholders, respecting the diverse nature of people, and placing emphasis on avoiding discrimination based on sex, gender, age, race, ethnicity, religion, nationality, and any other non-merit-based attributes.

3) The Company shall communicate its commitments and expectations regarding human rights to its stakeholders through the appropriate and relevant channels.

4) The Company shall provide appropriate reporting and whistleblowing channels as well as a clear grievance mechanism to manage any such reports, including managing fair and equitable remediation where necessary and appropriate.

(2) Within the Company and Its Projects

1) The Company respects labor rights and complies with labor laws, including complying with regulations regarding appropriate working hours and conditions, relevant freedoms and collective rights as appropriate, as well as supporting appropriate welfare benefits and compensation for employees beyond the legal minimum wage.

2) The Company shall support gender equality and women’s rights, including supporting equal pay for equal work based on a non-discriminatory, merit-based performance evaluation process.

3) The Company shall provide and maintain a safe and healthy workplace for employees with consideration for all aspects of employee well-being (including physical, mental, emotional, social well-being), and comply with applicable safety and health laws and regulations.

4) The Company shall maintain a ZERO TOLERANCE POLICY regarding child labor, slave labor, forced labor, or any form of human trafficking.

(3) Stakeholders and the General Society

1) The Company shall support human rights throughout its value chain through monitoring and advocacy, including educating and/or advocating for human rights both within the Company and among external stakeholders including business partners, suppliers, contractors, and the communities in which the Company operates.

2) The Company shall support corporate social responsibility programs and initiatives that promote human rights, with a focus on education, health, work and environmental protection, for children, local communities and the general society. These commitments shall be undertaken within the framework of sustainability and good corporate social responsibility to ensure that the Company continues to create a positive impact in all spheres where it operates.

3) These commitments shall be undertaken within the framework of sustainability and good corporate social responsibility to ensure that the Company continues to create a positive impact in all spheres where it operates.

1.4 SCREENING AND SCOPING OF ENVIRONMENTAL AND SOCIAL IMPACTS

(1) Study of Project Description

The study of project description includes examining the solar power plant characteristics and its components (workers' camp and transmission line), infrastructures, environmental management system, and project safety aspects. This information serves as a fundamental basis for assessing environmental impacts and determining environmental prevention and mitigation measures. The study in details shall cover Project location, project components, production process, utility systems (water and energy systems), pollutants and management systems (air pollutants, water pollutants, waste, and noise), as well as corporate social responsibility plan in addressing complaints and community relations.

(2) Study of Existing Environmental Conditions

The study of the existing environmental conditions within the Project area and its surrounding consists of four aspects: physical environmental resources, biological environmental resources, human use values, and quality of life values.

The study shall be conducted in the following steps;

1) Reviewing topographical information, which includes topographical maps, aerial photographs, satellite imagery, and relevant documents, as well as various study reports related to the Project area and its vicinity.

2) Conducting additional field surveys to collect environmental quality data, such as air quality, noise level, land use, terrestrial ecology, and transportation.

(3) Stakeholder Engagement

Stakeholder engagement to increase awareness and understanding within an area of the radius 3 kilometers from the Project boundary shall be conducted. This activity shall provide an opportunity for the public and stakeholders to participate and contribute their opinions or valuable information for the Project's implementation.

(4) Environmental and Social Impact Assessment

Environmental and social impact assessment shall consider Project proposal in construction, and operation phase. The assessment shall comprehensively undertake for all four aspects (physical environmental resources, biological environmental resources, human use values, and quality of life values) and both assess direct or indirect, short and long term positive and negative impacts.

(5) Provision of Environmental and Social Mitigation and Monitoring Measures

The following mitigation and monitoring measures shall be provided;

1) Environmental and Social prevention and mitigation measures for construction phase

2) Environmental and Social prevention and mitigation measures for operation phase

3) Environmental and Social monitoring measures for construction phase

4) Environmental and Social monitoring measures for operation phase

The Project life cycle can be divided into 2 main phases: construction phase and operation phase. During these phases there are main activities that may affect certain environmental and social components which can be scoped as shown in **Table 1.4-1**.

Table 1.4-1

Screening and Scoping of Environmental and Social Components

Phase	Result of Screening and Scoping
Construction phase - Land acquisition - Site preparation - Transport and stockpiling of construction materials and equipment - Construction of building - Installation of supporting structures, invertors, solar modules, substation, and transformer	- Soil - Climate change risk - Air quality - Noise - Surface water quality - Terrestrial ecology - Aquatic biological resources - Socio-economic - Public health - Human rights risk - Occupational health and safety - Land use - Land transportation - Solid waste management - Wastewater management
Operation Phase - Electricity production - Transmission line	- Climate change risk - Surface water quality - Flood risk - Electromagnetic field - Terrestrial ecology (Wildlife) - Aquatic biological resources - Socio-economic - Public health - Human rights risk - Occupational health and safety - Land transportation - Solid waste management - Wastewater management - Water drainage - Major hazard

1.5 PROJECT CATEGORIZATION

According to the ADB's SPS, Equator Principle 4 and IFC, the definition for project categories is defined as following.

Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required;

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures. An initial environmental examination is required; and

Category C – Projects with minimal or no adverse environmental and social risks and/or impacts. No environmental assessment is required although environmental implications need to be reviewed.

Based on the preliminary assessment of impact significance of each environmental aspects, the determination of the Project category is as follows:

Environment: After screening and scoping the initial Project activities and impacts, it can be concluded that construction activities, primarily related to site preparation and workforce presence, may lead to minor environmental and social impacts. For operation activities, relying on solar radiation for electricity production, shall not significantly contribute to environmental concerns. The primary source of pollution during the operation phase is attributed to workforce consumption (such as wastewater and general waste) and hazardous waste (from damaged solar panel). Moreover, the Project is not located within or near the protected environmental or wildlife areas, in compliance with both national and international standards, nor within the potentially valuable resource areas. In summary, it has been observed that the project's activities will result in limited impacts that are site specific and can be managed through project environmental and social management plan, both during the construction phase and operation phase. As such, the Project, is categorized as "**Category B**" under ADB's Safeguard Requirement 1: Environment.

Involuntary Resettlement: Regarding involuntary resettlement, the Project secured land tenure through agreements and land purchases from private landowners. Based on SCA report, it can be concluded that landowners were involved in the land acquisition process from the start since they were informed of the objective of the acquisition. They also have the option of accept or reject the offer. Previous land use was agriculture area and in the land sale agreement specified that the lands were sold without any buildings; therefore, there was no physical replacement.

The fair price was established during the price negotiation process during land purchase. Furthermore, a land sale agreement signed in the presence of Suphanburi Provincial Land Office officials stated that the seller agreed to sell the land at the purchase price. There are no grievances regarding the payment made to the landowners. Even though there were land users after the lands were acquired, they were notified of the Project's construction schedule so that he could harvest his crop before the Project begin construction. As of December, B.E. 2566 (2023), all users have vacated the area.

According to the SCA, the land acquisition had no impact on the landowners' well-being and even improved their livelihood. All landowners indicated that since selling their land, they have a better living so, land purchase did not lead to physical and economic displacement.

As for the Project's transmission line with a total length of 4.5 kilometers, it is under responsibility of the Provincial Electricity Authority (PEA) to construct, operate and maintenance. In order to minimize the impact of the electrical transmission line installation activity on the community, the transmission lines will be placing within the Right of Way (RoW). However, if the construction method for the transmission line requires clearing encroachments within the right-of-way or could lead to disputes with neighboring residents, PEA will modify the construction approach to avoid impacts. Thereby no physical displacement or involuntary resettlement occurs from the Project.

Consequently, it can be concluded that the Project is classified as "**Category C**"[1] for involuntary resettlement, under ADB's Safeguard Requirement 2: Involuntary Resettlement.

[1] Category C. A proposed project is classified as category C if it has no involuntary resettlement impacts. No further action is required.

Indigenous Peoples: The Project's location and surrounding area have no history of settlements by ethnic groups or indigenous peoples (IPs). From the ethnic group database of the Princess Maha Chakri Sirindhorn Anthropology Centre (Public Organization), there was no reported that any indigenous ethnic group communities were established in the area of Doem Bang Nang Buat District. COT also asked the village headman in the Project area, all of them explained that there are no indigenous peoples or other ethnic minority in the area, thus confirming the desk review information attained from the Princess Maha Chakri Sirindhorn Anthropology Centre. It can be concluded that the Project is classified as “Category C” for indigenous Peoples, under ADB’s Safeguard Requirement 3: Indigenous Peoples.

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CHAPTER 2

PROJECT DESCRIPTION

CHAPTER 2
PROJECT DESCRIPTION

The Project has planned installed capacity of 144.000 MW_{AC} (199.456 MW_P) within the area of 1,683,133.60 square meters (1,051.96 rais). Project location is in Moo 8, Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province (Geographic coordinates 47P 588287 E, 1647006 N). The Project is a solar power generation using photovoltaic (PV) solar panel technology with battery energy storage systems. The electricity will be transferred via a 115 kV high-voltage transmission line from the Project to Doem Bang Nang Buat Provincial Electricity Authority Station at about 42 kilometers from the Project site.

2.1 PROJECT LAYOUT AND UTILIZATION

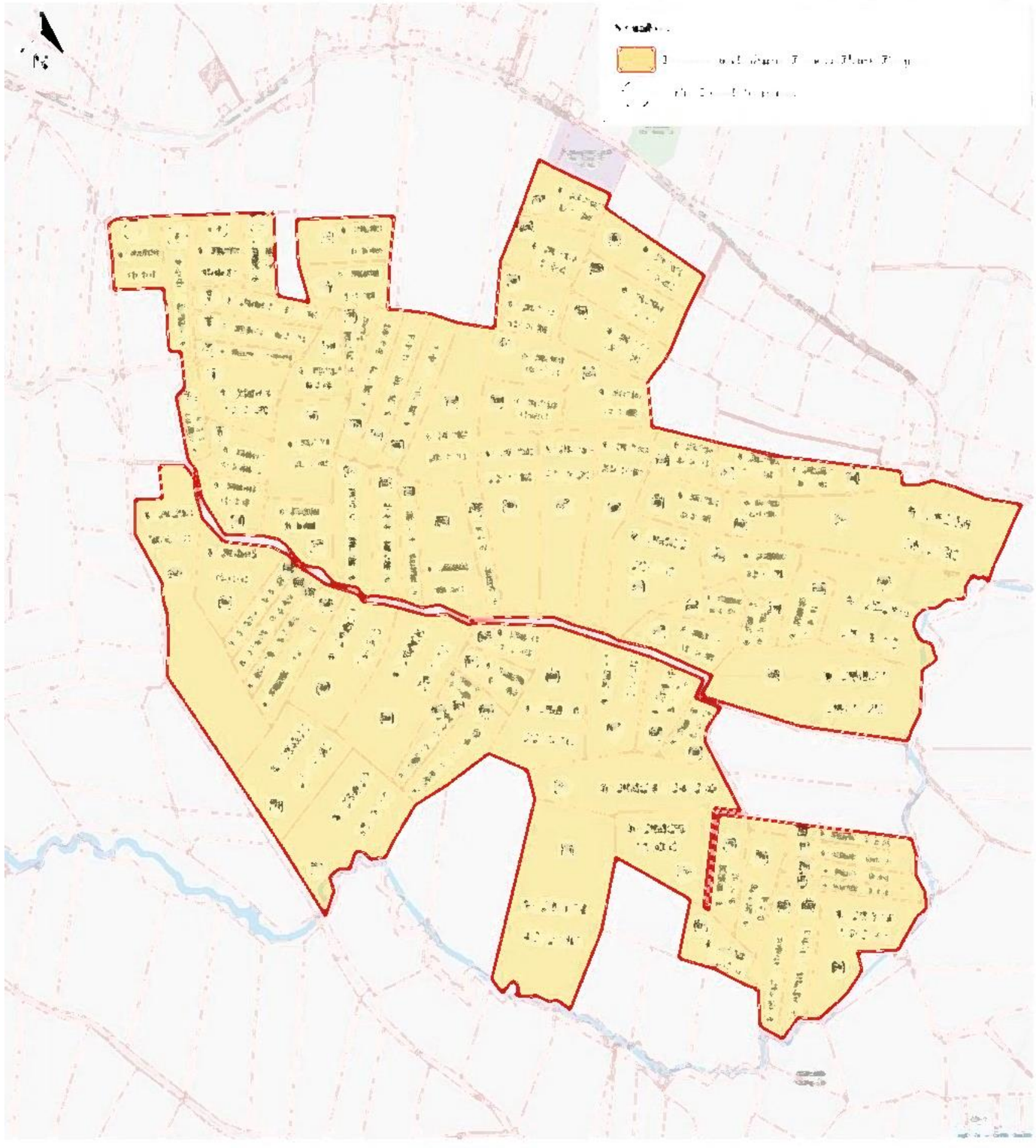
The Project covers an area of 1,683,133.60 square meters, equivalent to approximately 1,051.96 rais. Detail of the land title deeds are shown in **Figure 2.1-1**. For the proportions of land use within the Project area are detailed in **Table 2.1-1**. The Project layout and schematic design have been developed in compilation with the engineering and safety standards. Project layout is shown in **Figure 2.1-2** (**Appendix 2-1**).

Table 2.1-1

Land Use Proportions within the Project Area

Area	Size		
	Sq.m.	**Rai**	**Percentage**
1. Power Generation Area (area for solar panels, inverters, BESS, and substations)	1,113,605.60	696.00	66.16
2. Control Building Area	288.00	0.18	0.02
3. Spare Parts, Equipment, Waste and Material Storage, and Maintenance Area			
3.1 Spare Parts and Equipment, Maintenance Area	20.0	0.013	0.001
3.2 Waste and Material Storage Area	20.0	0.013	0.001
3.3 Service Office Area	80.0	0.05	0.005
4. Green Area	1,544.00	0.97	0.09
5. Buffer Zone Area *	61,961.00	38.73	3.68
6. Switchyard or Substation Area	1,815.00	1.13	0.11
7. Open Space, Roads, Walkways, and Parking	496,989.20	310.62	29.53
8. Support and Production-Related Area	4,800.00	3.00	0.29
9. Other Areas (Pond, Existing Drain)	2,010.80	1.26	0.12
Total	**1,683,133.60**	**1,051.96**	**100.00**

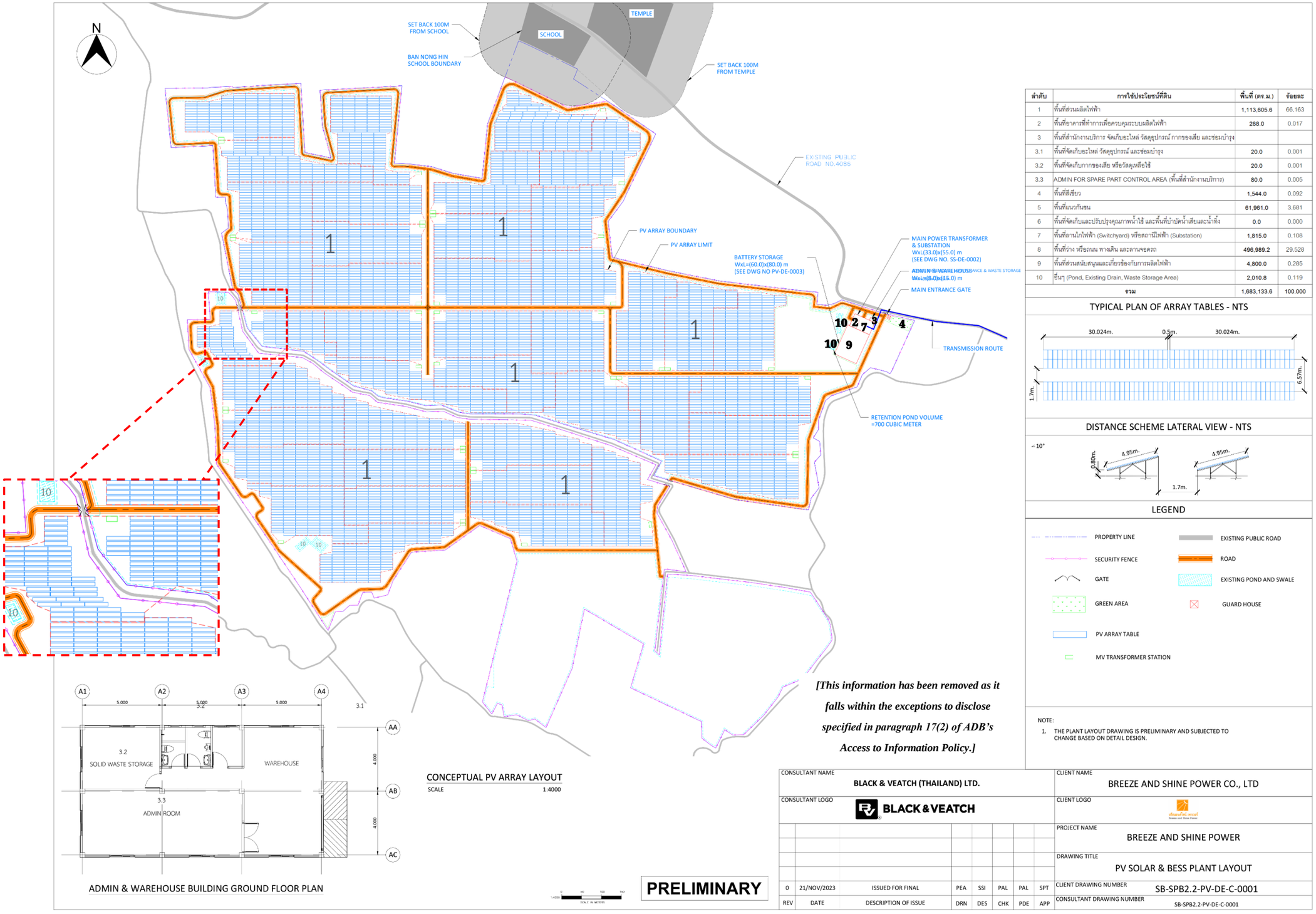
Remark: Buffer zone refers to green area that will be located in between fence and road in whole Project area.



[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Figure 2.1-1 Project's Land Title Deeds



ลำดับ	การใช้ประโยชน์ที่ดิน	พื้นที่ (ตร.ม.)	ร้อยละ
1	พื้นที่ส่วนผลิตไฟฟ้า	1,113,605.6	66.163
2	พื้นที่อาคารที่ทำการเพื่อควบคุมระบบผลิตไฟฟ้า	288.0	0.017
3	พื้นที่สำนักงานบริการ จัดเก็บอะไหล่ วัสดุอุปกรณ์ ภากของเสีย และซ่อมบำรุง		
3.1	พื้นที่จัดเก็บอะไหล่ วัสดุอุปกรณ์ และซ่อมบำรุง	20.0	0.001
3.2	พื้นที่จัดเก็บภากของเสีย หรือวัสดุเหลือใช้	20.0	0.001
3.3	ADMIN FOR SPARE PART CONTROL AREA (พื้นที่สำนักงานบริการ)	80.0	0.005
4	พื้นที่สีเขียว	1,544.0	0.092
5	พื้นที่แนวกันชน	61,961.0	3.681
6	พื้นที่จัดเก็บและปรับปรุงคุณภาพน้ำใช้ และพื้นที่บำบัดน้ำเสียและน้ำทิ้ง	0.0	0.000
7	พื้นที่ลานไกไฟฟ้า (Switchyard) หรือสถานีไฟฟ้า (Substation)	1,815.0	0.108
8	พื้นที่ว่าง หรือถนน ทางเดิน และลานจอดรถ	496,989.2	29.528
9	พื้นที่ส่วนสนับสนุนและเกี่ยวข้องกับการผลิตไฟฟ้า	4,800.0	0.285
10	อื่นๆ (Pond, Existing Drain, Waste Storage Area)	2,010.8	0.119
รวม		1,683,133.6	100.000

TYPICAL PLAN OF ARRAY TABLES - NTS

DISTANCE SCHEME LATERAL VIEW - NTS

LEGEND

PROPERTY LINE
SECURITY FENCE
GATE
GREEN AREA
PV ARRAY TABLE
MV TRANSFORMER STATION
EXISTING PUBLIC ROAD
ROAD
EXISTING POND AND SWALE
GUARD HOUSE

NOTE:
1. THE PLANT LAYOUT DRAWING IS PRELIMINARY AND SUBJECTED TO CHANGE BASED ON DETAIL DESIGN.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

CONSULTANT NAME	BLACK & VEATCH (THAILAND) LTD.						CLIENT NAME	BREEZE AND SHINE POWER CO., LTD
CONSULTANT LOGO	BLACK & VEATCH						CLIENT LOGO	
							PROJECT NAME	BREEZE AND SHINE POWER
							DRAWING TITLE	PV SOLAR & BESS PLANT LAYOUT
0	21/NOV/2023	ISSUED FOR FINAL	PEA	SSI	PAL	PAL	SPT	CLIENT DRAWING NUMBER SB-SPB2.2-PV-DE-C-0001
REV	DATE	DESCRIPTION OF ISSUE	DRN	DES	CHK	PDE	APP	CONSULTANT DRAWING NUMBER SB-SPB2.2-PV-DE-C-0001

Figure 2.1-2 Project Layout and Land Utilization

2.2 PROJECT COMPONENTS

2.2.1 Power Generation Area

The Project, a ground mounting solar farm, generates electricity from solar power using photovoltaic modules and battery energy storage system (BESS) with capacity of 144.000 MW_{AC} (199.456 MW_P) covering the area of 1,683,133.60 square meters (1,051.96 rais) in Nong Krathum Sub-district, Doem Bang Nang Buat District, Supanburi Province. Main components of the Project consist of photovoltaic (PV) modules, inverter, transformer, 22 kV switchgear, battery energy storage system (BESS), substation, and cables.

Electricity production from solar energy involves the use of equipment to convert solar energy into usable electrical power. The Project utilizes photovoltaic (PV) technology, specifically Monocrystalline Silicon solar cells. The Project has approximately 329,680 PV modules, resulting in an annual electricity production capacity of approximately 334.904 billion units. These PV modules consist of solar cells made of semiconducting material capable of directly converting solar energy into electricity. The electrical current output depends on the efficiency, surface area, and intensity of solar radiation incident on the solar cell surface. The electricity generated by the PV modules is then directed to a combiner box and converted from direct current to alternating current using inverters. Afterward, the electrical energy is transformed from 800 V to 22 kV using main transformers before being transmitted through 115 kV transmission lines to the Provincial Electricity Authority (PEA) grid. The total length of the transmission line is 4.5 kilometers, from a substation in the Project area connecting to the existing 115 kV transmission system at the intersection of Highway 3350. The Project features a real-time electricity production data display system accessible via the Project's intranet. The Project plans to commence commercial electricity supply to the Provincial Electricity Authority (PEA) in December B.E. 2567 (2024). However, transmission line is considered as associated facility.

Additionally, the Project includes a Battery Energy Storage System (BESS) with a capacity of 2.752 MWh, consisting of 42 sets of batteries. The BESS is responsible for storing excess electricity generated. Excess electricity produced is sent to a 22 kV switchgear, where it undergoes voltage conversion to 900 V. The electricity flow is controlled by Power Conversion Systems (PCS) within the BESS. During periods of low electricity production, electricity stored in the batteries is sent back to the 22 kV switchgear. Subsequently, the electricity is transmitted via 22 kV transmission lines to the

main transformers and then through 115 kV transmission lines to the Provincial Electricity Authority (PEA) for distribution. Details of the Project's electricity production system is provided in **Figure 2.2.1-1** (**Appendix 2-2**).

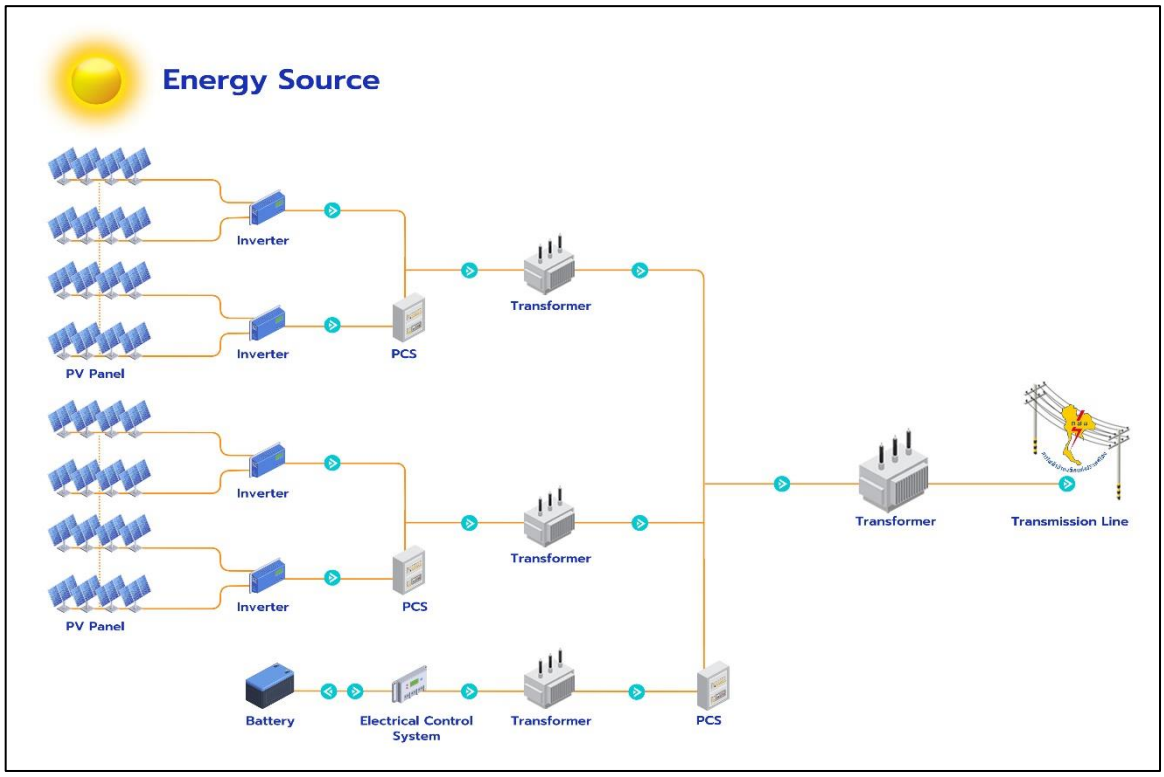


Figure 2.2.1-1 Electricity Production Process

The Project has chosen solar panels that adhere to the International Electrotechnical Commission (IEC) international standards for electrical, electronic, and related technologies. IEC standards are internationally recognized in the field of electricity. For other production equipment, the Project has selected devices that meet IEC standards or equivalent standards. Details are provided in **Table 2.2.1-1**.

Table 2.2.1-1

Electricity Production Equipment, Installed Capacity, and Design Standards

Detail	Amount	Unit	Standard
1. Capacity - PV Module - Inverter	 199.456 MW_P 199,456.000 144.000 MW_{AC} 144,000.000	 MW kVA MW kVA	
2. Electricity generation per year	334.904	GWh/year	
3. Solar Module, 605-Watt Monocrystalline Silicon	329,680	Module	- IEC61215 - IEC61730 - ISO9001:2015 - ISO14001:2015
4. Inverter - 300 kVA	 480	 Unit	 - IEC 62109 - IEC 61727 - IEC 62116
5. 3.437 MVA Transformer	48	Unit	- IEC 60076
6. 90 MVA Transformer	1	Unit	- IEC 60076
7. 22 kV Indoor Switchgear	18	Cabin	- IEC 62271-200 - Regulation on Regional Electricity, which deals with the requirements for connecting to the power grid, B.E. 2559 (2016).
8. 2.752 MWh BESS	42	Unit	- IEC 61000 - IEC 62619 - IEC 62271-200
9. Power Conversion System (PCS)	21	Unit	- SC2500UD
10. Cable - AC cable - DC cable - PV cable	 1 1 1	 Unit Unit Unit	 - IEC 60228 - IEC 60502 - TIS 2341-2555

2.2.1.1 Photovoltaic (PV) Modules

The Project will use 329,680 605-Watt monocrystalline silicon photovoltaic (PV) modules will be installed. The modules used are compliant with IEC 61215 and IEC 61730. The estimated annual output is 334.904 GWh (**Appendix 2-3**). Each solar panel has dimensions of 1.134 meters in width, 2.465 meters in length, and a thickness of 30 millimeters, weighing 34.6 kilograms. These panels can operate in temperatures ranging from -40 to 85 degrees Celsius.

2.2.1.2 Mounting Structures

The PV will be installed on ground mounting structures and will face South with a 10-degree tilt from the horizontal solar panel. The mounting structure is built to withstand wind shear and other outside forces. **Figure 2.2.1.2-1** depicts a typical mounting structure.

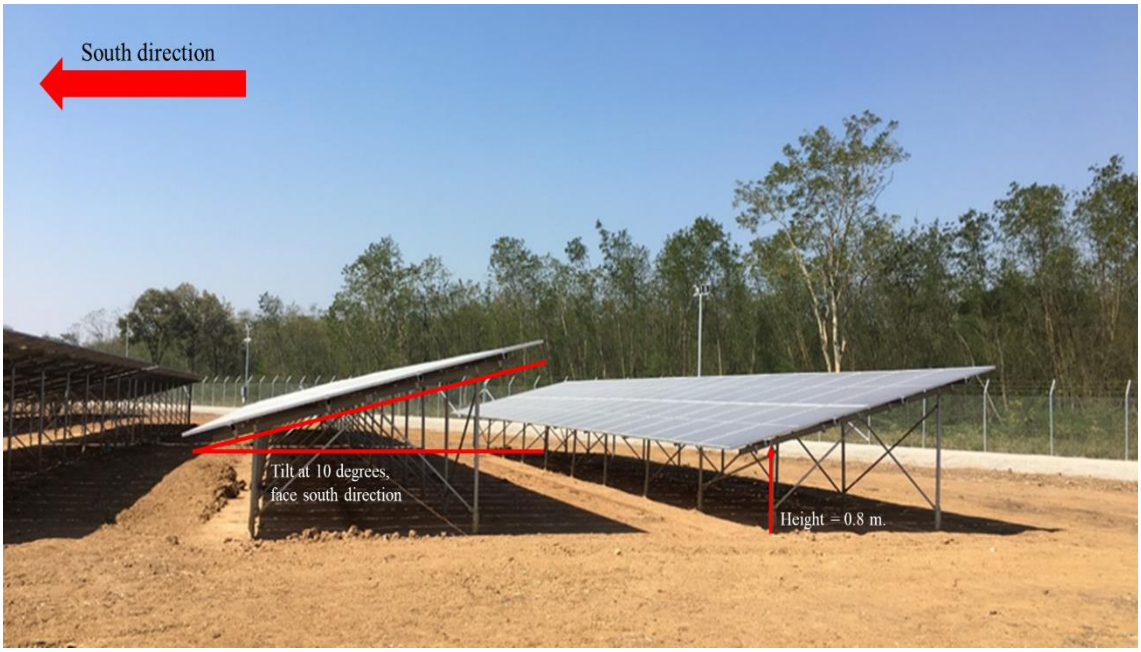


Figure 2.2.1.2-1 Ground Mounting Structure Facing South Direction

2.2.1.3 Inverters

An inverter is the device which converts direct current (DC) to alternate current (AC). The Project uses 480 units of outdoor type 300 kVA string inverter, with maximum output current capacity 238 Ampere. Inverters will be installed near the solar panel mounting structures according to IEC 62109, IEC 61727, and IEC 62116 standards (**Appendix 2-4**).

2.2.1.4 Transformers

The Project has 48 units of 3.437 MVA transformer are installed to transform voltage to 22 kV and further reduced to 115 kV by a 90 MVA transformer at the substation for grid feeding. All transformers comply with IEC 60076 standard with above 99% efficiency (**Appendix 2-5** Transformer specification).

2.2.1.5 Switch Gears

The Project has 18 units of indoor 22 kV switch gear consisting of disconnecting switches, fuse, or circuit breakers are employed. Switch gear controls and protect equipment in case of abnormality or equipment malfunction occurs in the electricity generation process. They are designed to meet IEC 62271-200 and Provincial Electricity Authority Regulations on Power Network System Interconnection Code B.E. 2559 (2016).

2.2.1.6 Battery Energy Storage System (BESS)

The Project has 42 units of 2.751 MWh Lithium-Ion battery with a lifetime of 15 years. BESS is served as an energy storage buffer to reduce inconsistency in power generation of the power plant so that the plant can feed the electricity into the grid steadier, reducing power generation variation between daytime and nighttime. BESS is designed to meet IEC 61000, IEC 62619, and IEC 62271-200 standards (**Appendix 2-6** BESS specification).

2.2.1.7 Power Conversion System (PCS)

Power Conversion System (PCS) is the system to control and regulate energy storage system is designated to comply with SC2500UD standards.

2.2.1.8 Electrical Substation

The electricity generation process starts when sunlight, which is an electromagnetic wave, comes in contact with PV modules, which are semiconductor. The contact will cause positive and negative charged particles to move in opposite directions. The movement of such positive and negative charged particles generates direct current power. Such DC power will be supplied to a device called "inverter" to convert direct current into alternating current, then sent to the transformer to convert to high voltage. Some portion of the electric power will be supplied to the supply system to distribute electric power to the Electricity Generating Authority of Thailand (EGAT). The excess electricity generated will be supplied to the 22 kV Switchgear, then adjust the voltage with a transformer from 22 kV to 900 V, control the supply of electrical energy with the Power Conditioning System (PCS) to store the power in the battery energy storage system (BESS).

During periods when electricity generation is low, or electricity generation from solar energy is not possible, such as at nighttime, the electric energy stored in the BESS is returned to the 22 kV switchgear. After that, the power from the 22 kV switchgear will be supplied through the 22 kV transmission line to the main transformer and to the 115 kV transmission line in order to supply power to EGAT (**Appendix 2-2**).

2.2.1.9 Cabling

The connection of the solar energy production system with the power distribution system of the Provincial Electricity Authority (PEA) is designed with inverters, which are devices used to convert direct current electricity from the production system into alternating current electricity for supply to the distribution network. In this regard, the connection with the PEA distribution network will adhere to the electrical installation standards for Thailand, established by the Engineering Institute of Thailand under the Royal Patronage (Standard TIS 022001-22). The installation will be supervised by licensed Control System Engineers specializing in electrical power, as stipulated by the Professional Engineers Act of 2542 B.E. The following are necessary descriptions of cabling of the Project (**Appendix 2-7**):

- DC low voltage PV cable complies with EN 50618 standard.
- SAC power cable for transmission line 22 kV complies with TIS 2341-2555.
- AC medium voltage power cable, AC low voltage power cable, and control cable comply with IEC 60502.

2.2.1.10 Communication

The Project shall establish communication channels during construction phase through telephone, postal mail, email, or community relations officers. Additionally, the Project shall communicate through the available communication channels to the local residents. In the Project area, an on-site local radio communication system will be prepared.

During operation phase, The Project shall provide basic telephone and mobile phone communication channels. Additionally, for on-site communication, a local radio communication system will be established. Furthermore, to facilitate data communication, the Project shall prepare an internet connection system to send and receive information and access relevant agencies.

2.2.1.11 Site Security and Fencing

The Project site will be surrounded by a barb wire fence and has an installed CCTV and a security guard on duty.

2.2.1.12 Access Road

The Project site location can be accessed via National Highway 3350 and Rural Highway 4086. Both are paved with asphalt concrete, 6 meters wide, 2 lanes, with 1.5 meters shoulder on each side. Internal roads and parking areas take up 29.54% of the entire Project area.

2.2.2 Transmission Line

The Project involves the construction of a 115 kV transmission line (TL). The total length of the transmission line is 4.5 kilometers, starting from a substation from the Project area connecting to the existing 115 kV transmission system of the Provincial Electricity Authority (PEA) at the intersection of Highway 3350. The TL will be constructed, owned and operated by PEA. It is noted that the TL will not be financed under the financing arrangements with the Lenders and will therefore be considered as Associated Facility.

In order to minimize the impact of the electrical transmission line installation activity on the community, the transmission lines will be placing within the Right of Way (RoW) (**Figure 2.2.2-1**). The **Table 2.2.2-1** presents a comprehensive summary of transmission line features.

Table 2.2.2-1
Description of Transmission Line

Detail	Transmission Line
Owner	Provincial Electricity Authority (PEA)
Location	Right of Way (RoW) along the public roads is required for the construction of a 115-kV transmission line. The transmission line spans a total length of 4.5 kilometers, starting from the project's substation and connecting with the existing 115-kV transmission line of PEA.
Components	1. Transmission Line: 400 square millimeters All Aluminum Conductor (AAC). 2. Transmission Circuit: Single circuit, Double conductor. 3. Electricity Poles: Reinforced concrete poles with a height of 22 meters, and about 0.9 x 2.2 x 3.0 meters (width x length x depth) of foundation dimensions. Distance between the pole is approximately 80 meters.
Study area and affected villages	100-m. from the transmission line route, covering 4 villages in Nongkrathum Sub-district, Doem Bang Nang Buat District, Suphanburi. **Nong Krathum Sub-district Municipality** - Moo 1 Ban Non Krathum - Moo 2 Ban Non Krathum - Moo 3 Ban Nong Po - Moo 8 Ban Nong Hin

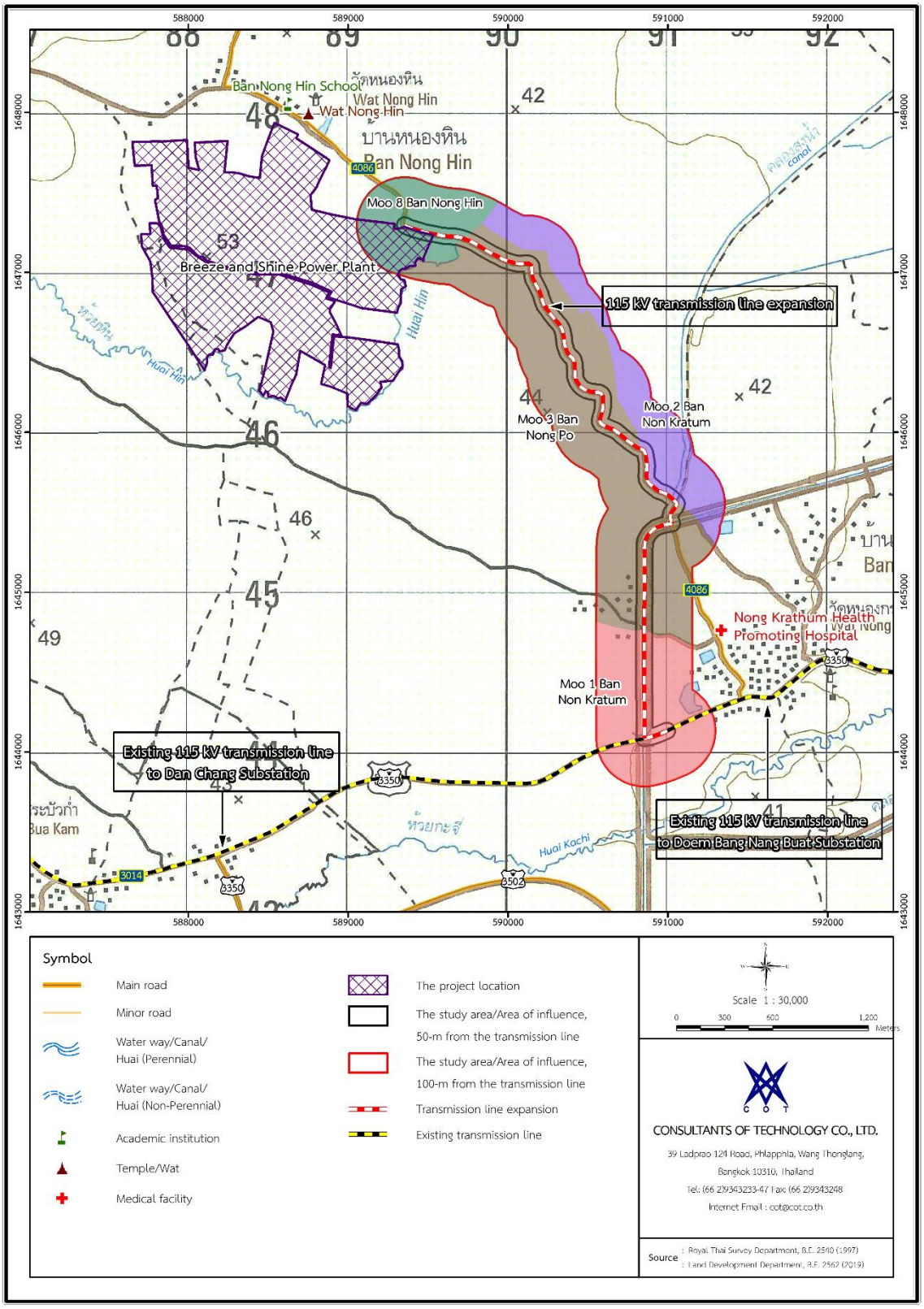


Figure 2.2.2-1 Project's Transmission Line Route

2.2.2.1 Approach of Transmission Line Construction

The power transmission lines will be constructed within the right-of-way of the public roads with 2 following approaches:

1) Construction within the area where PEA's power lines exist will be done using two approaches:

- Construction of new utility poles for the 115 kV power transmission lines, which will replace the existing utility poles for the PEA's 22 kV power transmission lines. The original 22 kV electricity transmission lines will be relocated to the new utility poles (as shown in **Figure 2.2.2.1-1**).



Figure 2.2.2.1-1 Example of the Construction of utility poles for 115 kV transmission line to replace the existing PEA utility poles

- Construction of new utility poles for the 115 kV power transmission lines along the same alignment as the existing utility poles for the PEA's 22 kV power transmission lines, without displacing the old PEA power transmission lines (as indicated in **Figure 2.2.2.1-2**).

2) In areas where there are no existing power transmission lines within the right-of-way, new utility poles and power transmission lines will be constructed along the right-of-way, as shown in the example of the utility pole alignment in **Figure 2.2.2.1-3**.

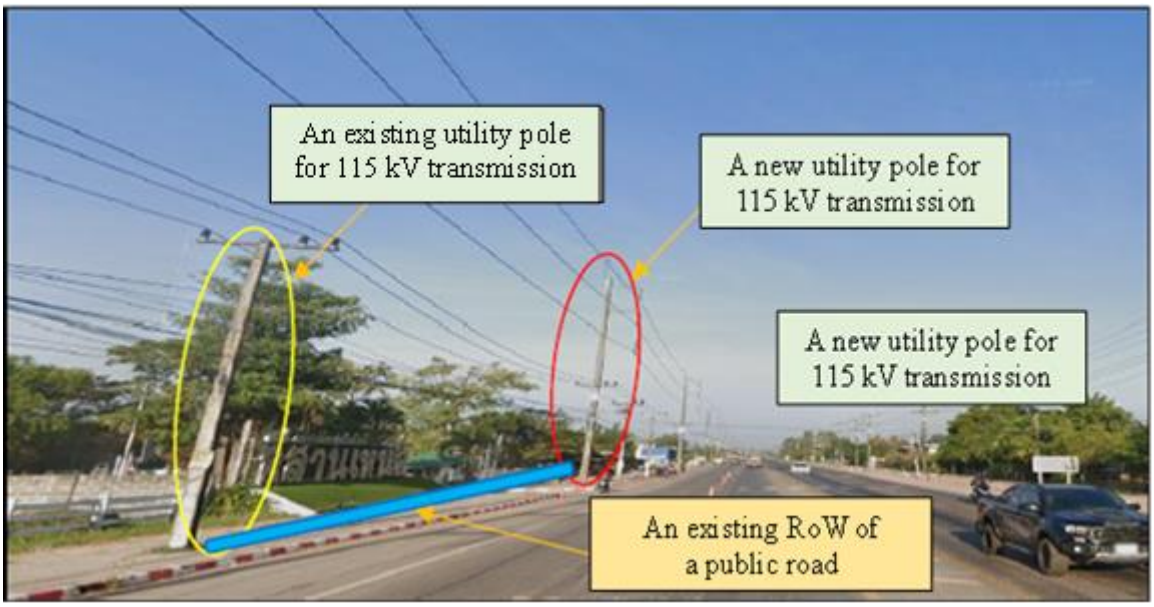


Figure 2.2.2.1-2 Example of the construction of utility poles for 115 kV transmission line in the same alignment as the existing PEA utility poles

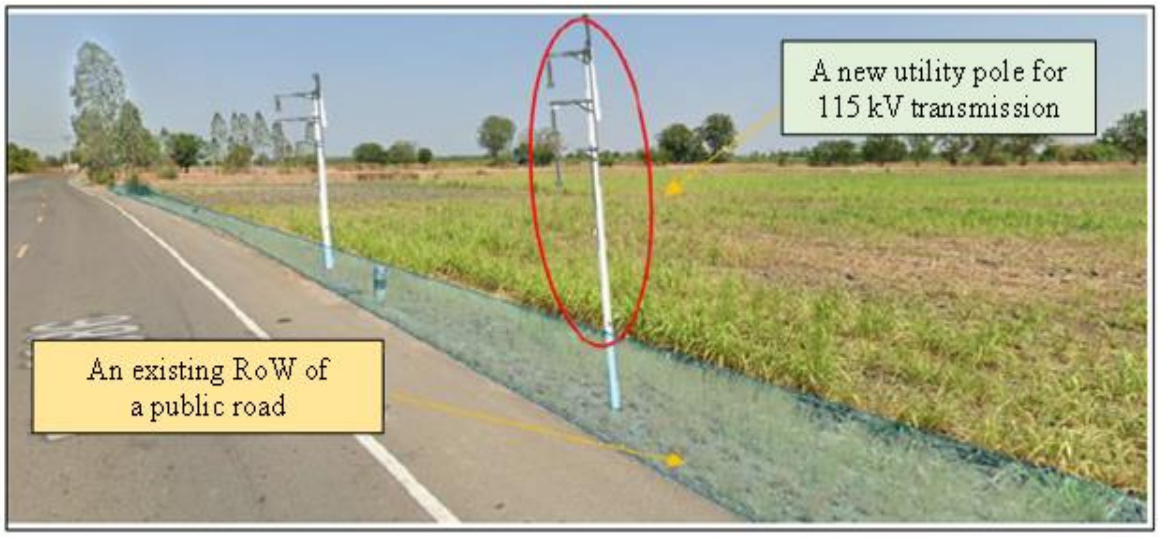


Figure 2.2.2.1-3 Example of the construction of utility poles for 115 kV transmission line in areas where there are no existing utility poles

2.2.2.2 Procedure of Transmission Line Construction

The construction of the Project's transmission line falls under the purview of the PEA and will occur within the restricted right-of-way of public roads, which is under the jurisdiction of the Department of Highways or the Department of Rural Roads or local administrative organizations. The PEA is responsible for obtaining the appropriate permissions from those agencies. The following are the procedures to be followed when designing and constructing power transmission lines in accordance with regulations of the Provincial Electricity Authority for the Establishment of Electrical Systems in B.E. 2559 (2016):

1) Supplement the physical site survey with data and maps obtained from the Geographic Information System (GIS) of the electrical system.

2) Conduct an examination and assessment of the tangible site conditions in order to utilize the information in the design and creation of plans. The plans ought to align with the existing conditions of the site.

3) For design purposes, coordinate with pertinent government and private sector agencies to obtain information regarding right-of-way areas.

4) Assess site conditions with respect to diverse impediments, including communication lines, fiber optic cables, and water drainage pipelines, in order to precisely delineate the electrical system configuration.

5) Obtain permission or consent from the respective landowners or agencies prior to constructing the electrical system or cutting down trees, branches, or roots in government agency areas traversed by construction projects. Such restricted areas consist of national highways, railway tracks, irrigation zones, forest preserves and more.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

During construction, issues arising will be monitored, the Project will coordinate with PEA to ensure resolution.

2.2.2.3 Stakeholder Engagement for Transmission Line

Engagement regards to the transmission line will be conducted by PEA as developer and owner of the TL. Hence, the engagement will be conducted by PEA as follow.

1) Typically, PEA notifies those living along the planned transmission line route in proper time before construction begins.

2) PEA will seek permission from authorities responsible for managing Right-of-Way (RoW) areas for use of land for construction and for cutting trees or roots within the RoW.

2.2.2.4 Compensation for Damages Caused by PEA's Operations

PEA indicated that in the event that the construction of the TL requires clearance or removal of encroaching structures, plants, trees within the Right-of-Way (RoW) or generates

disputes with neighboring residents, PEA will try to alter the design to avoid such clearance. In the event that the removal of encroachment is unavoidable, PEA will request that the RoW agencies, such as the Department of Highways to negotiate with the land user to remove their structures. ***[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]***

For damages caused to properties and assets within local ownership (outside of RoW), compensations can be claimed from PEA in accordance with the Provincial Electricity Authority Act (Version 4) B.E. 2542 (1999), stating: if there is any damage to the owner or possessor of an immovable property or a holder of other right as a result of the act officials from construction and maintenance of the electric energy transmission system, such person may claim compensation from PEA.

The compensation will be paid in accordance with the Provincial Electricity Authority's Regulations Concerning the Practice of Compensating for Damages or Providing Humanitarian Assistance to External Parties, B.E. 2564 (2021), state that in cases where damage is caused by a tortious act of PEA or arises from the performance of duties by its employees or workers, the following procedures should be undertaken:

1) In the event that an external party's property is damaged, consideration should be given to deducting depreciation according to the condition of the property or using the market price at the time of the incident as part of the assessment before proposing to the authorized person to approve the payment of damages.

2) In cases where an external party is deceased and the heirs make a claim for damages from PEA, the authorized person should provisionally approve an initial payment of damages to the heirs of the deceased not exceeding 50,000 baht. Subsequently, a fact-finding committee shall consider determining the damages, taking into account the status and actual damages incurred by the individual concerned.

3) In cases where an external party sustains injuries or disabilities, or loses their capacity, a fact-finding committee shall consider determining the damages by comparing guidelines for considering compensation payments as specified in the annex of these regulations. However, this does not include medical expenses and other damages such as loss of earnings or loss of support.

2.2.2.5 PEA's Complaint Receiving Channel

Complaints about impacts from PEA's operations can be made through the following channels:

1) Hotline 1129
2) Complaints via electricity billing officers or local electricity offices
3) The website of the Provincial Electricity Authority

When the PEA receives a complaint, they will respond within 30 days, and the complainant can track the progress of the complaint resolution on the PEA's website.

2.3 PROJECT ALTERNATIVES

2.3.1 Site Selection

The criteria for site selection was in compliance to the Regulations of the Energy Regulatory Commission Regarding the supply of electricity from renewable energy in the form of Feed-in Tarff (FiT) for the year 2022-2030 for the group without fuel costs, B.E. 2565 (2022) and the Regulations of the Energy Regulatory Commission Regarding the criteria for the preparation of the Code of Practice Report and the Compliance Repot with the Code of Practice for the Operation of Electricity Generation, B.E. 2565 (2022), which stipulates that the project area must not violate any laws about the location that is currently in effect, such as:

(1) Provincial City Planning
(2) National Environmental Promotion and Conservation Laws
(3) Laws related to Archaeological Sites and Artefacts
(4) Relevant Cabinet Resolutions
(5) In case the project is located in an industrial estate or other areas that look like industrial estates must not contradict the law on the Industrial Estate Authority of Thailand

Furthermore, the project location must not cause any impact on the reflection of light in the vicinity of the airport or be in a vulnerable area or have safety standard requirements. Before purchasing the land, the project owner ensured that it met the aforementioned standards.

Overall, there are other three criteria that will be considered in selection of the solar power plant location; sufficient solar energy, sufficient area, and legal status of land.

(1) The area experiences consistently high solar radiation throughout the year, providing sufficient solar energy for electricity production. The average annual solar radiation intensity in the province of Suphanburi is 18.6 MJ/m^2/Day, which is relatively high and offers ample potential for electricity production from solar energy.

(2) The selected land plot is appropriate having sufficient area for the Project's needs, detailed as refer to **Subject: Project Layout and Utilization**.

(3) The selected area is not subject to legal restrictions or prohibitions as per current applicable laws and regulations.

Upon conducting assessment of the Project's suitability, it was determined that the Project's location, Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province, has the adequate solar radiation intensity, appropriate land size, and has no legal restrictions or prohibitions as specified by laws and regulations, including Urban Planning Laws, National Environmental Promotion and Conservation Laws, Laws related to Archaeological Sites and Artefacts, and relevant Ministerial Resolutions, as detailed in **Table 2.3.1-1**. Therefore, the Project can proceed in accordance with relevant laws and regulations.

Table 2.3.1-1

The Evaluation of Project Suitability in accordance with Legal Requirements, Policies, and Relevant Regulations

Relevant Laws and Regulations	Project Implementation
1. Provincial city planning regulations for Suphanburi Province, Department of Land and City Planning, B.E. 2560 (2017)	
From provincial city planning regulations for Suphanburi Province, Department of Land and City Planning, B.E. 2560 (2017), land use has been designated into 7 categories, including: 1) Pink: Community land 2) Purple: Industrial and warehouse land 3) Green: Rural and agricultural land 4) Green with brown border and diagonal brown line: Land for land reform purposes for agriculture 5) Light green: Open land for recreational and environmental conservation purposes 6) Light green with white diagonal line: Forest conservation land 7) Blue: Open land for environmental conservation purposes	Referring to the land use of Suphanburi Province from provincial city planning regulations for Suphanburi Province, Department of Land and City Planning, B.E. 2560 (2017), it was determined that the Project is categorized as Type 3.1 which is the land use for agriculture or related agricultural purposes (in green). This Type of land use allows for agriculture, residential purposes, educational institutions, religious institutions, governmental institutions, public utilities, and public services. For other business activities, it is permissible within non-high-rise or large-scale buildings. Furthermore, regarding to the types and categories of factories prohibited from operating in the provincial city planning regulations for Suphanburi Province in B.E. 2560 (2017), the Project is not in that prohibited categorization. Therefore, the Project can proceed in accordance with the provincial city planning regulations for Suphanburi Province in B.E. 2560 (2017).
2. The power plant project location is not situated in an area that complies with the National Environmental Promotion and Conservation Laws as follows:	
2.1 First-Class and Second-Class Watershed Area	The Project is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. Upon reviewing the data on watershed quality within the Project study area, sourced from the Department of Natural Resources and Environment, B.E. 2544 (2001), it was found that the Project is in the fifth-class watershed area*, not in first-class or second-class watershed areas at all. (* The fifth-level watershed refers to areas within a watershed characterized by flat or gently sloping terrain, and in many cases, the forest has been encroached upon, primarily for agricultural purposes, especially for rice cultivation and other activities.)
2.2 Ramsar Sites or Internationally Important Wetlands	The Project is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. Based on the list of Thailand's registered wetlands as Ramsar Sites under the Convention on Wetlands, provided by the Office of Natural Resources and Environmental Policy and Planning (as of B.E. 2565 (2022)), there is no indication of Doem Bang Nang Buat District being designated as a Ramsar Site or internationally important wetland area.

Relevant Laws and Regulations	Project Implementation
2.3 Additional Conservation Forest Areas as per Cabinet Resolutions	The Project is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. According to the land use plan within the Project study area, it is primarily utilized for agricultural purposes, with no areas falling within the boundaries of national reserve forests or national parks.
2.4 Environmentally Protected Areas as per Ministry of Natural Resources and Environment Declarations	The Project is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. Based on the information obtained from the Ministry of Natural Resources and Environment regarding designated areas and environmental protection measures, there is no declaration designating Doem Bang Nang Buat District as an environmentally protected area.
3. The power plant project location is not situated within or in close proximity to areas within a 1-kilometer radius as follows:	
3.1 Wildlife Conservation and Wildlife Hunting Prohibition Areas	In Suphanburi Province, there are areas designated as wildlife conservation zones and wildlife hunting prohibition zones, with a total of 1 such area, known as the Bueng Chawak Wildlife Hunting Prohibition Zone, located in Doem Bang Sub-district, Doem Bang Nang Buat District. However, the Project site is situated in Nong Krathum Sub-district, Doem Bang Nang Buat District, and it has been confirmed that there are no wildlife conservation zones or wildlife hunting prohibition zones within or in proximity to the Project area, in compliance with relevant laws governing wildlife preservation and conservation.
3.2 National Parks or Areas Not Contradicting National Park Laws	Suphanburi Province has three designated areas consisting of national parks, wildlife sanctuaries, and nature reserves. These areas are the Phu Toei National Park, the Dan Chang National Park in Dan Chang District, and the Phu Muang Wildlife Sanctuary in U Thong District. Nevertheless, the Project is situated in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province, and there is no indication of any national park areas or any areas that contradict national park laws within or in close proximity to the Project site.
3.3 Historical and Archaeological Sites, Historical and Archaeological Artifacts, and National Museums or Areas Not Contradicting Laws on Historical Sites and Artifacts	Upon inspecting the archaeological database from the Cultural Heritage Information System of the Fine Arts Department, as of the year 2023 (B.E. 2566), it has been verified that there are no historical and archaeological sites, historical and archaeological artifacts, or national museums within a 3-kilometer radius from the Project's boundaries in compliance with laws related to historical sites and artifacts.
4. Cabinet Resolutions	
- Other Relevant Cabinet Resolutions:	There are no announcements or cabinet resolutions in this area.

2.3.2 Solar PV Technology

(1) Monocrystalline Solar Panels

Monocrystalline solar panels are a type of photovoltaic technology that is made from a single crystal structure, usually silicon. The advantages of this technology include:

- High energy conversion efficiency compared to other types of solar panels. It can generate more electricity from the same intensity of sunlight.
- Have a lifespan of 25 years or more.

However, the cost of monocrystalline panels is more expensive in comparison with other PV technologies.

(2) Polycrystalline Solar Panels

Polycrystalline solar panels are a type of photovoltaic technology made from multiple crystal structures of silicon. It advantages include; more cost-effective and more tolerate to high temperature in comparison with monocrystalline panels. However, Polycrystalline solar panels typically have lower energy conversion efficiency compared to monocrystalline panels, therefore they generate less electricity from the same intensity of sunlight.

Comparison between Monocrystalline Silicon and Polycrystalline Silicon as shown in **Figure 2.3.2-1**. According to the advantages and disadvantages of solar PV technology (monocrystalline and polycrystalline), the project chose monocrystalline silicon because it produces more electricity than polycrystalline.

2.3.3 Solar Resource and Supply

Solar energy is considered one of the renewable or alternative energy sources that can be continuously utilized without depletion. Photovoltaic power potential data provided by the World Bank Group (WBG) showed that during the period of 2007-2018, Suphanburi Province has about 5.2-5.3 kWh/m^2 (daily totals) of long-term average of Global Horizontal Irradiation (GHI) (**Figure 2.3.3-1**) and about of 4.2 kWh/kWp (daily totals) of long-term average of Photovoltaic Power Potential (**Figure 2.3.3-2**). It can be seen from these maps that Suphanburi Province is one of the highest potential areas for solar energy production in Thailand. Therefore, Breeze and Shine Power Company Limited has selected this province to develop the solar power plant project, a solar photovoltaic (PV) farm in this area.

	
Monocrystalline Silicon - Best electricity generation - Takes up little space - Life span more than 25 years - Shadows affect electricity generation	**Polycrystalline Silicon** - Produces less electricity than Monocrystalline - Takes up a lot of space - Life span more than 25 years - Shadows affect electricity generation

Figure 2.3.2-1 Comparison between Monocrystalline Silicon and Polycrystalline Silicon

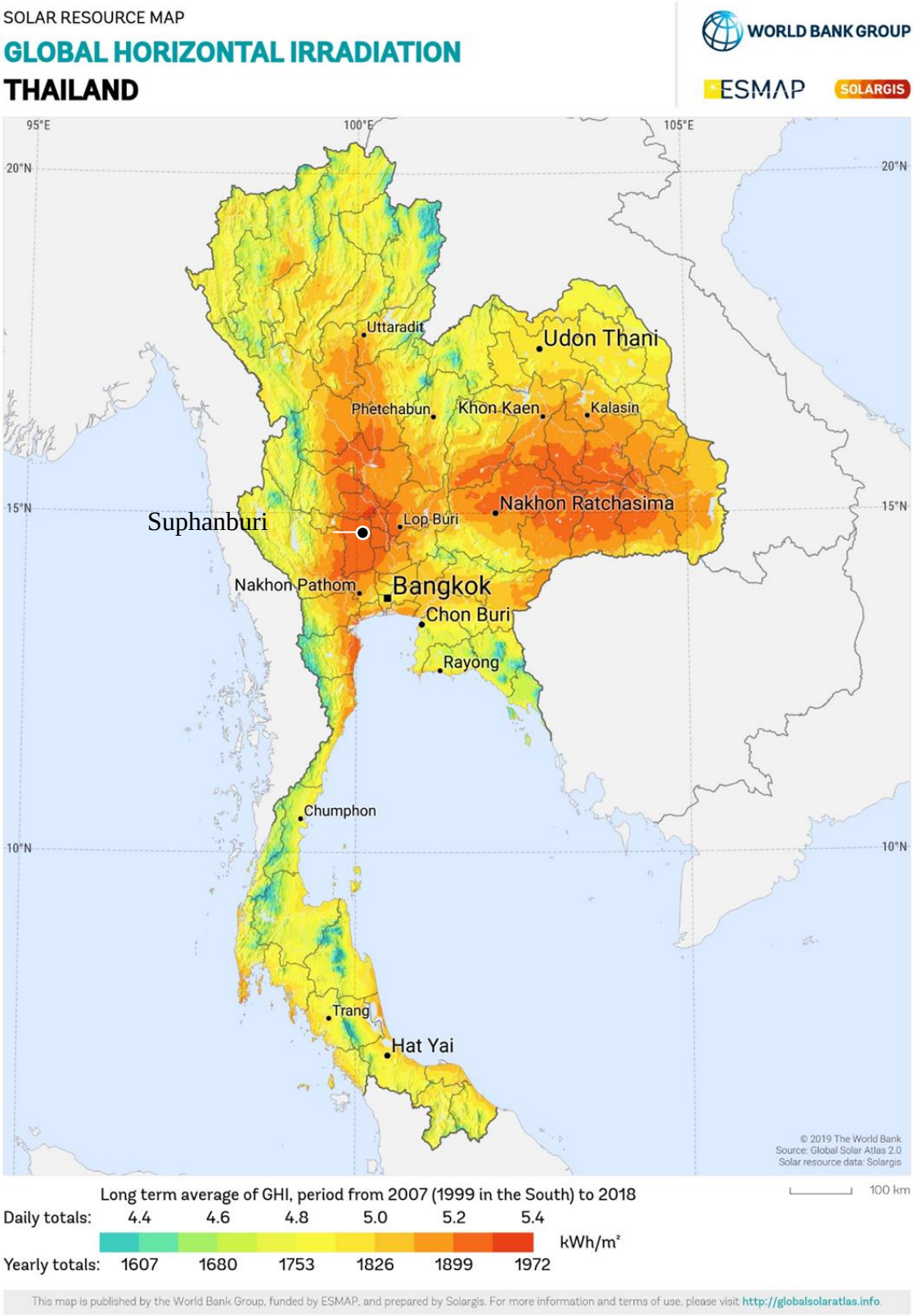


Figure 2.3.3-1 Thailand's Global Horizontal Irradiation

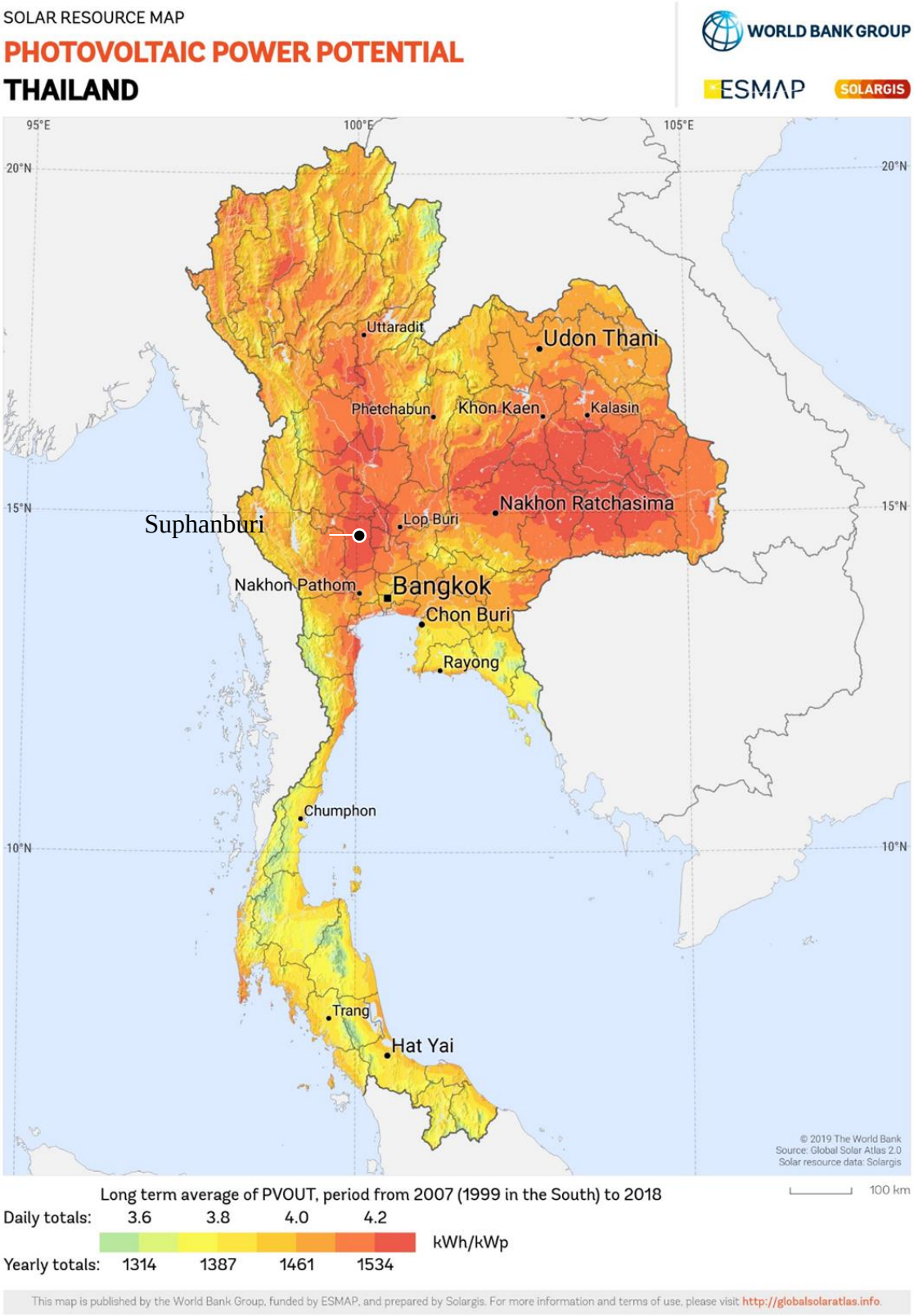


Figure 2.3.3-2 Thailand's Photovoltaic Power Potential

2.4 PROJECT IMPLEMENTATION PHASING AND ACTIVITIES

The implementation of the Project includes activities such as design, environmental and social impact assessment report preparation, and obtaining approvals from relevant agencies, construction and operation. The plan encompasses construction work, commissioning and power distribution system testing. The entire timeline for these activities is approximately 21 months. This aligns with the Regulation of the Energy Regulatory Commission: Criteria for Preparing Code of Practice Report and Monitoring Report for the operation of electricity production, B.E. 2565 (2022). The details of the Project implementation plan are summarized as follows;

2.4.1 Construction Phase

2.4.1.1 Project Area

The construction phase of the Project area begins with land clearance, fencing, site preparation, transportation of construction equipment, building and civil works, installation of solar panel structures, inverter installation, solar panel and battery installation, installation of electrical substation equipment and transformers, installation of public utility systems, testing of the electricity generation system, and finally, full-scale electricity production and commercial distribution. This phase is expected to take approximately 21 months, with a maximum workforce of approximately 1,596 individuals. The number of workers employed during each stage of the construction may vary depending on the volume of work during that time, as detailed in **Table 2.4.1.1-1**. Workers who all are local workers will be accommodated outside the Project area.

(1) List of Construction Equipment

Construction equipment include: Truck (6-wheel), Dump Truck, Trailer Truck, Water Truck, Truck & Crane 5 T., Rough terrain Crane (25 T., 60 T., and 200 T.), Fork Lift 2-3 T., Excavator, Back Hoe Loader, Vibrator Roller 10 T., Grader, Tractor, Farm Tractor, Pickup Car, and Pile Driving Machine. There is also a temporary batch plant that will be located in construction area of substation and diesel fuel for equipment

(2) Site Preparation

The preparation of the Project area and equipment installation takes place within the Project's designated boundaries. Site preparation will be based on site conditions such as flood study and equipment foundation requirement. Perimeter fences are constructed to prevent intrusion and facilitate security management. Additionally, the site preparation is

done by machinery and equipment located only within the designated boundaries. Material and equipment transportation activities occur only within the Project area (**Figure 2.4.1.1-1**). The Project shall remain level of ground as much as possible, it shall be finish after detailed design. Project would import soil in case of unable to cut soil in project area.



Figure 2.4.1.1-1 Site preparation activity

(3) Mounting Structure Construction

Mounting structure will be constructed to support the solar panels concurrently with the construction of the building and civil works. The work will start with the foundations for installing the support columns and bases for the solar panel arrays. Subsequently, the solar panels and other equipment will be installed on these structures in sequential order.

(4) PV Module Installation

Once the mounting structured are completed, PV modules will be installed and secured in place facing South with a 10-degree tilting angle. Each row is 0.8 meter apart. The solar panels will be installed at a height of approximately 0.8 meters above ground level, facing south and tilted at an angle of 10 degrees in a north-south direction, as illustrated in **Figure 2.4.1.1-2**.

Table 2.4.1.1-1

Project Development Plan

Detail	Duration	Months																					
	(months)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1. Design work	2																						
2. Preparation of CoP and ESA reports	7																						
3. Requesting Permissions from relevant authorities	3																						
4. Construction	12																						
4.1 Detailed engineering design	2																						
4.2 Equipment transportation	5																						
4.3 Building and civil works	5																						
4.4 Installation of solar panel support structure	4																						
4.5 Installation or inverters, solar panels, and batteries	6																						
4.6 Installation of power station equipment and transformer	4																						
4.7 Installation of public utilities	2																						
5. System testing and commissioning	2																						
6. Grid connection	-																						★
Number of workers	-	-	-	-	-	-	-	-	-	-	-	**146**	**436**	**1,596**	**1,596**	**1,596**	**1,306**	**1,306**	**1,335**	**1,335**	**30**	**30**	



Figure 2.4.1.1-2 Structure and Modules Installation

(5) Construction of Other Components

After site preparation, the Project shall commence the construction of buildings and civil works, including the construction of a control building for managing the electricity production system and the construction of the electrical switchyard or substation area, BESS, and related support areas. During the construction activities for the building foundation work will involve, excavation and piling activities.

(6) Commissioning

After complete installation and inspection of PV system, electricity from production system will be transferred to the grid. At this period, the contractor will hand over the system to the Project owner.

2.4.1.2 Campsite Area

The labor camp will be established to house labors imported by contractors from outside of the local areas. The Project's labor camp will be located outside of the project's boundaries. Currently, the labor camp location has not been determined because the project developer has yet to select the Engineering, Procurement, and Construction (EPC)

contractor who will provide input and advice on rental are for the labor camp. However, the Project provides general guidelines for selecting a site for the labor camp as follows:

(1) Physical Suitability and Constraints: The land must be suitable for development, taking into account any limitations such as flooding risk, and sensitive area from the work site or other sources.

(2) Environmental Impact: The development should have the least possible impact on major natural features and environmental assets. Considerations include biodiversity, local ecosystems, and potential contamination.

(3) Community and Cultural Values: Protecting or improving key community or cultural values is critical for maintaining positive relationships with local residents.

(4) Access to Infrastructure and Services: Worker accommodation must be supported by physical infrastructure (such as roads, water supply, and power) and community services (such as healthcare and shopping). This guarantees that workers have a decent standard of living and that the development does not overburden local services.

Furthermore, the project developer has established welfare criteria for worker camp construction, which were developed by referencing and/or adapting relevant laws or international standards, including recommendations and suggestions from ADB, as well as the project developer's own experiences, as follow:

(1) Surrounding Environment

- Clearly display signs indicating residential areas.
- Equip sturdy and secure fences around the residential areas.
- Ensure sufficient lighting along roads or general areas for safety in residential areas.
- Provide adequate parking spaces for the number of residents.
- Implement security systems and closed-circuit television.
- Appoint a supervisor to oversee the accommodation area.
- Establish a routine for keeping the area clean and hygienic, involving daily cleaning by the staff and regular check-ups by company personnel.
- Conduct training in regulations, health, and infectious disease prevention.

(2) Accommodation

- Room size should be at least 3 square meters per person, with a minimum width of 2.5 meters and a minimum height of 2.4 meters.

- Rooms must have doors, windows, or ventilation openings that connect to the outside to allow natural airflow. This collective open space should be no less than 10% of the room area, excluding door areas, window areas, and ventilation areas that connect to other rooms or internal building pathways.
- If accommodations are built in a continuous or combined manner and have a total length of 45 meters, there must be a gap between rows of at least 2.5 meters.
- The foundation and structure of the accommodation rooms must be safe and sturdy.
- Rooms or buildings should be able to prevent insects and reptiles, such as installing wire mesh or constructing buildings at least 50 centimeters above the ground.

(3) Bathrooms and Toilets

- Bathrooms and toilets must adhere to sanitary standards, providing clean water for washing, cleaning, and equipped with cleaning facilities.
- Bathrooms and toilets can be separate or combined in the same room, but must be segregated by gender
- Size for Bathrooms and toilets:
  - In the case of separate rooms, the size must be no less than 1 square meter, with an internal width of at least 1 meter.
  - In the case of combined rooms, the size must be no less than 1.5 square meters, with an internal width of at least 1 meter.
- Bathrooms and toilets must have ventilation openings equal to at least 10% of the room area or have sufficient natural airflow or exhaust fans.
- The distance from the bathroom floor or toilet floor to the lowest part of the wall must be at least 2 meters.
- The bathroom and toilet area must have a slope not less than 1 in 100, with drainage points at the lowest part of the sloped floor.
- The number of toilets (for defecation), bathrooms, and handwashing basins must comply with the proportions specified in Ministerial Regulation No. 63 (B.E. 2551 (2008)) under the Building Control Act B.E. 2522 (1979).
  - For male workers ranging from 41 to 80 people, there must be 3 toilets, 3 bathrooms, and 1 handwashing basin, with an additional increase of 1 for every 50 additional residents.

- For female workers ranging from 41 to 80 people, there must be 3 toilets, 3 bathrooms, and 1 handwashing basin, with an additional increase of 1 for every 50 additional residents.

- Adequate and appropriate space for changing clothes.

(4) Electrical System and Equipment

- Electrical equipment must be in a safe and undamaged condition, equipped with safety devices to prevent electrical leakage, including grounding for transformers, electrical panels, etc.
- Ensure the presence of circuit breakers to control electrical usage.
- In cases where electrical wiring is on ground or underground, use secure and safe conduits for the electrical cables.

(5) Water Use

- Provide clean and sufficient water for workers consumption.

(6) Drinking Water

- Drinking water for workers must be clean.
  - If bottled water is provided, the manufacturing company must meet the quality standards for drinking water as required by the law or international standards.
  - If water filtration systems are installed, the quality of the drinking water must meet the standards set by the Ministry of Public Health, and regular inspections must be conducted every three months.
- There must be at least one drinking water station provided for every 40 workers, and additional stations should be provided in proportion to the number of workers, with one station for every additional 40 workers.
- Containers for storing drinking water must be tightly sealed and regular cleaning must be carried out consistently.

(7) Wastewater Treatment System

- Septic tanks must be located at least 30 meters away from rivers or public water sources.
- Gas venting lines must have a diameter of no less than 2.5 centimeters, at the height level that not cause disturbance by odor.
- The wastewater treatment system must sufficient for the volume of wastewater generated in the residential area.
- In the case of discharge into natural water sources, must obtain permission from relevant government agencies or landowner to ensure that the discharged sewage will not have adverse environmental impact in the future. In the case of discharge into private areas, consent must be obtained in writing from the landowner.

- The wastewater treatment system should be capable of treating wastewater to meet the quality standards according to the announcement of the Ministry of Natural Resources and Environment regarding the standards for controlling the discharge of wastewater from certain types and sizes of buildings, B.E. 2548 (2005) before discharging into surrounding environment.

(8) Solid Waste Management

- Waste bins must be categorized, such as organic waste, general waste, recyclable waste, and hazardous waste.
- Waste bins must have tightly sealed lids and be sufficient in size for the amount of waste.
- Disposal of waste must comply with public health regulations, by being disposed of by government agencies or with permission from the government only.

(9) Rainwater Drainage

- Rainwater drainage channels must surround the worker accommodation area to prevent overflow into surrounding areas.
- Rainwater drainage channels must be able to accommodate the volume of rainwater falling in the area.
- The direction of the rainwater drainage channels must flow towards a rainwater storage pit before being discharged into public water sources and should not flow into adjacent areas.

(10) Health Management

- Provide essential household remedy in sufficient quantities and maintain a list as per the Ministry of Public Health regulations regarding employee welfare in the workplace, B.E. 2548.
- In cases where there are more than 200 residents, there must be at least one bed in the first aid room. In cases where there are more than 1,000 residents, there must be at least two beds in the first aid room.
- Provide clear contact information for the medical facility in easily visible areas.
- Provide transportation with readiness at all times for transporting workers to the medical facility.

(11) Fire Prevention

- Establish criteria or areas for cooking, such as prohibiting open-fire or gas cooking. Designate cooking areas and/or dining rooms, especially for centralized food warming (Canteen).

- Provide fire extinguishers in accordance with government regulations and standards for managing occupational health, safety, and environmental conditions related to fire prevention and control, as per the Occupational Safety, Health, and Environment Management in the Workplace to Prevent and Control Hazardous Incidents Act, B.E. 2555 (2012).
- Implement an alarm system capable of signaling emergencies to cover the entire area.
- Develop a fire prevention and suppression plan, including inspection, training, awareness campaigns, firefighting, evacuation, and relief measures.
- Conduct regular drills for fire evacuation and firefighting plans within 6 months of occupancy and annually thereafter following the initial drill.

2.4.2 Operation Phase

The Project plans to generate electricity for commercial distribution starting around the year B.E. 2567 (2024). The installed equipment will generate electricity for 25 years according to their useful lifetime. The operation will require 5 persons regularly and 20 workers will be employed occasionally during the PV modules cleaning activity twice a year by a contracted worker. Regular staff duties are as follows:

(1) Monitoring the plant operation real-time from the control room. The control system has been designed so that remote monitoring of the plant productivity, weather information, factors related to electricity production such as light intensity, temperature, etc. can be monitored remotely.

(2) Onsite schedule inspection and report the status of the equipment and the plant to ensure the plant working efficiently.

(3) Security control by patrolling the site to ensure safety of the plant, staff, and visitors in addition to monitoring using CCTV system.

In addition, the solar panels selected for the Project are expected to have a lifespan of approximately 25-30 years. The efficiency of electricity production will be regularly monitored, both from the control room and through field inspections. In case of any deterioration or damage, the solar panels will be replaced.

Furthermore, since the solar panel structures have safety glass covers on top to protect the panels, any dust or debris on the surface can reduce their efficiency by blocking sunlight. Therefore, the Project plans to clean the solar panels an average of twice a year or as needed according to environmental conditions, approximately 20 additional workers

will enter the Project area for each cleaning operation. This process will consume duration about two months each time. Cleaning will be done manually by workers using water spraying methods. The Project shall source water for cleaning from the regional water supply, Provincial Waterworks Authority (PWA), Dan Chang Branch.

2.5 UTILITY SYSTEMS

2.5.1 Water Use

(1) Construction Phase

The use of water during the construction phase can be classified into two categories:

1) Water for Consumption and Personal Hygiene of Construction Workers

This category includes water used for various cleaning purposes and wastewater generated from restrooms. The estimated daily water consumption is approximately 111.72 cubic meters/day. This calculation is based on a water usage rate of 70 liters/person/day for 1,596 construction workers. Water will be sourced from the regional water supply, Provincial Waterworks Authority, Dan Chang Branch (**Appendix 2-8**). As for drinking water, the Project stipulates that the contractor should prepare sufficient drinking water tanks at various points within the Project area.

2) Water for Construction Activities

The Project anticipates a water usage of approximately 50.00 cubic meters/day for construction activities. This includes water for spraying the construction site and washing vehicles before leaving the site, estimated at around 40.00 cubic meters/day. Additionally, water will be used for cleaning tools and equipment during construction, including a small amount of water mixed with concrete, estimated at 10.00 cubic meters/day. Since most of the Project's structures are made of steel, ready-mixed concrete is mostly used. Water source for construction activities will be the same as the water used for consumption and personal hygiene of construction workers.

Details of the water usage and wastewater balance for the Project during the construction phase is illustrated in **Figure 2.5.1-1**.

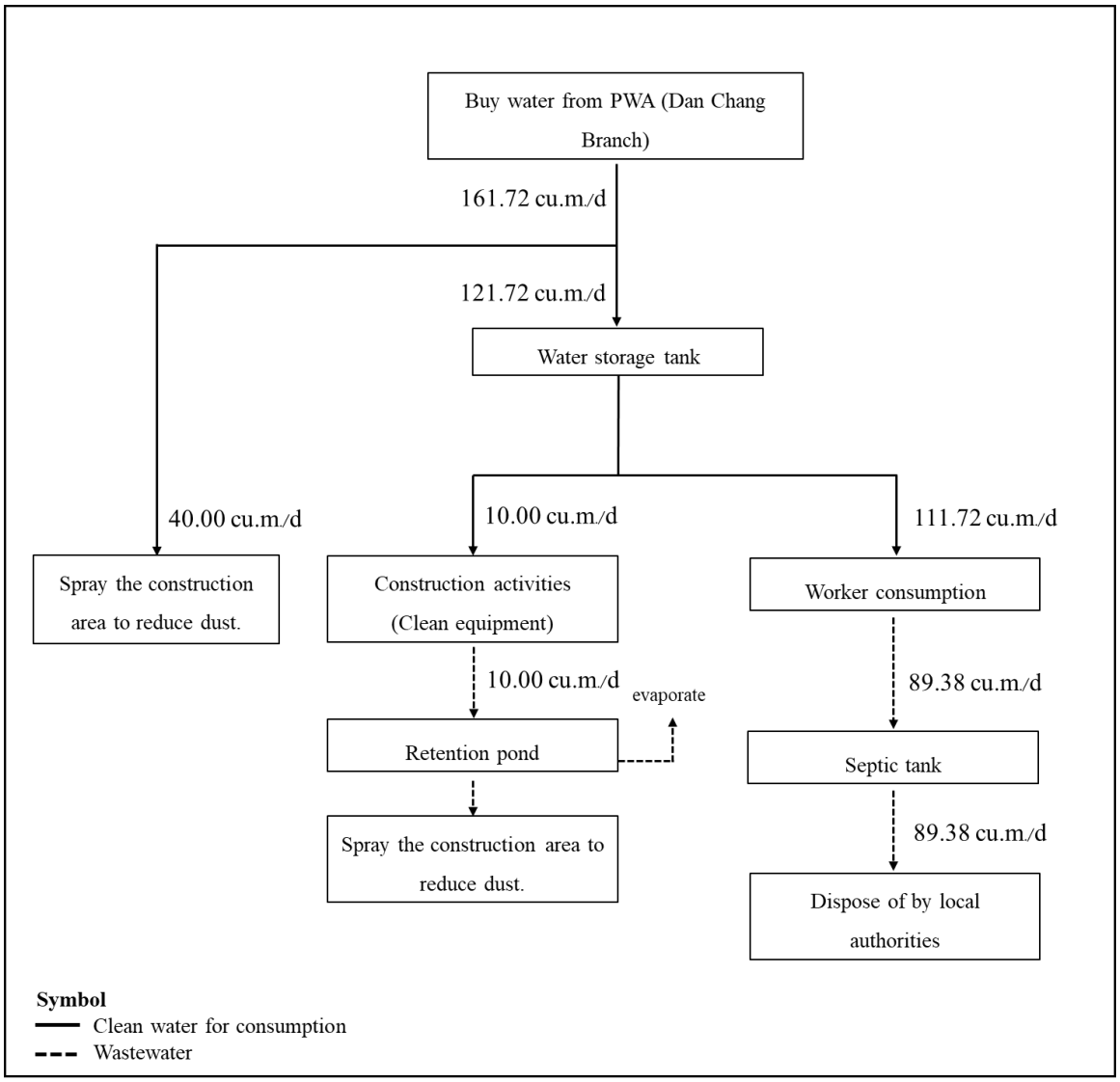


Figure 2.5.1-1 Water Balance for Construction Phase

(2) Operation Phase

1) Water for the Consumption and Personal Hygiene of Employees

Water used for the consumption and personal hygiene of employees includes water for various cleaning purposes and wastewater generated from restrooms. The estimated daily water usage is approximately 0.35 cubic meters/day. This calculation is based on a water usage rate of 70 liters/person/day for 5 employees. Water will be sourced from the regional water supply, Provincial Waterworks Authority, Dan Chang Branch (**Appendix 2-8**). Additionally, during a period of solar panel cleaning, 20 workers will be employed within the Project area for about 2 months, and their estimated daily water usage for cleaning purposes will be 1.40 cubic meters/day. Therefore, the Project's maximum water requirement for this category is approximately 1.75 cubic meters/day.

2) Water for Cleaning Solar Panels

Water used for cleaning solar panels and annual maintenance includes activities such as washing and cleaning. It is estimated to use approximately 494.52 cubic meters per cleaning cycle, cleaning will consume duration about two months each time, two times per year. Therefore, the daily water usage rate for cleaning solar panels is approximately 8.24 cubic meters/day. The Project plans to clean the solar panels twice a year or as needed based on environmental conditions. For each cleaning of the solar panels, approximately 1.5 liters per panel will be used. Water for this purpose will also be sourced from the regional water supply branch, Provincial Waterworks Authority, Dan Chang Branch.

3) Water for Watering Plants/Green Areas

The Project includes green areas covering an area of approximately 1,544 square meters (0.96 rai). It is estimated to use approximately 2.62 cubic meters/day for watering these green areas, calculated based on a water usage rate of 1.7 liters/square meter/day. The source of water for this purpose will also be the regional water supply, Provincial Waterworks Authority, Dan Chang Branch.

Details of the water usage and wastewater balance for the Project during the operation phase are illustrated in **Figure 2.5.1-2**.

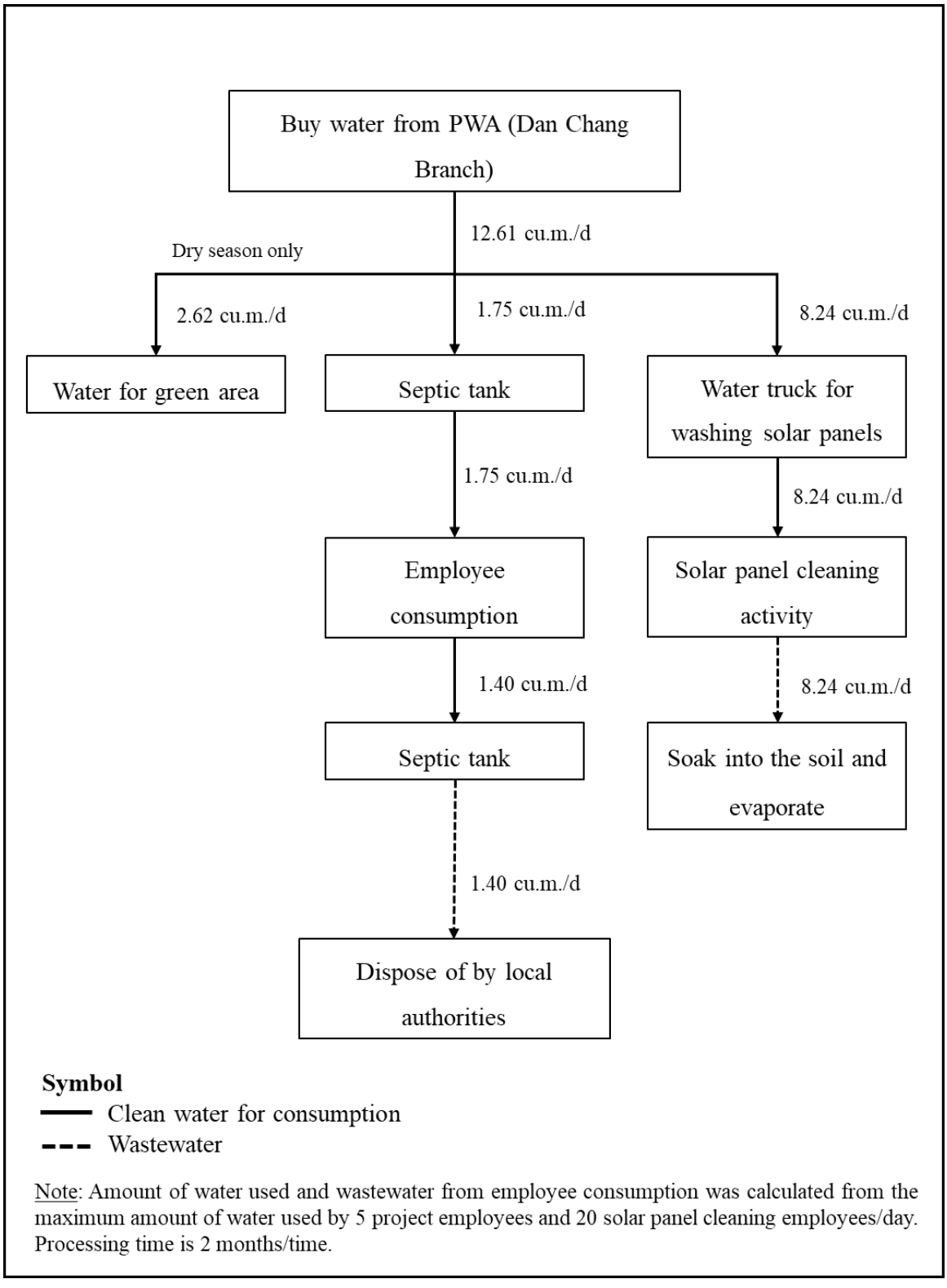


Figure 2.5.1-2 Water Balance for Operation Phase

2.5.2 Electricity Use

(1) Construction Phase

The Project requires electricity during the construction activities such as welding, drilling, tasks requiring lighting, and metal work. The electricity for the project will be supplied by the local district's electrical supply, the Provincial Electricity Authority in Doem Bang Nang Buat.

(2) Operation Phase

During the operation phase, the Project shall produce electricity, primarily from solar panels. This electricity will be converted to alternating current with a voltage of 115 kilovolts before being fed into the regional power grid through a power purchase agreement with the Provincial Electricity Authority (PEA). Internal use of electricity i.e. office building, it will be sourced from the district's electrical supply, Provincial Electricity Authority in Doem Bang Nang Buat.

2.5.3 Water Drainage and Flood Prevention System

(1) Construction Phase

The Project's construction is expected to take approximately 12 months. There are four areas that will be leveled off;

1) Control building area,
2) Spare parts, equipment, waste material storage, and maintenance area
3) Switchyard or substation area, and
4) Power generation area.

These four areas, total of 6,735 square meters, will be leveled off that may alter the water drainage conditions. Therefore, the Project plans to construct temporary drainage channels in these areas to collect rainwater and drain into a retention pond within the Project area.

(2) Operation Phase

The majority of the Project area is used for installing solar panels, which do not obstruct natural rainwater infiltration as they are not built on concrete. Rainwater falling on the solar panels is allowed to seep naturally into the ground. The Project is not

located in a flood-prone area, and there are no changes made to the area's original conditions. Therefore, the rate of infiltration and the direction of water flow remain unchanged from the conditions prior to the Project's development, except for areas where there have been changes due to construction activities. These include the areas around the buildings used for controlling the electricity production system, the area for storing spare parts, materials, equipment, waste materials, and maintenance, the electrical switchyard (Switchyard), or substation area, and the area related to supporting electricity production as mentioned. To accommodate any excess rainwater resulting from these modifications, the Project has designed temporary drainage channels to collect and drain rainwater into a retention pond sized at 700 cubic meters, located near the Project's buildings. The calculation details for the quantity of uncontaminated rainwater and oil-contaminated rainwater can be determined using the Rational Method (**Appendix 2-9**).

1) Non-contaminated Rainwater

Q = CIA,

where: Q = Flow rate (cubic meters per second)

C = Runoff coefficient of rainwater flow
(Before the Project C = 0.3, After the Project C = 0.9)

I = Average rainfall intensity over a 25-year period during a 3-hour duration, equal to 100 millimeters (Source: Frequency Analysis of Maximum Rainfall for Each Period at Suphan Buri (1986-1998)) = 0.1 meters

A = Total Project area = 1,683,133.60 square meters
Area with modifications = 6,735 sq.m.,
Area without modifications = 1,676,398.60 sq.m.

In this regard, the amount of rainwater that the Project must retain for a period of 3 hours can be calculated with the following details:

Variable	Before the Project	After the Project	
		Area without modifications	**Area with modifications**
C	Total Project area (Ground surface = 0.3)	Area without modifications (Ground surface = 0.3)	Area with modifications (Concrete surface = 0.9)
I	0.1 m.	0.1 m.	0.1 m.
A	1,683,133.60 sq.m.	1,676,398.60 sq.m.	6,735 sq.m.
Q	= 0.3 x 0.1 x 1,683,133.60 = 50,494.01 cu.m.	= 0.3 x 0.1 x 1,676,398.60 = 50,291.96 cu.m.	= 0.9 x 0.1 x 6,735 = 606.15 cu.m. (Choose the design value at 800 cubic meters)
	Q_before = 50,494.01	**Q_after = 50,291.96 + 800 = 51,091.96**	
The additional rainfall that needs to be collected into the retention pond over a 3-hour duration is calculated as follows: Q_after - Q_before = 51,091.96 - 50,494.01 = 597.95 cubic meters In this regard, the Project has designed a retention pond with a size of 700 cubic meters, which is sufficient to detain the rainfall within the Project area over a 3-hour duration.			

2) Contaminated Rainwater

The calculation for the quantity of rainwater mixed with oil in the electrical transformer area during the first 30 minutes can be determined using the Rational Method as follows:

Q = CIA

Where: Q = Flow rate (cubic meters per second)

C = Runoff coefficient for rainwater (C = 0.9)

I = Average rainfall intensity for a 25-year return period for 30 minutes, which is 91.7 millimeters (Source: Frequency Analysis of Maximum Rainfall for Each Period at Suphanburi (1986-1998)),

= 0.0917 meters

A = Area of the transformer area

= 37.5 square meters

Therefore, Q = 0.9 x 0.0917 x 37.5

= 3.09 cubic meters per 30 minutes.

Rainwater from the transformer area will be collected inside a dike with a capacity of about 3.2 cubic meters before being sent to the oil sump to separate water and oil. This sump is sufficient to withstand rainfall in the event of oil contamination. An authorized agency will be later contracted to properly dispose of. Details of the management plan for contaminated rainwater Shown as shown in **Figure 2.5.3-1**.

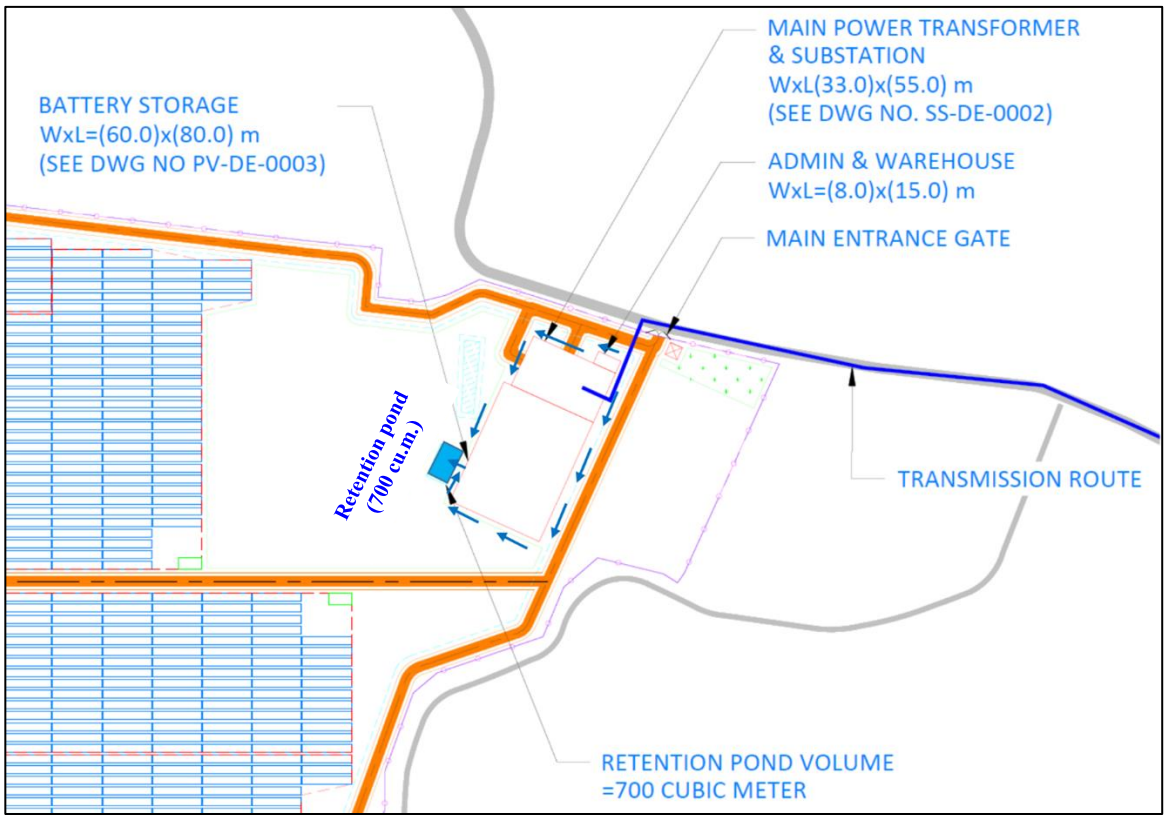


Figure 2.5.3-1 Management for Contaminated and Non-contaminated Rainwater in the Project, Rain Gutters, and Flow Directions

2.5.4 Transportation

(1) Construction Phase

The transportation during the construction phase primarily involves the transportation of machinery, equipment, and construction materials, especially solar panels, inverters, and labor. Equipment and construction materials are transported from Laem Chabang Port using Highway 3702 to reach Suphanburi Province, following Highway 340, and then Rural Highway 4086 to access the Project area. The contractor is responsible for arranging transportation routes, utilizing public roads, and ensuring minimal impact on the surrounding communities. Safety considerations are the most important throughout this process. Details of transportation during construction phase are provided in **Table 2.5.4-1**.

Table 2.5.4-1

Transportation and Logistics during Construction Phase

Vehicle type	Number (vehicle/day)	Frequency (trip/day)[1/]	PCU factor	PCU/day	PCU/hr
Employee transportation					
Medium truck (6 wheels)	27	108[2/]	1.0	108	13.5
Light truck (4 wheels)	1	2	1.0	2	0.25
Machinery and equipment transportation					
Full trailer	5	10	2.5	25	3.125
Medium truck (6 wheels)	4	8	1.0	8	1.0
Light truck (4 wheels)	2	4	1.0	4	0.5
Total	**133**	**266**	**-**	**147**	**18.375**

Remark: 1/ Number of trips per day (including round-trip) calculated in the case of the highest traffic volume per day. Work time is calculated as 8 hours per day.
2/ Number of transportation trips in the morning (including round-trip) and evening (including round-trip)

(2) Operation Phase

The operational phase will involve travel along the same routes used for accessing and exiting the project area as during the construction phase. It is anticipated that transportation and traffic activities due to operation activities as followings.

1) Regular staff vehicles (small 4-wheeled cars), totaling 2 vehicles (4 trips per day), will run round trips for staff transportation during peak hours (07.00 am-08.00 am and 04.00 pm-06.00 pm)

2) The inspector and maintenance staff will small 4-wheeled car, totaling 1 vehicle (2 trips per week), will run round trips for staff involved in maintenance and inspection during peak hours (07.00 am-08.00 am and 04.00 pm-06.00 pm).

3) Solar panel cleaning staff shuttle vehicles (4-wheeled cars), totaling 5 vehicles (10 trips per day), will run round trips for staff transportation every 3 months during the dry season (07.00 am-08.00 am and 04.00 pm-06.00 pm).

4) Waste transport vehicles will include 1 sludge suction vehicle (2 trips per month) and vehicles transporting waste from the solar power generation system. The project will collect and store waste in designated areas within the office building and material storage for subsequent disposal by authorized agencies, along with deteriorated solar panels. The latter vehicles will only 1 vehicle (2 trips every 3 months).

5) Water trucks used for cleaning solar panels during the dry season will operate for 120 days. A total of 1 water truck (10-wheeler) will make 2 trips per day.

In summary, during the operational phase, there will be a maximum of 8 vehicles (16 trips per day) during peak hours (07.00 am-08.00 am and 04.00 pm-06.00 pm), and during normal hours, there will be a maximum of 3 vehicles (6 trips per day).

2.6 ENVIRONMENTAL MANAGEMENT

2.6.1 Air Quality

(1) Construction Phase

The dispersion of dust and other air pollutants caused by the operation of machinery and vehicles is unavoidable. This dispersion typically occurs within a short period, mostly consisting of heavy dust, which tends to settle near the source or within a distance of 6-9 meters from the construction area. The Project plans to mitigate this impact by applying water to the construction area and access points at least twice a day (morning and afternoon) depends on the weather condition. Vehicles leaving the construction area will be cleaned to reduce dust particle dispersion.

(2) Operation Phase

The electricity generation does not cause air pollution. This is because the solar panels are installed in a fixed location, no combustion process involved, ensuring that no pollutants are emitted into the air.

2.6.2 Noise

(1) Construction Phase

Activities during the construction phase may generate different levels of noise depending on the machinery and the nature of the work. Typically, construction activities that result in noise include excavation, drilling, and structural construction. The noise levels during the construction phase are shown in **Table 2.6.2-1**.

Table 2.6.2-1
Typical Ranges of Noise Levels at Construction Sites with a 50 dB(A) Ambient Typical of Suburban Residential Areas

Construction stages	Building/Construction type							
	Residential Building		Office, Hotel, School, and Utilities		Industrial factory, parking areas, mall, and service station		road, highway, and water drainage system	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundation	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

Remark: I = All pertinent equipment presents at site
II = Minimum require equipment present at site
Source: Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, U.S. EPA 1971

Nevertheless, these noise levels can be controlled by scheduling construction activities with significant noise generation during day time hours (07:00 AM - 06:00 PM) and avoiding night time work to minimize the impact on the nearby communities during rest hours. This scheduling should be stipulated in the construction contract. Additionally, the Project specifies that the contracting company must provide hearing protection equipment for construction workers working near machinery, such as earplugs and earmuffs. Warning signs or symbols indicating the need to wear personal protective equipment should also be posted at entry points to areas with high noise levels.

(2) Operation Phase

The Project's activities involve the generation of electricity from solar panels. Equipment used in the electricity generation process includes solar panels, electrical transformers, inverters, and energy storage systems with batteries. There are no activities in the Project that generate significant noise during the electricity generation process.

2.6.3 Water Quality

(1) Construction Phase

Wastewater generated during the construction phase can be categorized into two types based on their sources (**Table 2.6.3-1**):

1) Wastewater from Consumption of Construction Workers

Wastewater from consumption and daily activities of construction workers includes wastewater from cleaning and sanitary use. The construction phase consumes an estimated 111.72 cubic meters of potable water per day, resulting in approximately 89.38 cubic meters of wastewater per day (calculated as 80% of the water usage rate, 70 liters per person per day, multiplied by the number of construction workers, which is 1,596 individuals). The Project ensures that the contractor provides adequate restroom facilities with healthcare standards for construction workers during peak hours, along with a wastewater treatment system. Any solid waste or pollutants generated by wastewater treatment system will be handed over to local authorities for proper disposal.

2) Wastewater from Construction Activities

Wastewater from construction activities amounts to approximately 50.0 cubic meters per day. This wastewater is primarily used for cleaning equipment and tools during construction. Additionally, there may be wastewater from minor concrete mixing activities since most of the Project's structures are steel and concrete-based. Wastewater generated from construction activities will be temporarily collected in the Project's

drainage system before being discharged into the Project's water storage pond. It will then undergo treatment and can be reused for other purposes, such as watering plants or spraying water on construction site areas.

Table 2.6.3-1
Wastewater Management During the Construction Phase

Source	Amount (m^3/day)	Wastewater Management
1. Wastewater from the consumption of workers	89.38	Coordinate for authorized waste collection vehicles from local authorities to enter and conduct waste collection and disposal activities.
2. Effluent from cleaning equipment and tools	50.00	Collect wastewater into a settling tank for sedimentation before further utilization.
Total	**139.38**	

A balanced water usage and wastewater system for the Project during the construction phase is illustrated in **Figure 2.6.1-1**.

(2) Operation Phase

Wastewater generated during the operation phase can be categorized into two types based on their sources (**Table 2.6.3-2**):

1) Wastewater from Consumption of Employees

During the operation phase, water is used for consumption and daily activities of workers, including cleaning and sanitary purposes. Water consumption for worker consumption amounts to approximately 0.35 cubic meters per day, resulting in wastewater generation of approximately 0.28 cubic meters per day (calculated as 80% of the water usage rate, 70 liters per person per day, multiplied by the number of workers, which is 5 individuals). During the period of solar panel cleaning, approximately 20 workers are involved in cleaning activities for about 2 months per cleaning session. This results in water usage of approximately 1.40 cubic meters per day (calculated based on a water usage rate of 70 liters per person per day multiplied by 20 workers), leading to wastewater generation of approximately 1.12 cubic meters per day (calculated as 80% of the water usage rate, 70 liters per person per day, multiplied by the number of workers, which is 20 individuals). The wastewater generated will undergo treatment in a septic tank system without direct discharge into the environment. Any solid waste or pollutants generated by the wastewater treatment system will be handed over to local authorities for proper disposal.

2) Wastewater from Solar Panel Cleaning

The Project has plans for cleaning solar panels approximately twice a year, depending on environmental conditions. Each cleaning session is estimated to use around 1.5 liters of water per panel. The Project anticipates generating wastewater from solar panel cleaning of approximately 494.52 cubic meters per cleaning cycle, cleaning will consume duration about two months each time, two times per year. This results in daily wastewater generation from solar panel cleaning of approximately 8.24 cubic meters. The wastewater generated from solar panel cleaning is not heavily polluted and does not contain hazardous chemicals. It will naturally infiltrate the soil and evaporate over time.

Table 2.6.3-2
Wastewater Management During the Operation Phase

Source	Amount (m^3/day)	Wastewater Management
1. Wastewater from the consumption of workers	0.28	Coordinate for authorized waste collection vehicles from local authorities to enter and conduct waste collection and disposal activities.
2. Wastewater from cleaning Solar module	8.24	Left to evaporate or seep into the ground naturally
Total	**8.52**	

A balanced water usage and wastewater system during the operation phase of the Project is illustrated in **Figure 2.6.1-2**.

2.6.4 Solid Waste

(1) Construction Phase

Solid waste and debris generated during the construction phase can be categorized into two types: general waste from worker consumption and construction waste. Details are presented in **Table 2.6.4-1**.

1) General waste from worker consumption, there will be approximately 1,276.80 kg/day (calculated from the waste generation rate of 0.8 kilograms per person per day x 1,156 people). Waste will be managed in 200-liter waste bins equipped with tightly sealed lids, strategically placed throughout the office buildings and work areas. Waste separation and disposal will be carried out in compliance with public health regulations.

2) Construction activity waste, approximately 4 ton/month, shall be collected, recycled, reused, or disposed of in accordance with regulatory requirements. Any waste that cannot be reused or recycled will be collected and handed over to authorized local agencies for proper disposal.

Table 2.6.4-1

Solid Waste and Debris from Construction Activities and Management

Type of Waste	Amount	Management
General waste from the consumption of construction workers Food containers (plastic bags, food boxes, etc.) and food waste.	Up to approximately 1,276.80 kilograms per day (calculated from the waste generation rate of 0.8 kilograms per person per day multiplied by 1,596 individuals)	Containers with a capacity of 200 liters and tight-fitting lids will be provided at various points to accommodate the waste. These containers will be installed as needed to handle the waste before contacting local government organizations or authorized agencies for disposal.
Construction Debris 1. Debris from construction activities, such as metal scraps, concrete remnants, and etc. 2. Debris from packaging for the transportation of solar panels, inverters, and other equipment (wooden pallet scraps, cardboard boxes, plastics, and straps).	4 tons/month	The Project shall collect and recycle these materials for reuse or distribution. Materials that cannot be distributed will be collected and handed over to authorized agencies for disposal or treatment.

(2) Operation Phase

1) Solid Waste from Consumption of Employees

General waste and solid waste generated from the regular work activities of employees in the Project area, involving 5 people, result in approximately 4.0 kilograms per day (calculated from the waste generation rate of 0.8 kilograms per person per day x 5 people).

During the solar panel cleaning period, there will be 20 employees per day entering the Project area to clean the solar panels. The Project plans to clean the panels twice a year, with each session lasting approximately 2 months, resulting in solid waste generated by the cleaning employees at approximately 16.0 kilograms per day (calculated from the waste generation rate of 0.8 kilograms per person per day x 20 people).

The Project must manage in accordance with the Public Health Act, B.E. 2535 (1992). Waste containers, categorized by type, with tightly fitting lids, will be placed near the office building and employee work areas, before collecting and coordinating with local authorities or authorized agencies for disposal in accordance with the subsequent sanitary regulations.

2) Waste from Project Activities (Defective Solar Panels)

Defective and damaged solar panels encountered during operations are expected to be minimal, as the solar panels used in the Project meet the standards certified by TIS 1843 or IEC 61215. The Project shall collect these damaged panels in a waste storage area, alongside spare parts, equipment materials, and maintenance items, categorized by waste type. The area will cover approximately 20.00 square meters. The Project shall clearly label each type of waste and regularly inspect the storage area.

Waste from the energy storage system, such as degraded and partially damaged battery cell sets, the project will proceed to store them in designated areas for waste storage. Subsequently, disposal will be carried out according to the legal procedures, ensuring compliance with the Notification of the Ministry of Industry: Management of Waste or Unusable Materials, B.E. 2566 (2023).

2.7 OCCUPATIONAL HEALTH AND SAFETY

The Project provides Occupational Health, Safety, and Environment Policy for as follows;

(1) The safety management system shall be put in place in compliance with the law and occupational health requirements as well as related international standards.

(2) Recognition and maintenance shall be ensured for occupational health principle to control and prevent hazards from business operation, which may impact the welfare and asset of the Company and its personnel.

(3) Resources shall be allocated to ensure continuous development of the occupational health management system.

(4) The following occupational health guidelines are established.

1) Occupational health is the first priority of all personnel of the Company.

2) The Company shall support the improvement of the workplace environment to ensure safety and minimize accident risk exposure as well as support and encourage safety activities to build awareness and attitude for occupational health so as to maintain the occupational health standard, aiming for zero accident.

3) Supervisors of all levels shall lead, oversee, and support personnel of the Company to ensure undisrupted occupational health.

4) Personnel of the Company shall consider about the safety of themselves, colleagues, and the Company’s assets throughout the operating period.

5) Personnel of the Company shall cooperate in occupational health projects and propose ideas for further safety and operations improvement.

(5) The Company shall comply with relevant safety laws and regulations throughout the life cycle of its projects.

(6) The Company shall take into consideration as part of its decision-making and risk assessment processes potential environmental and social impacts, including issues related to the health and safety of employees, local communities and other relevant stakeholders.

(1) Construction Phase

The Project has established operational guidelines to control construction work for maximum safety and in compliance with Ministry regulations on safety, occupational health, and environmental management for construction work in B.E. 2564 (2021) and other relevant regulations. It also supervises and ensures that the main contractors and subcontractors strictly adhere to safety laws, i.e., the Department of Labor Welfare and Protection's announcement on the types and categories of machinery and equipment used in annual inspections in B.E. 2564 (2021) and the announcement on safety planning for construction work in B.E. 2552 (2009). Key points include:

1) The Project establishes requirements for construction contractors and the Project team working within the Project's contract, to strictly enforce safety, occupational health, and environmental measures in both the design and execution phases to comply with relevant laws, standards, and regulations in occupational health and safety.

2) Project contractors must prepare safety plans for the construction work and submit to the Project prior to commencing construction.

3) Project contractors must establish a Safety, Occupational Health, and Environmental Committee following the guidelines specified in relevant regulations. The Safety, Occupational Health, and Environmental Manager will be appointed and will report directly to the Project's top management. Committee meetings are required to organize at least once a month to assess the performance and propose solutions to any issues.

4) Project contractors shall prepare basic Personal Protective Equipment (PPE), including safety helmets, safety shoes, and safety glasses, for all construction workers. They must also provide specialized PPE appropriate to the working conditions and potential risks arising from the work, as required by applicable laws. The PPE must conform to the standards specified in the Department of Labor Welfare and Protection's announcement regarding Personal Protective Equipment standards, B.E. 2554 (2011).

5) Project contractors shall place warning signs in the construction area, hazardous zones, and areas where Personal Protective Equipment must be worn.

6) Project contractors shall establish an authorization system for certain types of work activities as required by law.

7) Project contractors shall prepare a coordination plan with the local fire department to ensure readiness in case of emergencies.

8) Project contractors shall provide basic first aid equipment and medical supplies, including emergency transportation vehicles as required by the Ministry of Labor's regulations on employee welfare in establishments in B.E. 2548 (2005).

9) Project contractors shall ensure there are adequate public utilities for construction workers, following health regulations, including clean drinking water and restroom facilities.

10) In cases where the Project contractors provide worker accommodations; they must adhere to the labor welfare committee's announcement regarding standards for residential accommodations for construction employees in B.E. 2559 (2016).

(2) Operation Phase

The Project shall establish a safety management system during its operational phase, including safety, occupational health, and environmental policies, to ensure compliance with the Occupational Health, Safety and Working Environment Act, B.E. 2554 (2011) and the Labor Protection Act, B.E. 2541 (1998). The Project has developed an operational plan for safety, which includes:

1) The health plan comprising industrial health surveys, annual health inspection plans, analysis of inspection results, follow-up actions, and a summary of occupational health activities.

2) The health monitoring, measurement, and surveillance plan. The Project shall conduct health examinations for all employees based on the risk factors specified in the Ministry's regulations on health examinations for workers exposed to risk factors in B.E. 2563 (2020). This plan is aimed at ensuring the industrial health of all employees and will be used to develop health-related plans.

3) The Project shall develop an environmental protection plan to prevent potential hazards and dangers related to the working environment. This plan includes measures to mitigate risks such as noise levels and dangerous conditions to ensure the safety of employees in compliance with relevant laws and regulations, such as the Ministry's announcement regarding safety measures in factory environmental conditions in B.E. 2546 (2003).

4) The Project shall establish an emergency prevention and response plan in accordance with the guidelines specified in the regulations governing safety, occupational health, and environmental management in emergency prevention and response in B.E. 2555 (2012) and the Ministry's announcement on factory emergency prevention and response in B.E. 2552 (2009). This plan will include the installation of adequate safety equipment, compliance with international standards, and annual emergency prevention and response drills.

The Project shall also install standard safety equipment, including lightning protection and electrical surge protection devices and short-circuit protection equipment, to reduce the risk of fires. Additionally, measures will be implemented to prevent and minimize the impact of accidents, ensuring the highest level of safety for employees, the community, and the environment. These measures include the use of internationally standardized equipment, the installation of short-circuit protection systems, the installation of fire suppression equipment according to established standards (**Figure 2.7-1**), regular maintenance and inspections of fire suppression equipment, and basic fire safety training for employees to enhance their knowledge and readiness for emergency situations. In the event of a severe emergency that cannot be controlled, the project will coordinate with relevant local agencies to support equipment and manpower for future incident suppression.

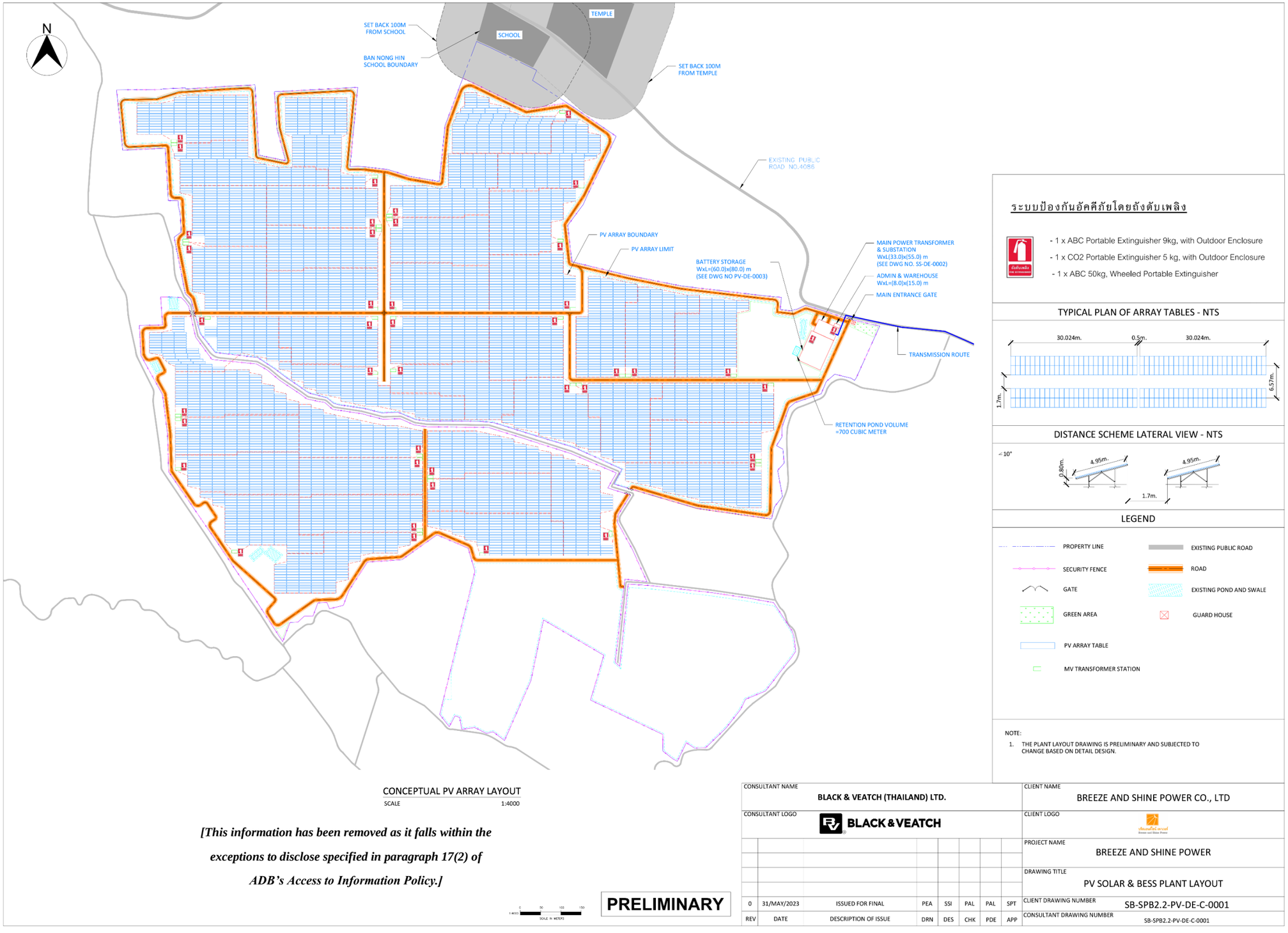


Figure 2.7-1 Location of Potable Fire Extinguisher

2.8 COMMUNITY RELATIONS

The Project may have both direct and indirect impacts on the current environment and the well-being of the surrounding community. To ensure sustainable development and foster understanding within the community, the Project shall provide operational plans aimed at promoting awareness and understanding of the Project. This will help build confidence in the Project's development and ensure that the local community benefits from the Project's initiatives and supports various community activities. The Project has developed guidelines for operational plans in various aspects, ensuring that the community is informed and engaged throughout the Project's lifecycle.

(1) Environmental Conservation Plan: This plan focuses on environmental conservation initiatives, such as school projects within the power plant, educational field trips related to the environment, or supporting community environmental activities, as examples.

(2) Social, Child, and Youth Development Plan: This plan is dedicated to the development of the social and educational aspects of children and youth. It includes supporting educational institution activities in the area, projects promoting sports activities in the community, as examples.

(3) Health Plan: This plan aims to improve health and well-being. It may involve projects like developing the potential of community health volunteers who serve the village.

(4) Cultural and Tradition Plan: This plan is designed to support cultural and traditional practices. It may include supporting events like ordination ceremonies or traditional Thai New Year celebrations (Songkran).

Example of future CSR plan for the Project is as shown in **Table 2.8-1**.

Table 2.8-1

Example of Future CSR Plan

Activities	Implementation	Target Group	Objectives	Budget	Responsible Parties
1. Environment					
- Open-house events for project visits and project learning	Organize educational field trips to visit and provide knowledge about the Solar project.	1. Communities within a 3-kilometer from the project boundary 2. Educational Institutions 3. Relevant Agencies	1. To provide the community with knowledge and understanding of the project's operations, including the project's environmental management. 2. To disseminate project information.	To be determined	CSR Department
- Education zone within the power plant	Conduct activities to provide knowledge and visit the production processes of the project, as well as energy-saving methods.	Educational Institutions within a 3-kilometers from the project boundary	1. To provide the community with knowledge and understanding of the project's operations, including the project's environmental management. 2. Promote campaigns on energy conservation.	To be determined	CSR Department and the Project
- Supporting community environmental activities	Conduct activities to provide knowledge and visit the production processes of the project, as well as energy-saving methods.	Educational Institutions within a 3-kilometers from the project boundary	1. To provide the community with knowledge and understanding of the project's operations, including the project's environmental management. 2. Promote campaigns on energy conservation.	To be determined	CSR Department and the Project
2. Social, Child, Youth					
- Supporting educational institution activities	Support teaching and learning materials and activities for educational institutions.	Educational Institutions within a 3-kilometers from the project boundary	To support teaching materials	To be determined	CSR Department

Activities	Implementation	Target Group	Objectives	Budget	Responsible Parties
- Supporting sports activities	Support sports equipment and school sports budget.	Communities within a 3-kilometer from the project boundary	To promote physical exercise.	To be determined	CSR Department
- Supporting National Children's Day activities	Support budget and gifts for National Children's Day activities.	Communities within a 3-kilometer from the project boundary	To build good relationships with the community.	To be determined	CSR Department
3. Health					
- Village Health Volunteer (VHV) Development Project	Support training sessions and provide support for basic health examination equipment.	Health Promoting Hospital and VHV within a 3-kilometers from the project boundary	1. Promoting health awareness among the community members. 2. Encouraging comprehensive health check-ups for the community.	To be determined	CSR Department
4. Cultural and Tradition					
- Supporting budget for local community cultural and traditional events	Provide budget support for local community cultural and traditional events as appropriate and opportunities.	Communities within a 3-kilometer from the project boundary	To collaborate in preserving and perpetuating local traditions.	To be determined	CSR Department
- Supporting budget for merit-making events	Support budget and participate in merit-making events at the temple in the area of operation and within a 3-kilometer study radius.	Communities within a 3-kilometer from the project boundary	To collaborate in preserving and perpetuating local traditions.	To be determined	CSR Department
- Supporting budget for Songkran Festival events	Participate in community activities and support drinking water for public service points.	Communities within a 3-kilometer from the project boundary	1. To collaborate in preserving and perpetuating local traditions. 2. To be part of creating road safety during festivals.	To be determined	CSR Department

2.9 ENVIRONMENTAL AUDIT COMMITTEE

The Project shall establish an Environmental Audit Committee to build confidence and provide clear and continuous information about the Project's environmental aspects. Furthermore, the Project places the great importance on environment and well-being of the community. Therefore, it encourages and supports community involvement in monitoring and assessing the environmental impact of Project activities, both during construction and throughout the Project's operation. The committee will be operational at least one month before construction begins, serving as a central hub for communication, monitoring, control, and any necessary actions. This ensures that concerns are addressed, and accurate and clear understanding is maintained, fostering a collaborative relationship between the Project and the community. The objectives, structure, and responsibilities of the Environmental Audit Committee are as follows:

(1) Objectives of Establishing the Environmental Audit Committee

1) To raise public awareness, create knowledge, understanding, and positive relationships regarding the environmental aspects of the Project within the communities surrounding the Project area through the Environmental Audit Committee.

2) To serve as a channel for communication between the community and the Project, addressing complaints and various feedback related to the Project's operations.

3) To establish a central organization representing the local communities around the Project area and relevant government agencies, with the authority to conduct examinations and make judgments on community complaints regarding environmental impacts resulting from the Project's activities.

(2) Components of the Environmental Audit Committee

The Environmental Audit Committee consists of members representing various sectors, including community representatives, government representatives, qualified individuals, and company representatives. The community representatives must make up at least half of the committee, totaling 27 members from all sectors. The details are as follows:

1) Community Representatives

These members are selected through a selection process conducted by each sub-district or municipality within a 3-kilometer radius of the Project boundary in the Doem Bang Nang Buat District and Dan Chang District, Suphanburi Province. The allocation is as follows:

(a) Community Representatives from Nong Krathum Sub-district, Doem Bang Nang Buat District: 9 members.

(b) Community Representatives from Bo Kru Sub-district, Doem Bang Nang Buat District: 3 members.

(c) Community Representatives from Nong Makhamong Sub-district, Dan Chang District: 3 members.

2) Government Representatives

(a) A representative from the Doem Bang Nang Buat District, where the Project is located: 1 member.

(b) Representatives from local government organizations within a 3-kilometer radius from the Project's location, with each organization providing 1 member. This totals 3 members and includes:

(i) A representative from the Nong Krathum Sub-district Municipality, Doem Bang Nang Buat District, Suphanburi Province.

(ii) A representative from the Bo Kru Sub-district Administrative Organization, Doem Bang Nang Buat District, Suphanburi Province.

(iii) A representative from the Nong Makhamong Sub-district Administrative Organization, Dan Chang District, Suphanburi Province.

(c) Hospital Director of the Sub-district Health Promoting Hospital in the Project's location: 1 member.

(d) A representative from educational institutions within the Project's location: 1 member.

(e) Additional government representatives consisting of 4 units, with each unit providing 1 member. This totals 4 members of:

- A representative from Suphanburi Provincial Industry Office
- A representative from Suphanburi Provincial Office of Natural Resources and Environment.
- A representative from Suphanburi Provincial Energy Office
- A representative from Office of Energy Regulatory Commission, Regional Office 9 (Kanchanaburi)

(f) A Qualified Individual Committee Member: 1 member.

(g) A Company Representative Committee Member: 1 member.

(3) The Committee Selection

includes the following steps:

1) Representatives of the Public

The selection of community representatives as committee members shall follow the guidelines, methods, or customary practices of each sub-district or municipality. These representatives may be chosen through appointment, election, or nomination.

2) Committee Member Qualifications

Community representatives on the committee must meet the following qualifications:

a) Must be at least 25 years old on the day of appointment, election, or nomination and must not possess the following disqualifications:

- Inappropriate conduct or dishonesty in their duties, resulting in a court verdict declaring them bankrupt or sentencing them to prison, unless the offense was a minor or non-criminal act.
- Mental illness or mental instability, or being declared legally incompetent or incapacitated by a court.

b) Must have their name registered on the household registration within that sub-district for at least one year before the day of selection.

3) Government Sector Representatives

The government sector representatives shall be selected by state agencies and local government organizations within the area where the Project is located and within a 3-kilometer radius from the Project's location.

4) Qualified Individual Representative

This representative shall be selected jointly by the community representatives and the company representative, with one member in this category.

Qualifications for the Qualified Individual Representative:

(a) Must be at least 30 years old on the day of selection.

(b) Must possess knowledge and abilities related to environmental impact assessment or any relevant field related to the committee's duties, or be an individual considered suitable by the community or widely recognized by the general public.

(c) Must not have the following disqualifications:

a) Inappropriate conduct or dishonesty in their duties, resulting in a court verdict declaring them bankrupt or sentencing them to prison, unless the offense was a minor or non-criminal act.

b) Mental illness or mental instability, or being declared legally incompetent or incapacitated by a court.

5) Company Representative

The company representative shall be appointed by the "Breeze and Shine Power Co., Ltd."

(4) Term of Committee

1) Committee members shall have a term of office lasting 4 years from the date of their appointment and may serve for a maximum of two consecutive terms.

2) When the term of office is completed, and if there has been no proposal for new appointments, the committee member whose term has ended shall continue to perform their duties until a new committee member is proposed or appointed, but for no more than ninety days from the end of their term.

3) In the event that a committee member vacates their position before completing their term, a replacement committee member of the same type shall be recruited and appointed within forty-five days from the date the committee member vacated their position. The appointed person shall assume the remaining term of the vacated committee member.

4) If the remaining term of the vacated committee member is less than ninety days, there is no obligation to recruit or appoint a replacement committee member, and the committee shall continue to function with the remaining members.

5) In addition to vacating the position at the end of the term, a committee member shall vacate their position when:

- Dead
- Resign
- Unsuitable behavior for holding the position of committee member, such as failing to attend three consecutive meetings without valid reasons, engaging in misconduct related to their duties, or losing their ability to perform their duties, and the majority of the committee members vote for their removal.
- A court sentences them to imprisonment, except for non-criminal offenses or offenses committed unintentionally.
- Exhibit moral turpitude or mental instability or are declared legally incapacitated or incompetent by a court.

6) Meeting Frequency: Committee meetings must have at least half of the total committee members present to be considered a valid meeting. Meetings shall be held every six months, and if there is an urgent need, meetings can be called before the scheduled time with the approval of at least half of the total committee members.

7) Decision-Making: In the event of a tie vote during a meeting, each committee member shall have one vote. If the votes are tied, the meeting chairperson shall cast an additional deciding vote.

(5) Powers and Duties

1) Establish guidelines and procedures for assessing the environmental impact of the Project.

2) Receive and consider complaints, as well as evaluate suggestions and recommendations from the public regarding the environmental impact of construction and Project operations.

3) Provide feedback or suggestions to the Project to ensure it complies with the guidelines outlined in the Project's Code of Practice (CoP) report.

4) Make recommendations to government agencies for Project adjustments or modifications in construction methods or Project operations to align with the requirements stated in the Project's Code of Practice (CoP) report.

5) Appoint assistants or support personnel for other relevant tasks as needed and appropriate.

6) Create good understanding among the community and collaborate with relevant organizations.

7) Conduct environmental quality monitoring according to the environmental impact prevention and mitigation measures and environmental monitoring measures of the Project.

8) Arrange on-site visit to check construction activities and implementation.

9) Disseminate accurate Project information to the public.

10) Establish regulations for receiving complaints, dispute resolutions, judgments, and grievances from the public, or any other regulations necessary for job performance.

11) Publicly announce complaints or grievances submitted by the public to the working committee and post the committee's decisions at the government agency's operating location, with a minimum of 3 public announcements.

12) Participate in assessing cases for compensation in situations where damage can be proven to result from Project implementations.

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CHAPTER 3

EXISTING ENVIRONMENTAL CONDITIONS

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EXISTING ENVIRONMENTAL CONDITIONS

The current environmental conditions comprehensively include physical condition, natural resources, social economic condition and human use value will relate to the project. The scope of the Project's study area extends within a 3-kilometer radius from the project's location. This comprehensive study encompasses all four aspects: Physical Resource, Biological Resource, Human Use Value, and Quality of Life Value.

The study area also includes sensitive areas in two districts and three sub-districts within the Suphanburi province. Specifically, it encompasses:

1) Doem Bang Nang Buat District, consisting of Nong Kratum Sub-district (the project's location) and Bo Kru Sub-district, and
2) Dan Chang District, Nong Makha Mong Sub-district.

3.1 PHYSICAL CONDITIONS

3.1.1 Geology and Soil

(1) Geographical Feature

Suphanburi Province is located along the Tha Chin River or Suphanburi River. The river flows along the length of the province from north to south. Suphanburi Province locates between latitude 14°4' to 15°5' North and between longitude 99°17' to 100°16' East, with 3 – 10 meters elevation above sea level. A total area of Suphanburi Province is approximately 5,358.01 square kilometers or approximately 3.3 million rai, representing 5.2% of the central region. The distance from Bangkok is about 107 kilometers along National Highway No. 340 and about 142 kilometers by train. Its geographical feature consists of mountains, forest, and plain fields.

(2) Geology and Earthquakes

1) Geology

The geological features of Suphanburi Province encompass rocks from various eras, including Cambrian-Ordovician (approximately 570-438 million years), Silurian and Ordovician (approximately 505-438 million years), Silurian-Devonian (approximately 438-360 million years), Permian (approximately 256-245 million years),

and Triassic (approximately 245-210 million years) periods. Additionally, a large portion of the flat lowland area is covered by Quaternary deposits (approximately 1.6-0.01 million years) (Source: District classification for geological and mineral resource management, Department of Mineral Resources, Ministry of Natural Resources and Environment, B.E. 2557 (2014))

The Project study area consists of two primary geological characteristics (**Figure 3.1.1-1**):

(a) Colluvial deposits (Qc) is encompassing fragments of weathered rock, gravel, sand, silty clay, and loam. This characteristic is covering an area of 27.28 square kilometers, representing 56.45% of the total study area (including most of the Project location).

(b) Alluvial deposits and Alluvial fan delta deposits (Qfa) compose of sandy loam soil mixed with clay, silt, and reddish-brown soils. This characteristic is covering an area of 21.05 square kilometers, representing 43.55% of the total study area.

In conclusion, the Project location exhibits the two geological features discussed above. The majority of the area consists of Colluvial deposits (Qc).

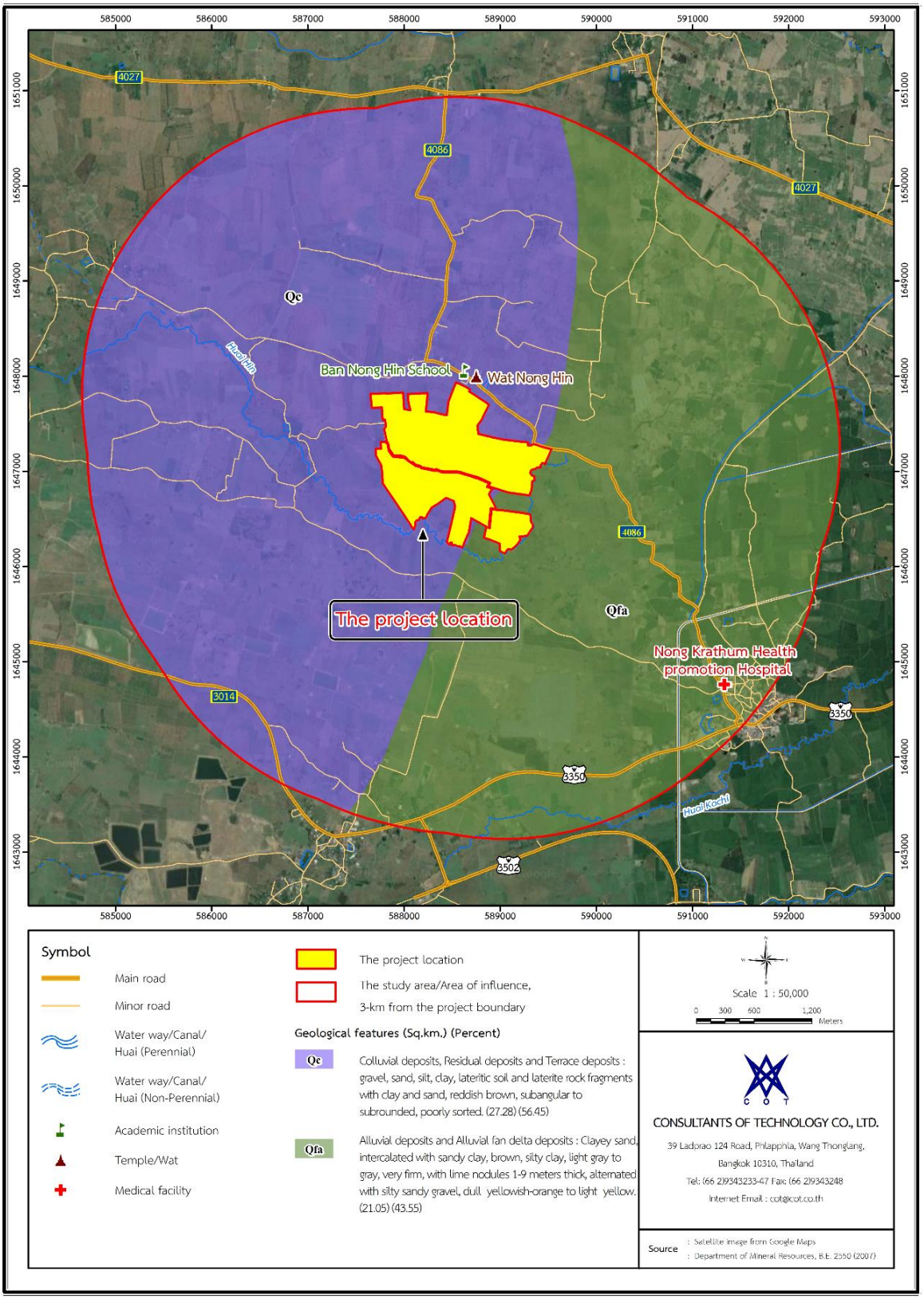
2) Active Faults

Thailand is surrounded by several active faults which can be classified into three major faults based on orientation and motion: a group-oriented northeast-southwest, a group-oriented northwest-southeast, and a group-oriented north-south. There are 16 identified active faults in Thailand (**Figure 3.1.1-2**), the nearest one is the Sri Sawat, approximately 100 kilometers from the Project area.

3) Seismic Zonation

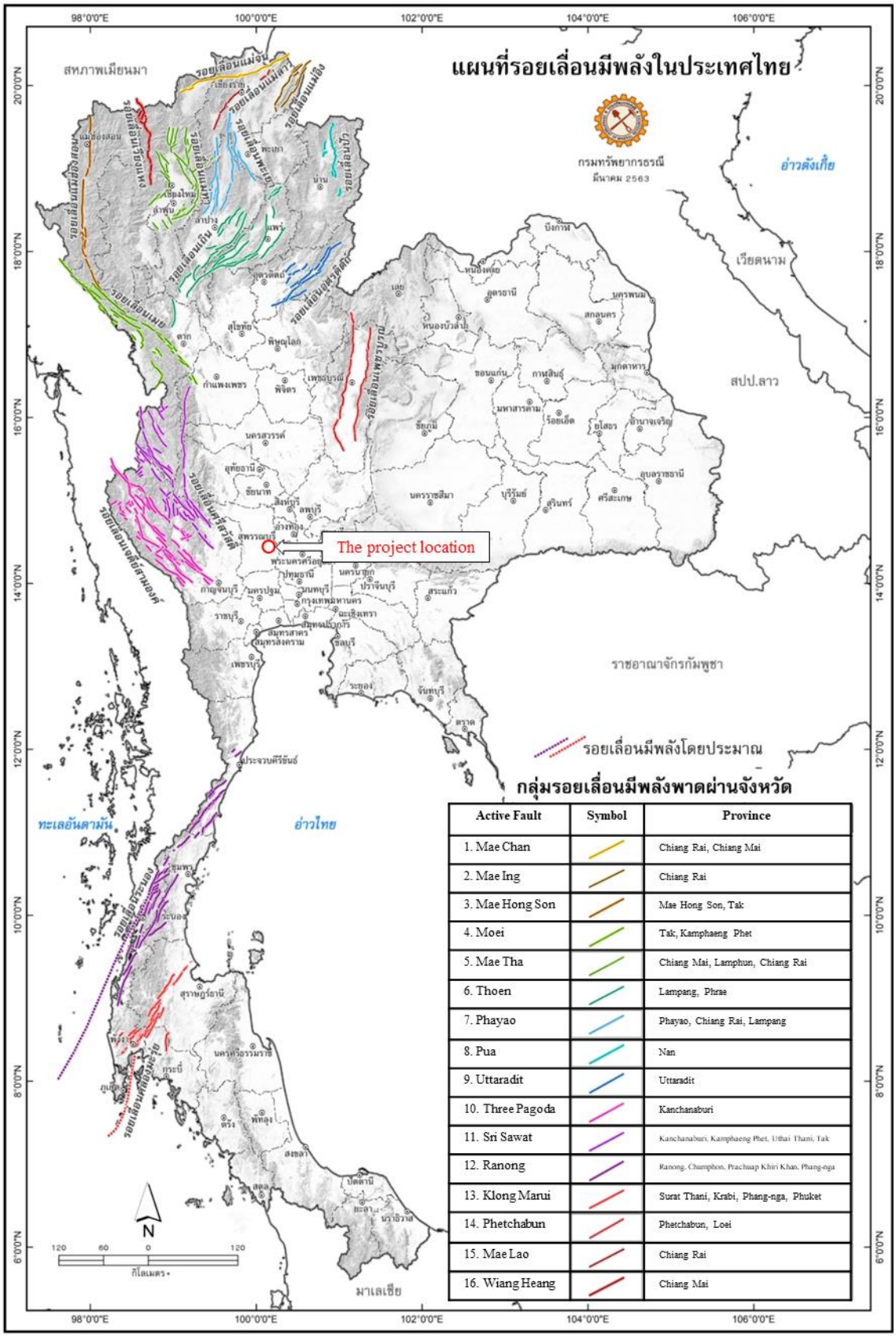
Based on statistics of earthquake occurrences impact the country and environmental geological data from the Department of Mineral Resources, Thailand has been an earthquake disaster risk map or seismic hazard map. The map analyzes seismic data and intensity, categorizes earthquake intensity levels with a 10% likelihood over a 50-year period into five levels, as shown in **Table 3.1.1-1** and **Figure 3.1.1-3**.

The Project site is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province, with earthquake intensity level at I-III. Majority of earthquake incidents in Thailand have low intensity up until now, no significant incidents were found in the study area.



Source: Satellites image from Google Maps and data from the Department of Mineral Resources, B.E. 2550 (2007)

Figure 3.1.1-1 Geological Features in the Study Area



Source: Department of Mineral Resources, B.E. 2563 (2021)

Figure 3.1.1-2 Active Faults in Thailand

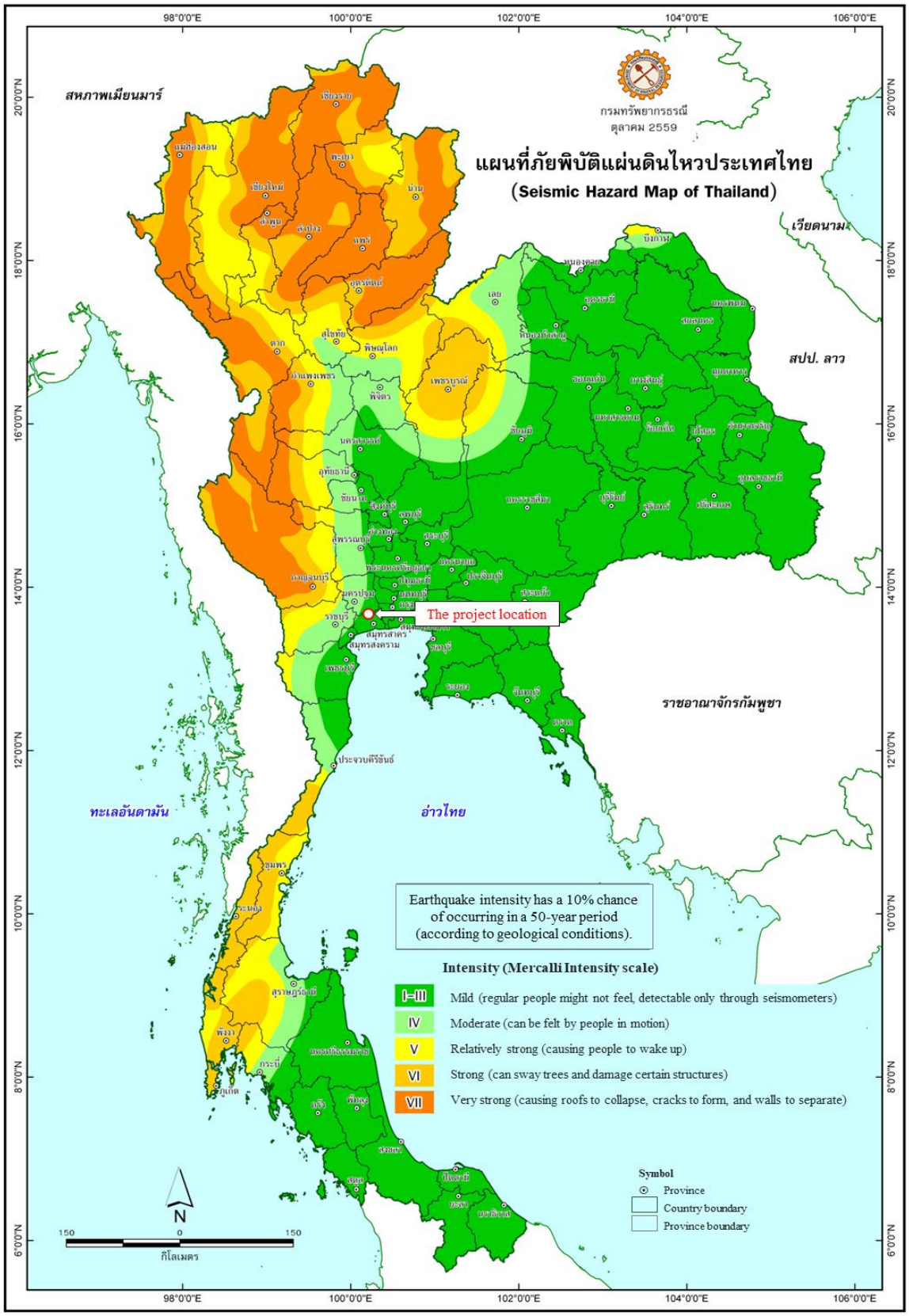
Table 3.1.1-1

Intensity of Seismic in Regions of Thailand

Scale	Intensity	Region
Less than 3.0 Mercalli	Mild	Lower northeastern part of the eastern region, some parts of the eastern region, and lower parts of the southern region.
4.0 Mercalli	Moderate	Upper parts of the northeastern region, some parts of the central region, some parts of the eastern region, and lower parts of the southern region.
5.0 Mercalli	Relatively strong	Some parts of the northern region, upper parts of the northeastern region, some parts of the central region, and lower parts of the southern region.
6.0 Mercalli	Strong	Some parts of the northern region, upper parts of the northeastern region (Bung Kan and Nakhon Phanom provinces), some parts of the central region, and some parts of the southern region.
7.0 Mercalli	Very Strong	some parts of the northern region, some parts of the central region, and upper parts of the southern region.

4) Statistics of the Earthquake Situation in Thailand

Based on the earthquake statistics from the Thai Meteorological Department's Earthquake Monitoring Center, as of May 17, B.E. 2566 (2023), 57 times noticeable but generally non-severe earthquakes occur in Thailand between the years B.E. 2561-2566 (2018-2023). The epicenters were primarily in neighboring countries, causing tremors in areas close to the epicenters, especially in the southern and northern regions, including Bangkok and its suburbs. No earthquakes were recorded in the Project area in Suphanburi Province.



Source: Department of Mineral Resources, B.E. 2563 (2021)

Figure 3.1.1-3 Seismic Hazard of Thailand

(3) Soil Resources

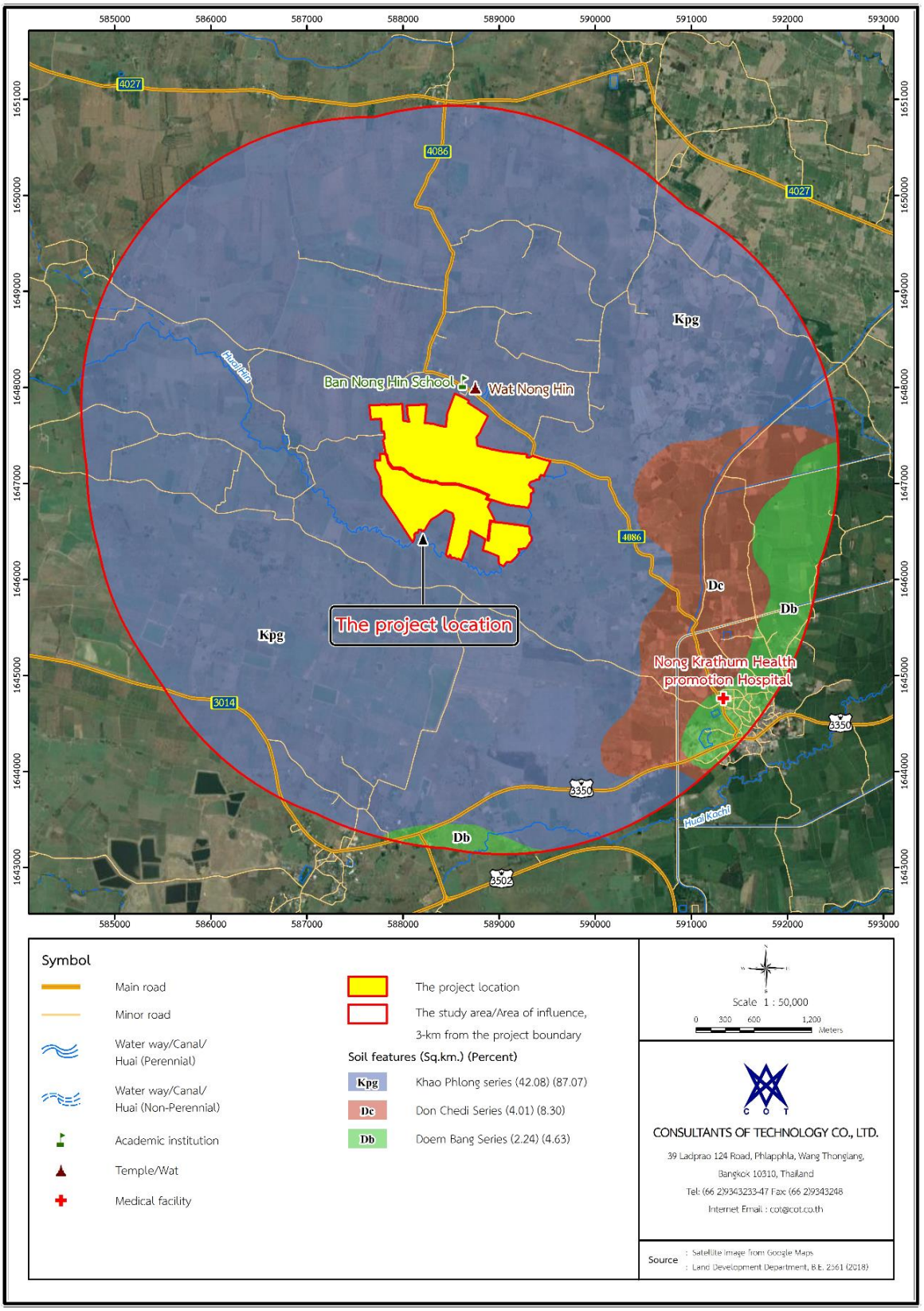
1) Soil Characteristics

Based on the soil classification study conducted within the study area, which covered a radius of 3 kilometers from the Project site boundaries, utilizing Geographical Information System (GIS) data from the Department of Land Development, B.E. 2561 (2018) and satellite images from Google Earth (**Figure 3.1.1-4**), it was observed that the study area comprised of three distinct soil series as follow.

Khao Phlong Series (Kpg) has its origin as waterborne sediments. The area is relatively smooth, good drainage, moderate to fast water permeability, slow to moderate surface runoff. The top soil is sandy loam soil. The soil reaction is slightly acidic (pH 5.5-6.5) throughout the soil layer. This soil series is covering an area of 42.08 square kilometers or representing 87.07% of the total study area (including Project location).

Don Chedi Series (Dc) has its origin as water sediment. The area is quite smooth to a little undulating with 1-5% slope, moderate to good drainage, moderate water permeability and surface water runoff. The top soil is loamy, sandy brown or grayish brown. The soil reaction is slightly acidic (pH 5.5-6.5). The bottom soil is sandy loam or loam with brown or reddish-brown color. The soil reaction is acidic (pH 5.0-5.5). The bottom soil is sandy loam with brown to dark brown color. This soil series is covering an area of 4.01 square kilometers or representing 8.30% of the total study area.

Doem Bang Series (Db) has its sediment deposited on the old low-level sludge or fan-shaped sediment mound. The area is flat to relatively smooth, with 0-2% slope, poor drainage, relatively slow surface water runoff, moderate to slow water permeability. The topsoil is sandy loam to sandy loam or clay loam with grayish brown color. The soil reaction is slightly acidic (pH 6.0). The lower soil is clay loam, clay or silty clay with brownish gray or grayish brown color with dark brown spots. The soil reaction is slightly acidic (pH 6.0). The bottom soil is clay, light brownish gray with red dots. The soil reaction is slightly alkaline (pH 7.0-8.0). This soil series covering an area of 2.24 square kilometers or representing 4.63% of the total study area.



Source: Satellites image from Google Maps and data from the Department of Land Development, B.E. 2561 (2018)

Figure 3.1.1-4 Soil Series in the Study Area

2) Soil Erosion

Based on the topographical data from the Department of Land Development in B.E. 2544 (2001), which categorized soil erosion rates into five classes: slight, moderate, severe, very severe, and extremely severe (**Table 3.1.1-2**).

Table 3.1.1-2
Soil Erosion Rate in Thailand

Class	Erosion Risk	Soil Erosion Rate	
		(ton/rai/year)	(mm./year)
1	Slight	0 - 2	0 - 0.96
2	Moderate	2 - 5	0.96 - 2.40
3	Severe	5 - 15	2.40 - 7.20
4	Very severe	15 - 20	7.20 - 9.60
5	Extremely severe	> 20	> 9.60

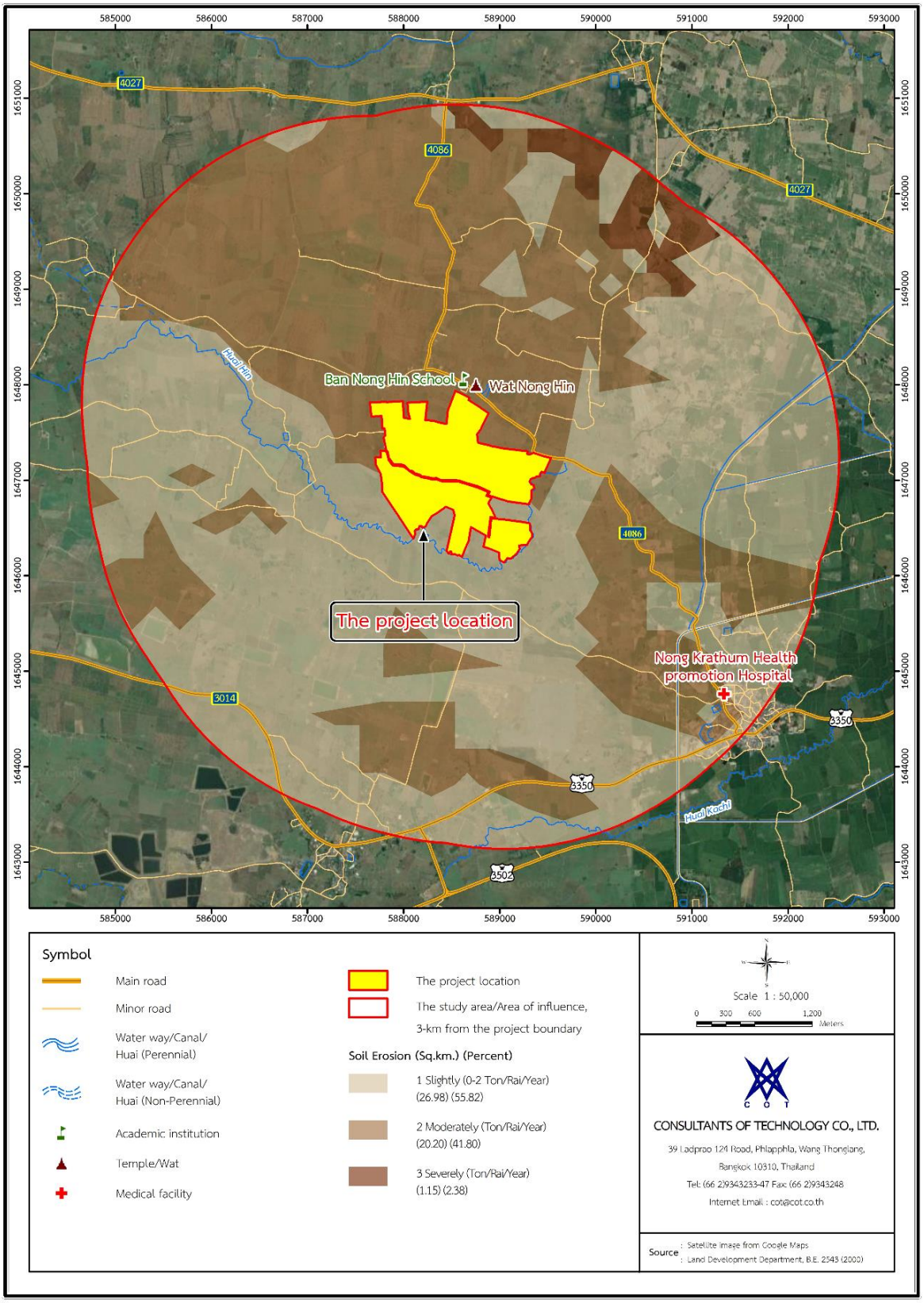
Source: Department of Land Development, B.E. 2544 (2001)

When considering the area within a radius of 3 kilometers from the Project boundary, it was found that there are three classes of soil erosion risk as follows (**Figure 3.1-1-5**).

- Class 1, slight (0-2 tons/rai/year): covering an area of 26.98 square kilometers or representing 55.82% of the total study area (including Project location).

- Class 2, moderate (2-5 tons/rai/year): covering an area of 20.20 square kilometers or representing 41.80% of the total study area.

- Class 3, severe (5-15 tons/rai/year): covering an area of 1.15 square kilometers or representing 2.38% of the total study area.



Source: Satellites image from Google Maps and data from the Department of Land Development, B.E. 2561 (2018)

Figure 3.1.1-5 Risk of Soil Erosion in the Study Area

3.1.2 Climate and Meteorology

(1) Climate

Suphanburi Province is under the influence of 2 types of monsoons, the northeastern monsoon which blows from the northeast, covered in winter, causing Suphanburi to experience cold and dry conditions, as well as the southwest monsoon, blowing from the southwest during the rainy season which result in rain and humidity. (Source: Suphanburi Provincial Development Plan B.E. 2566-2570 (2023-2027), Suphanburi Provincial Office)

Winter begins from mid-October to mid-February, which is influenced by the northeast monsoon and high pressure from China, resulting in lower temperature and dry air. However, Suphanburi experiences the weather season later than the northern and northeastern regions, leading to a slower onset of cool weather, starting around mid-November.

Summer starts after the end of the northeast monsoon, approximately from mid-February to mid-May. During this season, a high pressure creates widespread heat over the upper part of Thailand, resulting in generally hot and stifling weather. The highest temperature usually lies around April or May.

Rainy starting from mid-May to mid-October, is characterized by the southwest monsoon covering Thailand. The low-pressure area passing through the southern region gradually moves northward, affecting the central and northern regions. This leads to the beginning of rainfall around mid-May. September experiences the highest rainfall of the year, as well as high humidity, similar to October.

(2) Meteorology

Meteorological data from the air quality monitoring station in Mueang Suphanburi District, Suphanburi Province, located at coordinates 14°28'N, 100°8'E, is selected to represent the study area. The data covers a 30-year period B.E. 2535-2564 (1992-2021) and includes climatic statistics as presented in **Table 3.1.2-1**, along with wind rose shown in **Figure 3.1.2-1**.

Table 3.1.2-1
Meteorological Data for the 30-year Period (B.E. 2535-2564 (1992-2021))
Suphanburi Meteorological Station

Station	Suphanburi				Elevation of station above MSL						7.23	Meters	
Index Station	48425				Height of barometer above MSL						8.83	Meters	
Latitude	14° 28' 28.0" N				Height of Thermometer above ground						1.20	Meters	
Longitude	100° 8' 20.0" E				Height of wind vane above ground						11.65	Meters	
					Height of rainguage						0.80	Meters	
Elements	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Pressure (Hectopascal)													
Mean	1,012.70	1,011.60	1,009.90	1,008.60	1,007.20	1,006.50	1,006.50	1,006.80	1,008.00	1,010.20	1,011.60	1,013.10	1,009.39
Mean Daily Range	4.8	5.1	5.4	5.3	4.7	4.0	3.9	4.1	4.7	4.7	4.6	4.7	4.67
Ext.Max.	1,024.40	1,022.82	1,025.93	1,018.08	1,016.14	1,013.49	1,013.92	1,013.33	1,018.21	1,018.51	1,021.90	1,024.09	1,025.93
Ext.Min.	1,004.82	1,003.36	994.99	999.97	999.75	998.41	998.86	999.19	999.53	1,000.85	1,003.10	1,003.03	994.99
Temperature (Celsius)													
Mean Max.	32.1	34.1	35.9	37.3	36.3	35.1	34.3	34.3	33.8	32.8	32.2	31.3	34.1
Ext.Max.	36.4	39.1	41.0	42.2	42.0	39.9	38.8	38.3	37.9	36.9	36.7	36.5	42.2
Mean Min.	21.0	22.8	24.6	25.8	26.1	25.8	25.3	25.1	24.9	24.7	23.1	20.9	24.2
Ext.Min.	11.2	13.5	16.6	20.6	20.9	22.0	22.0	22.0	21.7	18.0	16.2	10.4	10.4
Mean	26.0	27.7	29.4	30.7	30.3	29.6	29.0	28.8	28.6	28.3	27.4	25.7	28.5
Dew Point Temp. (Celsius)													
Mean	19.9	21.6	23.2	24.2	24.7	24.4	24.0	23.9	24.4	24.2	22.0	19.2	23.0
Relative Humidity (%)													
Mean	71.0	72.0	72.0	71.0	74.0	75.0	76.0	77.0	80.0	80.0	74.0	69.0	74.2
Mean Max.	89.0	91.0	92.0	91.0	90.0	89.0	90.0	90.0	93.0	93.0	89.0	86.0	90.2
Mean Min.	49.0	47.0	47.0	46.0	54.0	57.0	59.0	58.0	62.0	62.0	55.0	49.0	53.6
Ext.Min.	21.0	20.0	18.0	21.0	27.0	25.0	34.0	28.0	37.0	39.0	33.0	7.0	7.0
Visibility (Km.)													
Mean	5.6	5.6	6.1	7.2	9.1	10.3	10.3	10.3	9.8	8.5	7.6	6.9	8.1
07.00LST	3.6	3.4	4.4	6.1	8.3	10.0	9.9	9.9	9.4	7.5	6.5	5.7	7.1
Cloud Amount (1-10)													
Mean	3.5	3.3	3.9	4.7	6.6	7.6	8.0	8.3	8.0	6.6	4.5	3.5	5.7
Wind (Knots)													
Prev.Wind	NE	S	S	S	S	S	S	S	S	NE	NE	NE	-
Mean	1.3	1.6	1.9	1.9	1.8	2.1	2.1	1.9	1.3	1.4	1.8	2.0	1.8
Max.	24.0	18.0	25.0	43.0	42.0	40.0	24.0	29.0	47.0	32.0	25.0	33.0	47.0
Pan Evaporation (mm.)													
Total	121.0	128.7	163.2	179.3	178.1	160.0	150.6	144.8	131.7	125.1	120.4	126.6	1,729.5
Rainfall (mm)													
Total	5.5	8.1	28.5	60.6	121.1	94.9	101.2	117.0	224.4	183.4	43.8	6.5	995.0
Num. of Days	1.4	1.0	3.0	5.2	12.1	12.7	14.8	15.9	18.3	14.2	4.1	1.3	104.0
Daily Max.	48.1	49.4	84.4	146.0	103.4	77.9	82.7	108.6	190.4	109.7	75.1	17.5	190.4
Phenomena (Days)													
Fog	3.4	3.8	1.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	8.8
Haze	29.2	25.9	27.9	22.5	7.8	0.4	0.1	0.1	0.6	8.3	17.2	25.7	165.7
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ThunderStorm	0.1	0.3	1.1	3.0	6.1	4.6	3.4	3.9	7.5	6.8	1.1	0.1	38.0
Squall	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

Source: Thai Meteorological Department, B.E. 2566 (2023)

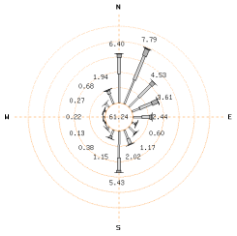
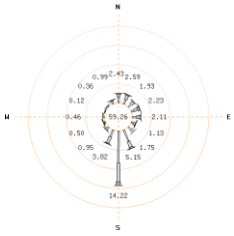
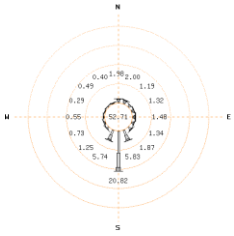
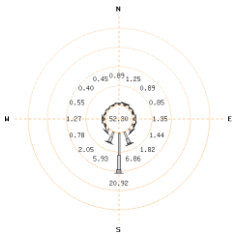
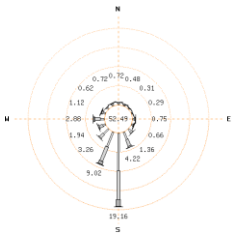
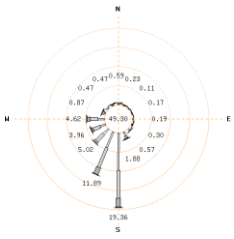
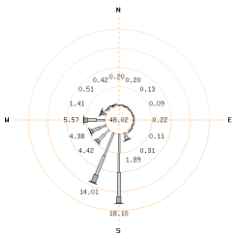
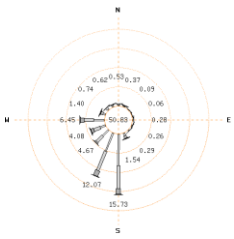
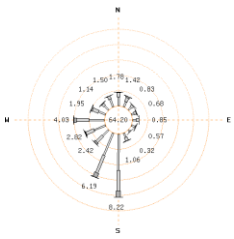
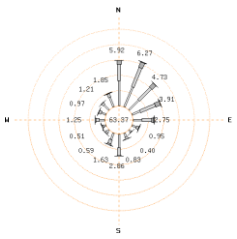
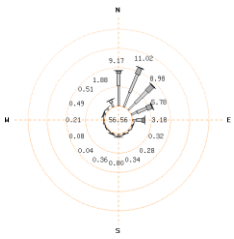
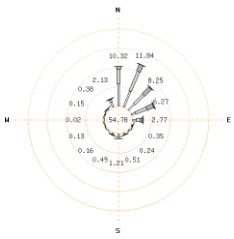
Index Station 48425 Latitude 14° 28' 28.0" N Longitude 100° 8' 20.0" E	Elevation of station above MSL 7.23 Meters Height of wind vane above ground 11.65 Meters	
		
January	February	March
		
April	May	June
		
July	August	September
		
October	November	December
		

Figure 3.1.2-1 Wind Rose for the 30-year Period (B.E. 2535-2564 (1992-2021)), Suphanburi Meteorological Station

INTERNAL. This information is accessible to ADB Management and staff. It may be shared outside ADB with appropriate permission.

1) Barometric Pressure

The average barometric pressure throughout the year is 1,009.39 hectopascals, with a range of variation between 1,006.50 and 1,013.10 hectopascals. Daily average pressure differences range from 994.99 to 1,025.93 hectopascals. The highest atmospheric pressure occurs in March at 1,025.93 hectopascals, while the lowest occurs in March at 994.99 hectopascals.

2) Temperature

The average temperature throughout the year is 28.5 degrees Celsius, with the highest annual average temperature of 34.1 degrees Celsius as well as the lowest annual average of 24.2 degrees Celsius. The highest recorded temperature is 42.2 degrees Celsius, occurring in April, while the lowest recorded temperature is 10.4 degrees Celsius, observed in December.

3) Humidity

The average relative humidity throughout the year is 74.2%, with the highest annual average of 90.2% and the lowest annual average of 53.6%. The lowest recorded relative humidity value is 7%, observed in December.

4) Cloud

The average cloud cover in the sky ranges from 3.3 to 8.3 out of ten parts. August has the highest cloud cover at 8.3, while February has the lowest cloud cover at 3.3.

5) Wind

The predominant wind directions are from the northeast and south, which are from October to January and February to September respectively. The average wind speed throughout the year is 1.8 knots. The average monthly wind velocity ranges from 1.3 to 2.1 knots. The highest recorded is 47 knots, observed in September.

6) Rainfall

The total annual rainfall is 995.0 millimeters. The month with the highest rainfall of 224.4 millimeters is September, while the month with the lowest rainfall of 5.5 millimeters is January.

7) Storm

The total time duration of thunderstorms that occurred in a year is 38 days. The month with the longest duration of thunderstorms is September, with 7.5 days. On the other hand, January and December have the shortest duration of thunderstorms, occurring only 0.1 day.

3.1.3 Air Quality

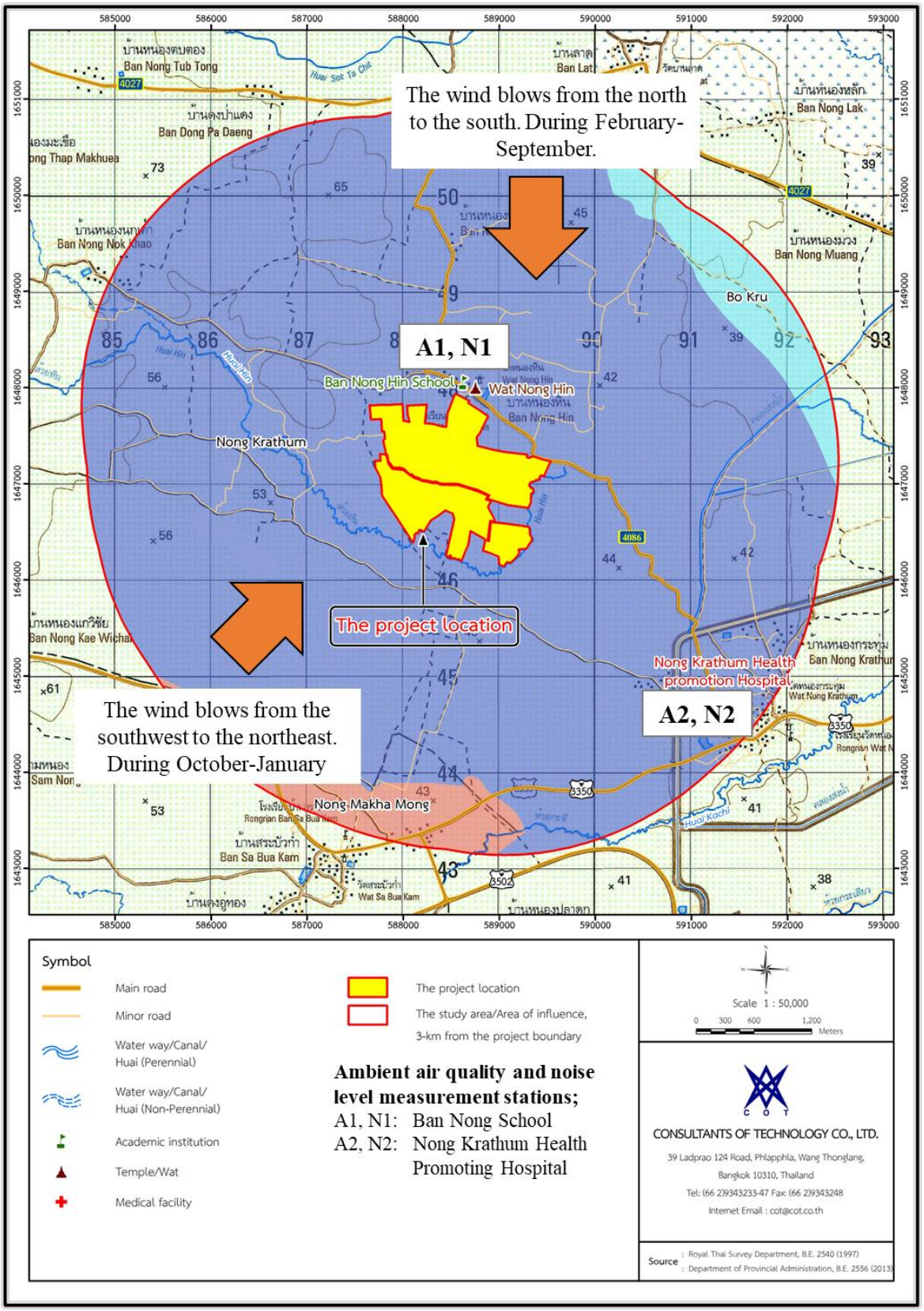
Ambient air quality measurements will be conducted during dry season and rainy season (**Appendix 3-1** to **Appendix 3-3**). Two stations of air quality measurement (as shown in **Figure 3.1.3-1** and **Figure 3.1.3-2**) are as follows:

A1: Ban Nong Hin School (approximately 120 meters from the Project to the north), situated in a community and agricultural area.

A2: Nong Krathum Sub-district Health Promoting Hospital (approximately 3 kilometers from the Project to the southeast), situated in a community area, government office, and open space.

The measured parameters included Total Suspended Particles (TSP), and Particulate Matter with a diameter of less than 10 micrometers (PM-10), During dry season, ambient air quality measurements were conducted in the study area from May 24th to 29th, B.E. 2566 (2023).

For the rainy season, ambient air quality measures were conducted during October 24th – 29th B.E. 2566 (2023). The measure parameters included Total Suspended Particles (TSP), Particulate Matter with a diameter of less than 10 micrometers (PM-10), and Particulate Matter with a diameter of less than 2.5 micrometers (PM-2.5) Results of ambient air quality measurements are summarized in **Table 3.1.3-1 and Figure 3.1.3-3**.



Source: Royal Thai Survey Department B.E. 2540 (1997) and Department of Provincial Administration B.E. 2556 (2013)

Figure 3.1.3-1 Ambient Air Quality and Noise Level Measurement Stations





Ban Nong Hin School (A1)





Nong Krathum Health Promoting Hospital (A2)

Figure 3.1.3-2 Ambient Air Quality Measurement

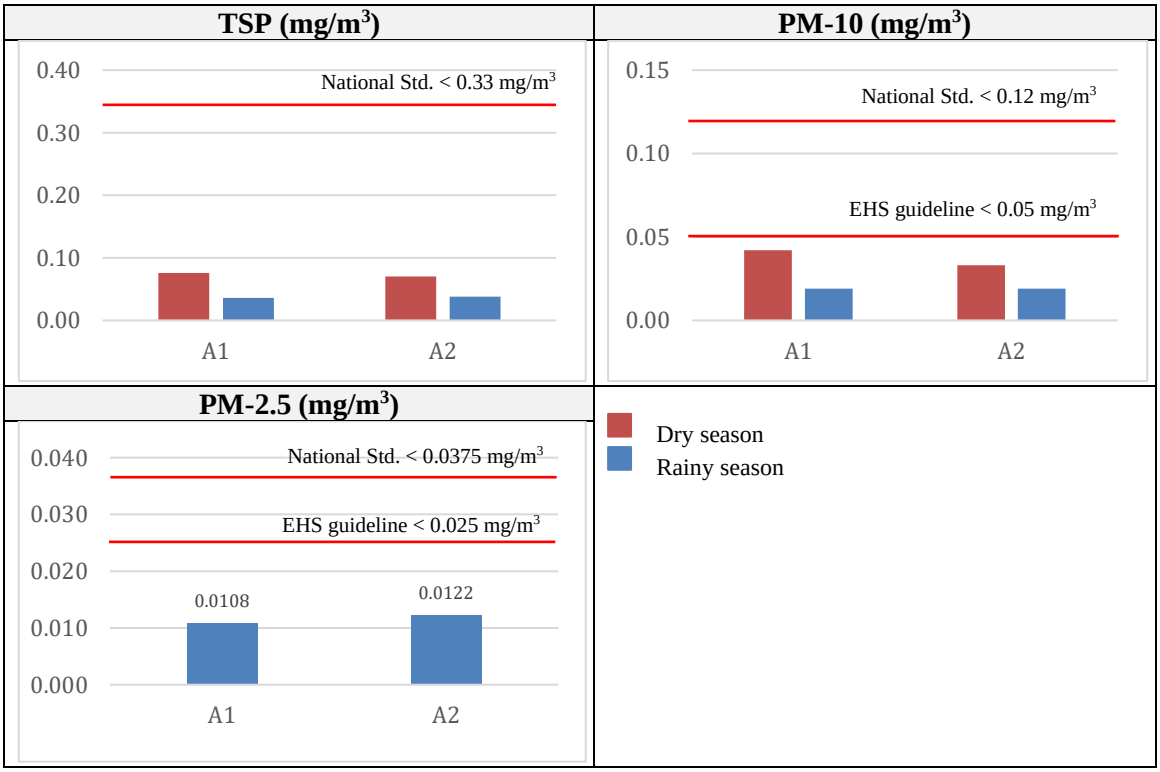


Figure 3.1.3-3 Bar Chart Shows Results of Ambient Air Quality Sampling

Table 3.1.3-1

Results of Ambient Air Quality Measurements

Station	Date of measurement	Concentration (milli gram per cubic meter), average 24-hr		
		TSP	PM-10	PM-2.5
A1: Ban Nong Hin School	24-25 May	0.067	0.038	-
	25-26 May	0.076	0.042	-
	26-27 May	0.066	0.036	-
	27-28 May	0.046	0.026	-
	28-29 May	0.042	0.024	-
	Min-Max	**0.042-0.076**	**0.024-0.042**	**-**
	24-25 Oct	0.032	0.018	0.0108
	25-26 Oct	0.032	0.016	0.0094
	26-27 Oct	0.033	0.017	0.0050
	27-28 Oct	0.036	0.019	0.1070
	28-29 Oct	0.035	0.018	0.0085
	Min-Max	**0.0032-0.036**	**0.016-0.019**	**0.0050-0.0108**
A2: Nong Krathum Sub-district Health Promoting Hospital	24-25 May	0.051	0.022	-
	25-26 May	0.070	0.033	-
	26-27 May	0.062	0.029	-
	27-28 May	0.049	0.028	-
	28-29 May	0.044	0.026	-
	Min-Max	**0.044-0.070**	**0.022-0.033**	**-**
	24-25 Oct	0.038	0.018	0.0076
	25-26 Oct	0.032	0.016	0.0067
	26-27 Oct	0.028	0.015	0.0028
	27-28 Oct	0.038	0.019	0.0122
	28-29 Oct	0.032	0.017	0.0043
	Min-Max	**0.028-0.038**	**0.015-0.019**	**0.0028-0.0122**
National Standard		**0.33** [1/]	**0.12** [1/]	**0.0375** [2/]
General EHS Guidelines [3/]		**-**	**0.050**	**0.025**

Source: Measured by Environment Research and Technology Co., Ltd.

Remark: [1/] National Environmental Board, No. 24 (B.E. 2547 (2004))

[2/] National Environmental Board, (B.E. 2566 (2023))

[3/] General EHS Guidelines, IFC, 2007

(1) Total Suspended Particles (TSP), 24-hour Average

During dry season, the average 24-hour TSP concentration at Ban Nong Hin School ranged from 0.042 to 0.076 milligrams per cubic meter. At Nong Krathum Sub-district Health Promoting Hospital, the concentration ranged from 0.044 to 0.070 milligrams per cubic meter. During rainy season, the average 24-hour TSP concentration at Ban Nong Hin School ranged from 0.0032 to 0.036 milligrams per cubic meter. At Nong Krathum Sub-district Health Promoting Hospital, the concentration ranged from 0.028 to 0.038 milligrams per cubic meter. The measured values are, therefore, in accordance with the National Environmental Board, No. 24 (2004).

(2) PM-10, 24-hour Average

During dry season, the average 24-hour PM-10 concentration at Ban Nong Hin School ranged from 0.024 to 0.042 milligrams per cubic meter. At Nong Krathum Sub-district Health Promotion Hospital, the concentration ranged from 0.022 to 0.033 milligrams per cubic meter. During rainy season, the average 24-hour PM-10 concentration at Ban Nong Hin School ranged from 0.016 to 0.019 milligrams per cubic meter. At Nong Krathum Sub-district Health Promotion Hospital, the concentration ranged from 0.015 to 0.019 milligrams per cubic meter. The measured values are, therefore, in accordance with both the National Environmental Board, No. 24 (2004) and General EHS Guidelines, IFC (2007).

(3) PM-2.5, 24-hour Average

During rainy season, the average 24-hour PM-2.5 concentration at Ban Nong Hin School ranged from 0.0050 to 0.0108 milligrams per cubic meter. At Nong Krathum Sub-district Health Promoting Hospital, the concentration ranged from 0.0028 to 0.0122 milligrams per cubic meter. The measured values are, therefore, in accordance with both the National Environmental Board, No. 24 (2004) and General EHS Guidelines, IFC (2007).

(4) Wind Speed and Wind Direction

Wind speed and wind direction measurements were conducted in the study area same period with ambient air quality sampling, at 2 stations: Ban Nong Hin School and Nong Krathum Sub-District Health Promoting Hospital.

1) Ban Nong Hin School: during dry season, the wind speed ranged from calm (less than 0.4 meters per second) to 5.4 meters per second. The prevailing wind direction came from the South-southeast (SSE). During rainy season the wind speed ranged from calm (less than 0.4 meters per second) to 2.7 meters per second. The prevailing wind direction came from the North (N). (**Table 3.1.3-2**, **Table 3.1.3-3**, and **Figure 3.1.3-4**)

2) Nong Krathum Sub-District Health Promoting Hospital: during dry season, the wind speed ranged from calm (less than 0.4 meters per second) to 3.1 meters per second. The prevailing wind direction came from the North (N). During rainy season, the wind speed ranged from calm (less than 0.4 meters per second) to 2.7 meters per second. The prevailing wind direction came from the North-northeast (NNE). (**Table 3.1.3-4**, **Table 3.1.3-5**, and **Figure 3.1.3-4**)

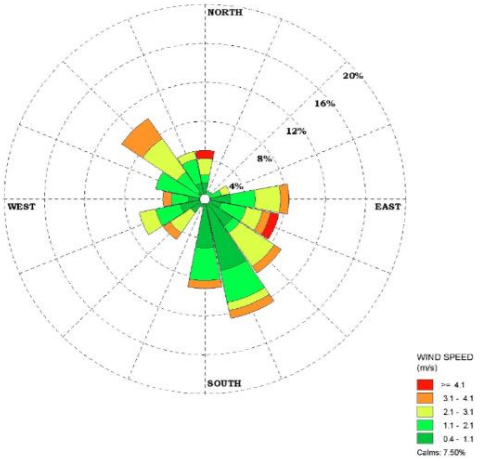
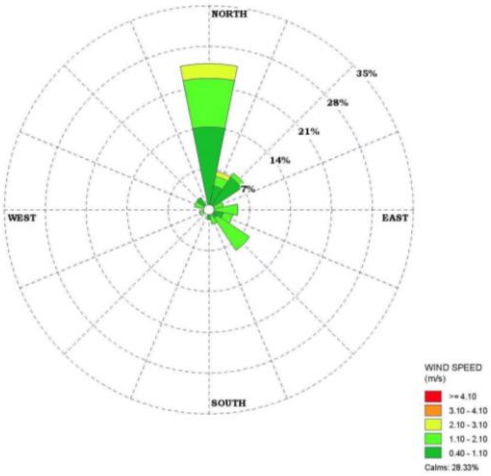
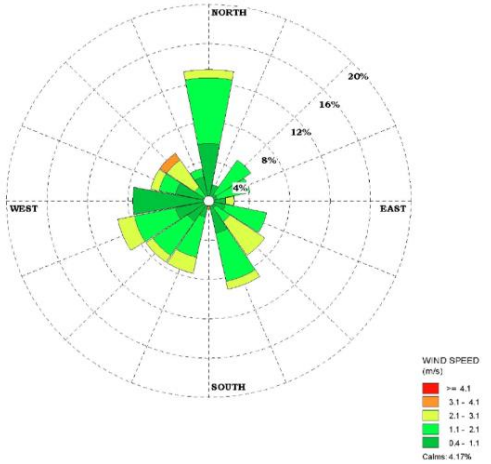
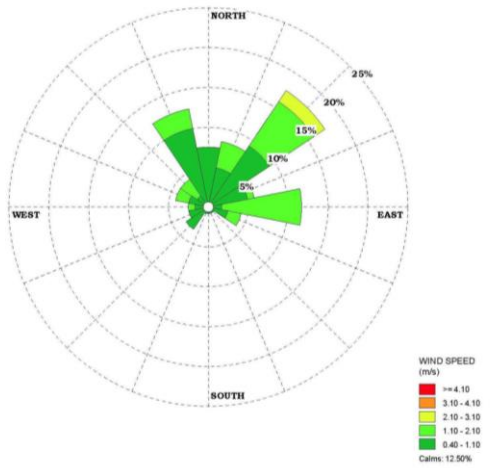
<table>
<tr><td>
</td><td>
</td></tr>
<tr><td>Dry Season</td><td>Rainy Season</td></tr>
<tr><td colspan="2">A1 Ban Nong Hin School</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Dry Season</td><td>Rainy Season</td></tr>
<tr><td colspan="2">A2: Nong Krathum Sub-district Health Promoting Hospital</td></tr>
</table>

Figure 3.1.3-4 Wind Rose at Ambient Air Quality Measurement Stations

Table 3.1.3-2
Wind Speed and Wind Direction at Ban Nong Hin School, During Dry Season

Time	24-25 May		25-26 May		26-27 May		27-28 May		28-29 May	
	WS	**WD**	**WS**	**WD**	**WS**	**WD**	**WS**	**WD**	**WS**	**WD**
08:00-09:00	1.8	WNW	0.4	NNW	0.9	W	0.4	WSW	0.9	SE
09:00-10:00	3.1	NW	1.8	NW	0.4	W	0.9	SE	1.3	WNW
10:00-11:00	3.1	NW	1.8	NNW	1.3	W	0.9	ESE	2.2	NW
11:00-12:00	1.8	N	1.8	NW	1.8	WNW	2.2	NW	2.2	E
12:00-13:00	2.2	N	1.8	NW	1.3	WNW	2.7	NNW	2.2	E
13:00-14:00	1.8	NNW	1.8	E	2.7	N	2.2	NW	1.8	ESE
14:00-15:00	2.2	SSE	1.8	SE	2.7	SE	3.1	NW	0.9	S
15:00-16:00	1.3	SSE	2.2	SE	5.4	ESE	2.2	NW	1.8	E
16:00-17:00	3.1	SSE	2.7	ESE	1.3	NNE	0.9	SE	2.7	E
17:00-18:00	4.5	N	3.1	SE	3.1	W	0.9	SE	3.1	E
18:00-19:00	1.3	E	1.8	S	1.3	W	2.7	S	3.1	ESE
19:00-20:00	0.4	S	2.7	SE	<0.4	Calm	2.7	SW	2.7	ESE
20:00-21:00	1.8	SSE	2.7	SE	0.4	SSE	2.2	SW	1.3	ESE
21:00-22:00	3.6	S	1.8	SSE	0.4	SSE	2.2	SW	0.9	E
22:00-23:00	1.3	S	2.2	NW	0.9	SSE	1.3	WSW	1.8	WNW
23:00-00:00	1.3	SSE	1.3	NE	0.4	SSE	0.4	SW	3.1	SW
00:00-01:00	1.3	S	<0.4	Calm	0.9	S	0.9	NNW	2.2	WS
01:00-02:00	0.4	S	<0.4	Calm	1.3	S	0.4	N	2.2	WSW
02:00-03:00	0.9	SSE	1.3	WSW	0.4	SSE	0.4	N	1.8	WNW
03:00-04:00	0.4	S	1.8	WSW	0.9	SSE	2.2	ENE	0.9	NW
04:00-05:00	0.4	S	0.4	WSW	0.4	SSE	1.3	ENE	1.3	NW
05:00-06:00	0.4	SSE	0.4	WSW	<0.4	Calm	0.4	ESE	13	ENE
06:00-07:00	0.9	SSW	<0.4	Calm	<0.4	Calm	0.4	E	1.3	ESE
07:00-08:00	0.4	SW	<0.4	Calm	<0.4	Calm	<0.4	Calm	0.9	E
Min	**0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**	**0.9**	**-**
Max	**4.5**	**-**	**3.1**	**-**	**5.4**	**-**	**3.1**	**-**	**3.1**	**-**
Unit	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**

Remark**:** WS = Wind Speed (m/s)
WD = Wind Direction
Calm = Calm Wind (a wind speed less than 0.4 m/s) (direction of calm wind is not taken into account the wind direction)

Table 3.1.3-3
Wind Speed and Wind Direction at Ban Nong Hin School, During Rainy Season

Time	24-25 Oct		25-26 Oct		26-27 Oct		27-28 Oct		28-29 Oct	
	WS	**WD**	**WS**	**WD**	**WS**	**WD**	**WS**	**WD**	**WS**	**WD**
08:00-09:00	0.4	N	<0.4	Calm	0.9	NE	1.3	N	1.3	N
09:00-10:00	0.9	N	<0.4	Calm	1.3	N	1.8	N	1.8	N
10:00-11:00	0.9	NE	0.9	NNE	0.9	N	1.3	NE	2.7	N
11:00-12:00	1.3	SE	0.9	ESE	0.9	N	0.9	SSE	2.7	N
12:00-13:00	1.8	ESE	1.3	SE	0.9	NE	0.9	NE	2.7	N
13:00-14:00	1.8	ESE	1.8	SE	1.8	N	0.9	ESE	2.7	NNE
14:00-15:00	1.8	SE	1.3	E	0.4	NNE	1.3	E	1.8	NNE
15:00-16:00	1.3	SE	1.8	E	0.9	N	1.3	SSE	1.8	N
16:00-17:00	0.4	ENE	1.3	NNE	1.3	ENE	0.9	SE	1.3	SSE
17:00-18:00	1.3	E	1.8	N	1.3	SE	0.9	S	1.3	SE
18:00-19:00	0.9	NNE	0.9	NE	1.8	ENE	0.9	S	0.9	SE
19:00-20:00	<0.4	Calm	0.9	NE	0.4	NW	<0.4	Calm	1.3	SE
20:00-21:00	<0.4	Calm	0.9	N	<0.4	Calm	<0.4	Calm	0.4	ESE
21:00-22:00	<0.4	Calm	0.4	N	0.4	N	<0.4	Calm	0.4	N
22:00-23:00	<0.4	Calm	0.4	N	0.4	NE	0.4	NW	1.3	N
23:00-00:00	0.4	N	<0.4	Calm	0.4	NNE	0.4	NW	0.9	NNW
00:00-01:00	1.3	E	<0.4	Calm	<0.4	Calm	0.4	W	1.3	WSW
01:00-02:00	1.3	E	<0.4	Calm	0.9	WSW	0.9	N	<0.4	Calm
02:00-03:00	0.4	N	<0.4	Calm	<0.4	Calm	0.4	N	<0.4	Calm
03:00-04:00	0.4	WNW	<0.4	Calm	<0.4	Calm	0.4	N	<0.4	Calm
04:00-05:00	1.3	WNW	<0.4	Calm	<0.4	Calm	<0.4	Calm	0.4	NNE
05:00-06:00	1.3	WNW	<0.4	Calm	<0.4	Calm	<0.4	Calm	0.4	NE
06:00-07:00	0.4	N	<0.4	Calm	<0.4	Calm	0.9	N	<0.4	Calm
07:00-08:00	<0.4	Calm	<0.4	Calm	<0.4	Calm	1.3	N	<0.4	Calm
Min	**<0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**
Max	**1.8**	**-**	**1.8**	**-**	**1.8**	**-**	**1.8**	**-**	**2.7**	**-**
Unit	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**

Remark**:** WS = Wind Speed (m/s)
WD = Wind Direction
Calm = Calm Wind (a wind speed less than 0.4 m/s) (direction of calm wind is not taken into account the wind direction)

Table 3.1.3-4
Wind Speed and Wind Direction at Nong Krathum Subdistrict Health Promoting Hospital, During Dry Season

Time	24-25 May		25-26 May		26-27 May		27-28 May		28-29 May	
	WS	**WD**	**WS**	**WD**	**WS**	**WD**	**WS**	**WD**	**WS**	**WD**
08:00-09:00	1.8	NW	0.9	NNW	0.4	NNW	0.4	WNW	0.9	SSE
09:00-10:00	2.2	NW	1.8	NW	0.9	NNW	0.9	N	0.9	N
10:00-11:00	2.2	NW	1.3	WNW	1.3	N	0.9	SSE	1.3	N
11:00-12:00	1.3	NE	1.3	NE	1.3	NE	1.3	NE	1.8	N
12:00-13:00	1.3	ESE	1.3	ENE	1.3	ENE	1.8	NE	1.3	SSE
13:00-14:00	2.2	SE	2.2	SE	1.8	ESE	1.3	ENE	1.8	N
14:00-15:00	1.8	SSW	1.3	SE	2.7	SE	1.8	ENE	1.3	SW
15:00-16:00	1.3	ESE	1.8	SSW	2.7	SE	1.8	SSE	1.3	SSE
16:00-17:00	3.1	S	1.3	SSE	2.2	E	2.2	SSW	2.2	SE
17:00-18:00	2.7	WSW	1.8	SSW	0.9	NNE	1.3	SSW	1.8	SSE
18:00-19:00	1.3	ESE	1.3	SW	0.4	NNE	2.2	WSW	2.2	SSE
19:00-20:00	0.4	SSW	0.9	N	<0.4	Calm	2.2	N	1.3	N
20:00-21:00	2.7	SSW	1.3	N	0.9	W	2.2	NW	0.9	N
21:00-22:00	2.2	SW	1.3	N	0.9	W	1.3	WNW	0.9	N
22:00-23:00	1.3	WSW	1.8	NNW	0.9	W	0.9	W	1.3	SSE
23:00-00:00	0.9	SSW	0.9	ENE	0.4	WSW	0.9	WNW	2.7	WNW
00:00-01:00	1.3	SW	<0.4	Calm	0.9	W	0.4	WNW	3.1	NW
01:00-02:00	1.3	SW	0.4	NE	0.4	WNW	<0.4	Calm	2.7	NW
02:00-03:00	0.9	SW	0.9	SW	1.3	WSW	0.4	ESE	1.3	N
03:00-04:00	1.3	SW	0.9	W	1.3	WSW	1.8	SE	0.4	N
04:00-05:00	0.9	SW	0.9	W	0.9	WSW	1.3	ESE	0.4	N
05:00-06:00	1.3	SW	0.4	W	0.4	WSW	0.9	E	0.9	SE
06:00-07:00	1.3	WSW	0.4	W	0.4	WSW	0.4	ESE	0.9	SSE
07:00-08:00	1.3	WSW	<0.4	Calm	<0.4	Calm	0.4	E	0.9	SSE
Min	**0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**	**0.4**	**-**
Max	**3.1**	**-**	**2.2**	**-**	**2.7**	**-**	**2.2**	**-**	**2.7**	**-**
Unit	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**

Remark**:** WS = Wind Speed (m/s)
WD = Wind Direction
Calm = Calm Wind (a wind speed less than 0.4 m/s) (direction of calm wind is not taken into account the wind direction)

Table 3.1.3-5
Wind Speed and Wind Direction at Nong Krathum Subdistrict Health Promoting Hospital, During Rainy Season

Time	24-25 Oct		25-26 Oct		26-27 Oct		27-28 Oct		28-29 Oct	
	WS	**WD**	**WS**	**WD**	**WS**	**WD**	**WS**	**WD**	**WS**	**WD**
08:00-09:00	0.9	NNW	0.4	NNW	1.3	NE	0.9	N	0.9	NNW
09:00-10:00	0.4	N	0.9	NE	1.3	NNE	0.9	N	1.3	NNW
10:00-11:00	0.9	NW	0.9	ENE	0.9	NNE	0.9	N	1.3	NNE
11:00-12:00	1.8	E	0.9	ENE	0.9	NW	0.9	ENE	1.3	NNE
12:00-13:00	1.8	E	0.9	NE	0.9	NE	0.9	N	1.8	NNE
13:00-14:00	1.8	ENE	1.3	E	1.3	NE	0.9	NNE	2.7	NE
14:00-15:00	1.3	NNW	1.8	E	1.3	E	0.9	NE	0.9	ENE
15:00-16:00	1.3	E	1.3	E	1.8	E	0.9	N	1.3	E
16:00-17:00	1.3	NE	1.8	NE	1.3	E	0.9	ESE	1.3	E
17:00-18:00	1.3	NE	0.9	N	1.3	E	0.9	S	1.3	ESE
18:00-19:00	0.9	NNE	0.9	NE	2.7	NE	0.4	SE	0.9	ESE
19:00-20:00	0.4	NNW	1.3	NE	1.3	NW	0.4	ESE	1.8	ESE
20:00-21:00	0.4	NNW	0.9	NNE	0.4	NNW	0.4	E	0.9	NE
21:00-22:00	0.4	NNW	0.4	NNE	0.4	N	<0.4	Calm	0.4	ENE
22:00-23:00	0.4	NNW	0.4	NNW	0.4	WSW	0.4	SW	1.8	NNW
23:00-00:00	0.9	ENE	0.4	NNW	0.4	N	<0.4	Calm	1.3	NW
00:00-01:00	1.8	NE	<0.4	Calm	0.4	E	0.4	WNW	1.3	W
01:00-02:00	1.3	NE	<0.4	Calm	0.9	SW	0.4	W	0.9	WSW
02:00-03:00	0.9	WNW	0.4	NNW	0.4	WSW	0.4	NE	0.4	SSE
03:00-04:00	1.3	WNW	<0.4	Calm	0.4	SW	<0.4	Calm	<0.4	Calm
04:00-05:00	1.3	NW	<0.4	Calm	0.4	SW	<0.4	Calm	<0.4	Calm
05:00-06:00	1.8	WNW	<0.4	Calm	<0.4	Calm	0.4	SSW	<0.4	Calm
06:00-07:00	0.9	WNW	<0.4	Calm	0.4	NE	0.9	NW	0.4	NE
07:00-08:00	0.4	NNE	<0.4	Calm	0.4	NE	0.4	NNW	0.4	W
Min	**0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**	**<0.4**	**-**
Max	**1.8**	**-**	**1.8**	**-**	**2.7**	**-**	**0.9**	**-**	**2.7**	**-**
Unit	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**	**m/sec**	**-**

Remark**:** WS = Wind Speed (m/s)
WD = Wind Direction
Calm = Calm Wind (a wind speed less than 0.4 m/s) (direction of calm wind is not taken into account the wind direction)

3.1.4 Noise

Noise level measurements will be conducted during dry season and rainy season (**Appendix 3-1** and **Appendix 3-2**) at two stations (**Figure 3.1.3-1**) as follows:

N1: Ban Nong Hin School (approximately 120 meters from the Project to the north), situated in a community and agricultural area.

N2: Nong Krathum Sub-district Health Promoting Hospital (approximately 3 kilometers from the Project to the southeast), situated in a community area, government office, and open space.

The measured parameters included the average 24-hour noise level ($L_{eq\ 24\ hr}$), the maximum noise level (L_{max}), the average daytime and nighttime noise level (L_{dn}), and the background noise level (L_{90}). During dry season, the measurements were conducted in the study area from May 24th to 29th, B.E. 2566 (2023). During dry season, the measurements were conducted in the study area from October 24th to 31st, B.E. 2566 (2023). Results of measuring noise level is summarized in **Figure 3.1.4-2** and **Table 3.1.4-1**.





Ban Nong Hin School (N1)





Nong Krathum Sub-district Health Promoting Hospital (N2)

Figure 3.1.4-1 Noise Level Measurement



Figure 3.1.4-2 Bar Chart Shows Results of Noise Measurements



Figure 3.1.4-2 (continue) Bar Chart Shows Results of Noise Measurements

Table 3.1.4-1
Results of Noise Level Measurements, During Dry Season

Station	Date of measurement	Noise level (dB(A))				One Hour (dB(A))	
		$L_{eq24\ hr}$	L_{max}	L_{dn}	L_{90}	Day time 7 a.m. - 10 p.m.	Night time 10 p.m. – 7 a.m.
N1	24-25 May	47.3	87.4	51.0	41.0	43.1-53.0	37.0-48.6
	25-26 May	46.8	83.7	51.1	39.7	40.4-51.5	36.6-49.1
	26-27 May	53.9	86.6	61.2	47.4	42.3-60.9	40.1-63.1
	27-28 May	46.6	87.7	51.0	39.1	40.2-52.1	38.2-48.1
	28-29 May	51.7	85.4	60.5	46.9	39.7-51.7	42.7-63.0
	Min-Max	**46.6-53.9**	**83.7-87.7**	**51.0-61.2**	**39.1-47.4**	**39.7-60.9**	**36.6-63.1**
	24-25 Oct	50.3	88.0	55.4	45.0	48.4-54.2	46.7-50.5
	25-26 Oct	50.2	84.1	54.6	45.0	47.3-55.9	45.4-49.3
	26-27 Oct	55.5	86.6	64.1	51.6	46.9-57.4	54.7-62.1
	27-28 Oct	51.9	80.8	58.5	47.2	46.2-55.0	47.4-55.9
	28-29 Oct	58.2	85.8	64.6	50.7	46.8-65.7	46.2-66.8
	29-30 Oct	59.0	88.9	64.9	53.7	49.0-65.6	48.2-65.6
	30-31 Oct	58.4	89.0	59.8	52.1	49.8-68.5	47.6-51.2
	Min-Max	**50.2-59.0**	**80.8-89.0**	**54.6-64.9**	**45.0-53.7**	**46.2-68.5**	**45.4-66.8**
N2	24-25 May	48.5	90.9	53.4	42.3	47.6-50.7	40.5-51.7
	25-26 May	50.1	80.7	55.9	43.9	47.3-53.2	39.7-52.7
	26-27 May	50.7	92.0	56.0	45.0	46.4-56.2	43.1-52.1
	27-28 May	49.4	86.9	54.6	43.3	46.8-54.3	42.8-52.1
	28-29 May	53.7	89.1	62.2	49.9	45.7-54.1	52.2-63.2
	Min-Max	**48.5-53.7**	**80.7-92.0**	**53.4-62.2**	**42.3-49.9**	**45.7-56.2**	**39.7-63.2**
	24-25 Oct	53.0	83.9	58.0	47.5	51.4-56.1	48.8-52.8
	25-26 Oct	54.4	84.2	60.3	49.3	51.4-58.5	51.8-54.7
	26-27 Oct	55.9	88.0	60.4	51.0	53.6-64.5	50.3-54.4
	27-28 Oct	54.6	86.1	60.0	49.7	51.9-59.9	51.6-54.3
	28-29 Oct	53.5	89.4	59.2	49.2	51.3-57.3	51.1-53.4
	29-30 Oct	53.7	91.1	58.8	48.2	50.5-58.1	49.0-55.2
	30-31 Oct	52.0	90.4	56.3	44.4	47.9-55.9	44.4-53.2
	Min-Max	**52.0-55.9**	**83.9-91.1**	**56.3-60.4**	**44.4-51.0**	**47.9-64.5**	**44.4-55.2**
National Standard [1/]		**≤70**	**≤115**	**-**	**-**	**-**	**-**
General EHS Guidelines [2/]		**-**	**-**	**-**	**-**	**55**	**45**

Source: Measured by Environment Research and Technology Co., Ltd.
Remark: [1/] National Environmental Board, No. 15 (B.E. 2540 (1997))
[2/] General EHS Guidelines, IFC, 2007

(1) 24-hour Equivalent Noise Level ($L_{eq\ 24\ hr}$)

During dry season, the equivalent 24-hour noise level at Ban Nong Hin School ranged from 46.6 to 53.9 dB(A), while at Nong Krathum Sub-district Health Promoting Hospital, the average 24-hour noise level ranged from 48.5 to 53.7 dB(A). During rainy season, it is ranged from 50.2 to 59.0 dB(A) at Ban Nong Hin School, ranged from 52.0 to 55.9 dB(A) at Nong Krathum Sub-district Health Promoting Hospital. The measured values, therefore, are within the established standards set by the National Environmental Board, No. 15 (B.E. 2540 (1997)), which does not exceed 70 dB(A).

(2) The Maximum Noise Level (L_{max})

During dry season, the maximum noise level at Ban Nong Hin School ranged from 83.7 to 87.7 dB(A), while at Nong Krathum Sub-district Health Promoting Hospital ranged from 80.7 to 92.0 dB(A). During rainy season, it is ranged from 80.8 to 89.0 dB(A) at Ban Nong Hin School, ranged from 83.9 to 91.1 dB(A) at Nong Krathum Sub-district Health Promoting Hospital. The measured values, therefore, are within the established standards set by the National Environmental Board, No. 15 (B.E. 2540 (1997)), which does not exceed 115 dB(A).

(3) The Average Daytime and Nighttime Noise Level (L_{dn})

During dry season, the average daytime and nighttime noise level at Ban Nong Hin School ranged from 51.0 to 61.2 dB(A), while at Nong Krathum Sub-district Health Promoting Hospital ranged from 53.4 to 62.2 dB(A). During rainy season, it is ranged from 54.6 to 64.9 dB(A) at Ban Nong Hin School, ranged from 56.3 to 60.4 dB(A) at Nong Krathum Sub-district Health Promoting Hospital.

Regarding to the general EHS guidelines which stipulate that the one-hour average of L_{Aeq} during the daytime should not exceed 55 dB(A), and during the nighttime should not exceed 45 dB(A) for residential, institutional, and educational areas, consequently, the measured values is not compliance with the guidelines.

(4) The Background Noise Level (L_{90})

During dry season, the background noise level at Ban Nong Hin School ranged from 39.1 to 47.4 dB(A), while at Nong Krathum Sub-district Health Promoting Hospital ranged from 42.3 to 49.9 dB(A). During rainy season, it is ranged from 45.0 to 53.7 dB(A) at Ban Nong Hin School, ranged from 44.4 to 51.0 dB(A) at Nong Krathum Sub-district Health Promoting Hospital.

3.1.5 Hydrology and Water Quality

(1) Hydrology

Suphanburi Province is located in the area of Tha Chin River Basin and Mae Klong River Basin, as shown in **Figure 3.1.5-1**. These river basins have significant natural water sources, including various canals and important main rivers that contribute to the well-being and economy of the population. Crucial sources include the Tha Chin River or Suphanburi River approximately 28 kilometers from the Project location to the west, with

the Kra Siao Dam as an important branch water storage of the Tha Chin River (**Figure 3.1.5-2**). There is natural surface water volume of approximately 721 million cubic meters per year flowing down from various canals into the Tha Chin River (Source: Watershed Development Plan Report for Suphanburi Province, B.E. 2561 (2018)).

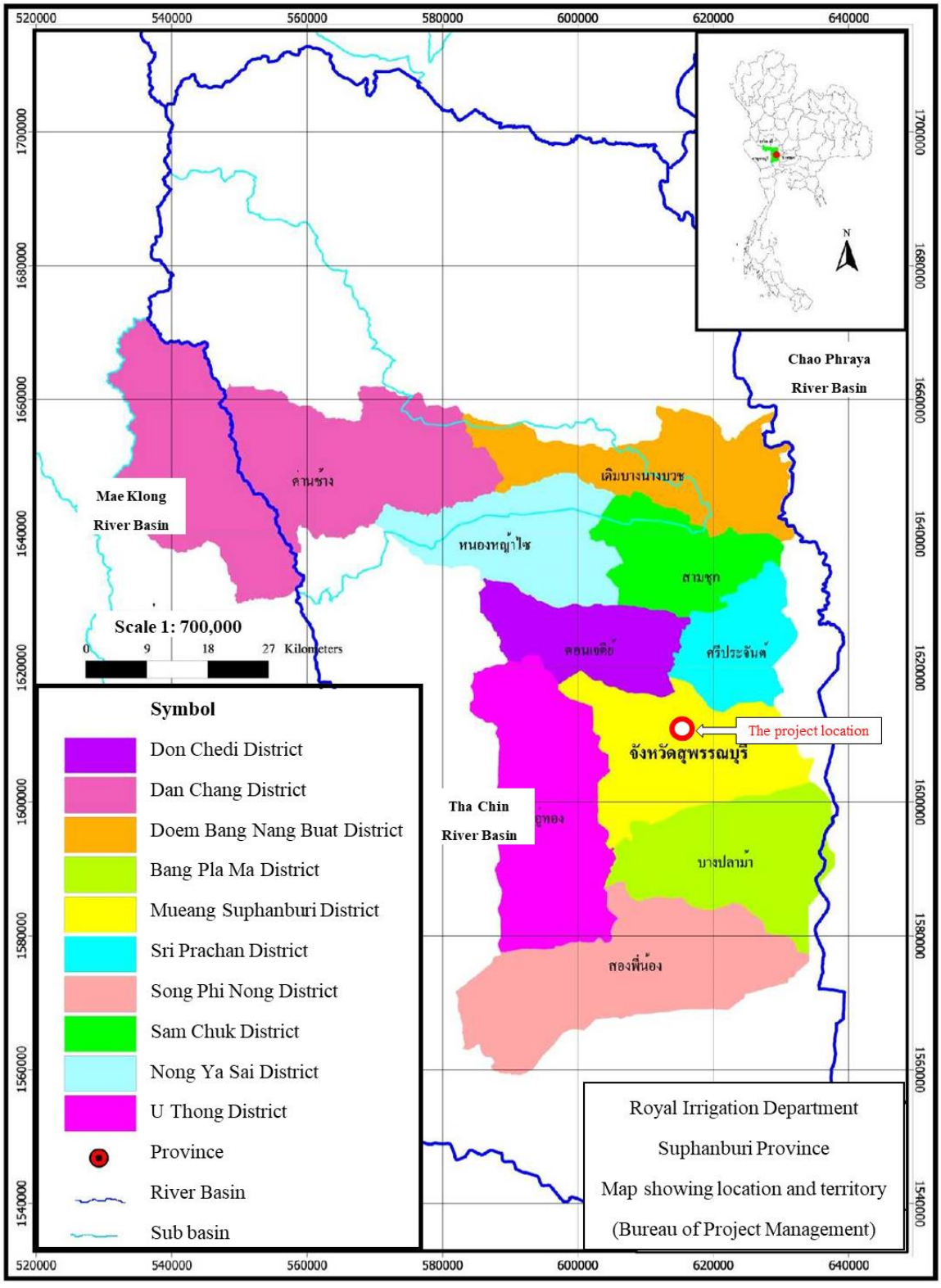


Figure 3.1.5-1 River Basin in Suphanburi Province

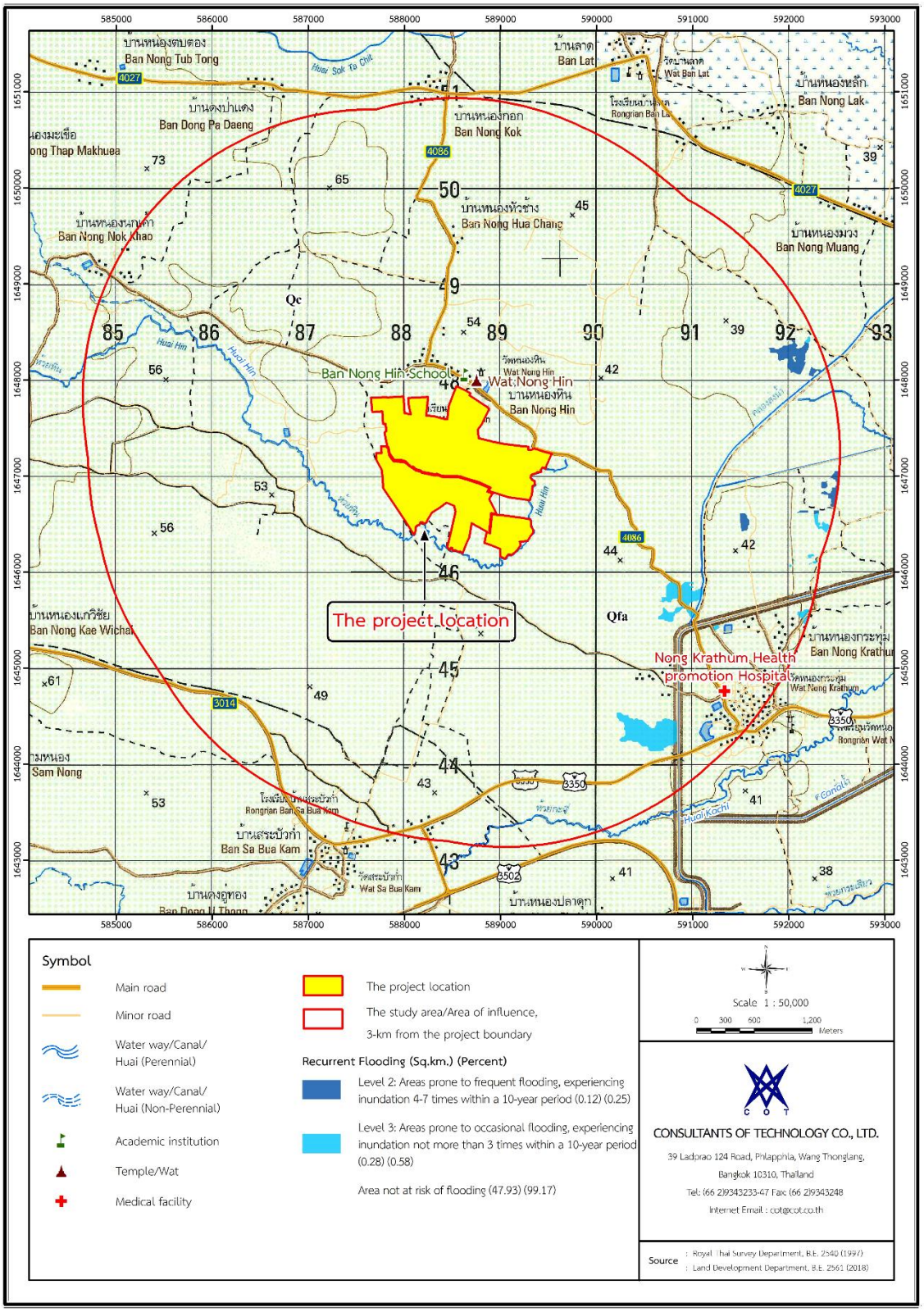


Figure 3.1.5-2 Surface Water Resources in the Study Area

1) Tha Chin River Basin

The Chin River Basin covers approximately 90% of the Suphanburi Province area, include Dan Chang District, Doem Bang Nang Buat District, Nong Ya Sai District, Sam Chuk District, Don Chedi District, Sri Prachan District, Mueang Suphanburi District, U Thong District, Bang Pla Ma District, and Song Phi Nong District. The prominent water source in this area is the Tha Chin River, which flows extensively from north to south through the province. Additionally, there are branches of the Tha Chin River originating from Kra Siao Dam in Dan Chang District.

2) Mae Klong River Basin

Mae Klong River Basin covers approximately 10% of the Suphanburi Province area, primarily located to the west of Dan Chang District. In this area, there are branches of Tha Chin River originating from the Kra Siao Dam in Dan Chang District. These branches flow eastward to Tha Chin River.

(2) Surface Water Quality

The nearest surface water source of the Project is Huai Hin. It is located approximately 100 meters away from the Project area. The water flows from the west to the east of the Project area. A survey which conducted on May 5th, B.E. 2566 (2023) revealed that Huai Hin is a seasonal water source, and it remains dry throughout the year, especially during the dry season. There are only a few spots with slightly deeper areas compared to other parts where water is stagnant (**Figure 3.1.5-3**).



Figure 3.1.5-3 Huai Hin's Current Condition (picture taken on May 5th, B.E. 2566 (2023))

On October 28th, B.E. 2566 (2023), sampling of surface water quality and aquatic ecology was conducted. The Parameters to be measured include flow rate, temperature, pH, suspended solids (SS), total dissolved solids (TDS), dissolved oxygen (DO), chemical oxygen demand (COD), biochemical oxygen demand (BOD), total coliform bacteria, and fecal coliform bacteria. Results of sampling can be summarized as shown in **Table 3.1.5-1**. All results are in accordance with the Standard Value of Surface Water for Class 3, 4 except for DO and BOD at all three sampling points.

SW1 Huai Hin (from the Project to the west):

- The physical quality of water is still water with a temperature of 31.5 degrees Celsius, <0.1 m^3/s flow rate, 12 m width and 1.4 m depth.
- The chemical water quality has pH of 7.4, dissolved oxygen (DO) of 1.3 mg/l, BOD of 4.8 ml/l, COD of 44 ml/l, total dissolved solids of 141 mg/l, and total suspended solid of 15 ml/l.
- The biological water quality has total coliform bacteria (TCB) of 5,400 MPN/100 ml and fecal coliform bacteria (FCB) of 1,100 MPN/100 ml.

SW2 Huai Hin (from the Project to the south):

- The physical quality of water is still water with a temperature of 29.0 degrees Celsius, <0.1 m^3/s flow rate, 10 m width and 2.5 m depth.
- The chemical water quality has pH of 7.0, dissolved oxygen (DO) of 1.7 mg/l, BOD of 4.0 ml/l, COD of 65 ml/l, total dissolved solids of 141 mg/l, and total suspended solid of 36 ml/l.
- The biological water quality has total coliform bacteria (TCB) of 5,400 MPN/100 ml and fecal coliform bacteria (FCB) of 790 MPN/100 ml.

SW3 Huai Hin (from the Project to the east):

- The physical quality of water is still water with a temperature of 28.5 degrees Celsius, <0.1 m^3/s flow rate, 11 m width and 3.0 m depth.
- The chemical water quality has pH of 7.0, dissolved oxygen (DO) of 1.5 mg/l, BOD of 5.3 ml/l, COD of 53 ml/l, total dissolved solids of 155 mg/l, and total suspended solid of 29 ml/l.
- The biological water quality has total coliform bacteria (TCB) of 490 MPN/100 ml and fecal coliform bacteria (FCB) of 78 MPN/100 ml.

The results of surface water quality monitoring at three sampling points shows that most monitoring indices are within the standard value of surface water quality sources according to the Notification of the National Environment Board, No. 8 (B.E. 2537), class 3 - water sources receiving wastewater from some activities and can be used for (1) Consumption but disinfection and general water quality improvement processes are required. (2) Agriculture, except the DO and BOD that exceed the standard class 3 but is still within the surface water quality standard in type 4 - water sources receiving wastewater from some activities and can be used for (1) Consumption, but disinfection and general water quality are required (2) Industry. Due to the general conditions in the sampling area which show that the land is an agricultural area, living space and establishments, wastewater from agricultural areas, communities and the establishment may be one of the factors for the high BOD value (BOD).

Table 3.1.5-1
Result of Surface Water Sampling

Parameters	Unit	SW1	SW2	SW3	Standard [1/]	
					Class3	Class4
Temperature	°C	31.5	29.0	28.5	n'	n'
pH	-	7.4	7.0	7.0	5.0-9.0	5.0-9.0
DO	mg/l	1.3	1.7	1.5	≥4.0	≥2.0
BOD	mg/l	4.8	4.0	5.3	2.0	4.0
COD	mg/l	44	65	53	-	-
TDS	mg/l	141	141	155	-	-
TSS	mg/l	15	36	29	-	-
Total Coliform Bacteria	MPN/100 ml	5,400	5,400	490	20,000	-
Fecal Coliform Bacteria	MPN/100 ml	1,100	790	78	4,000	-
Flow Rate	m^3/s	<0.1	<0.1	<0.1	-	-
Velocity	m/s	<0.1	<0.1	<0.1	-	-
Width	m	12	10	11	-	-
Depth	m	1.4	2.5	3.0	-	-

Remark: 1′ Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)

n' = naturally but changing not more than 3°C, SW1 = Huai Hin (from the Project to the west)
SW2 = Huai Hin (from the Project to the south), SW3 = Huai Hin (from the Project to the east)

3.1.6 Topography

Suphanburi Province is located in the central-western region of Thailand with Suphanburi River, also known as Tha Chin River, flows through the province from north to south. The majority of the terrain is flat, with some elevated areas and slopes ranging from 0-3% in the western part. The highest point is in the southeast, reaching about 3 meters above sea level. The northern and western parts consist of hills and high plateaus, particularly in Doem Bang Nang Buat District, Dan Chang District, and parts of Don Chedi District and Nong Ya Sai District.

The southwestern side of the province has an undulating area with steep slopes and hillsides, and the western side features valleys and hills, with some steep slopes that connect to the Tanaosri Range. The highest peak is Khao Thewada with approximately 1,220 meters above sea level, followed by Khao Phu Toei at around 760 meters above sea level. Next to the east, the terrain transitions from hills to undulating plains before sloping down towards the eastern part of the province.

The lowland area lies to the east of the province, along Tha Chin River, with elevation of about 3 meters above sea level in the northern part and around 10 meters above sea level in the northern region, including Doem Bang Nang Buat Sub-district, Sam Chuk District, Don Chedi District, Sri Prachan District, Mueang District, Bang Pla Ma District, Song Phi Nong District, and parts of U Thong District.

The Project is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. Overall, the topography is characterized by a diverse landscape of plains, hills, and rivers. (Source: District Development Office, Doem Bang Nang Buat, retrieved on April 25, B.E. 2566 (2023), from https://district.cdd.go.th/ doembang/about-us)

3.1.7 Flood Risks

The occurrence of natural disasters in Suphanburi Province is generally characterized by the flood-prone areas which are flat and low-lying, with Tha Chin River flowing through the middle of the province. In the area which located beneath the floodgates of the Pho Phraya Reservoir, if there is continuous heavy rainfall in the region and a significant volume of water flows down from the north, the flood gates of the Pho Phraya Reservoir will release excess water downstream. If the water level behind the flood gates rises more than 5.60 meters, it can lead to flooding within the town area of Suphanburi Province. The flood-prone areas would be in the low-lying basin region to the south of the province, particularly in Bang Pla Ma District and Song Phi Nong District. The main cause of the flooding issue is due to the limited capacity of Tha Chin River to drain water, combined with the predominantly low-lying basin terrain of the area. When the water from the north flows through Tha Chin River in large quantities, it overflows and inundates a wide area. Based on the flood-prone area data for Suphanburi Province from the Geo-Informatics and Space Technology Development Agency (GISDA) in the year B.E. 2556 (2013), it was found that most of the province's area has a low to moderate risk of recurring floods, with some areas having a high risk. The level of risk and severity is concentrated in the lower basin areas of the province (Source: Master Plan of Development for the Watershed of Suphanburi Province, Department of Irrigation, December B.E. 2561 (2018)).

Based on the data obtained from the Department of Land Development (**Figure 3.1.7-1)**, upon examining the flood-prone area map of Suphanburi Province, the severity levels are categorized into 3 levels as follows:

Level 1: Areas prone to recurrent flooding, experiencing inundation 8-10 times within a 10-year period.

Level 2: Areas prone to frequent flooding, experiencing inundation 4-7 times within a 10-year period.

Level 3: Areas prone to occasional flooding, experiencing inundation not more than 3 times within a 10-year period.

As shown in **Figure 3.1.7-2** and **Figure 3.1.7-3**, it was found that the Project is located in the area with no risk of flooding.

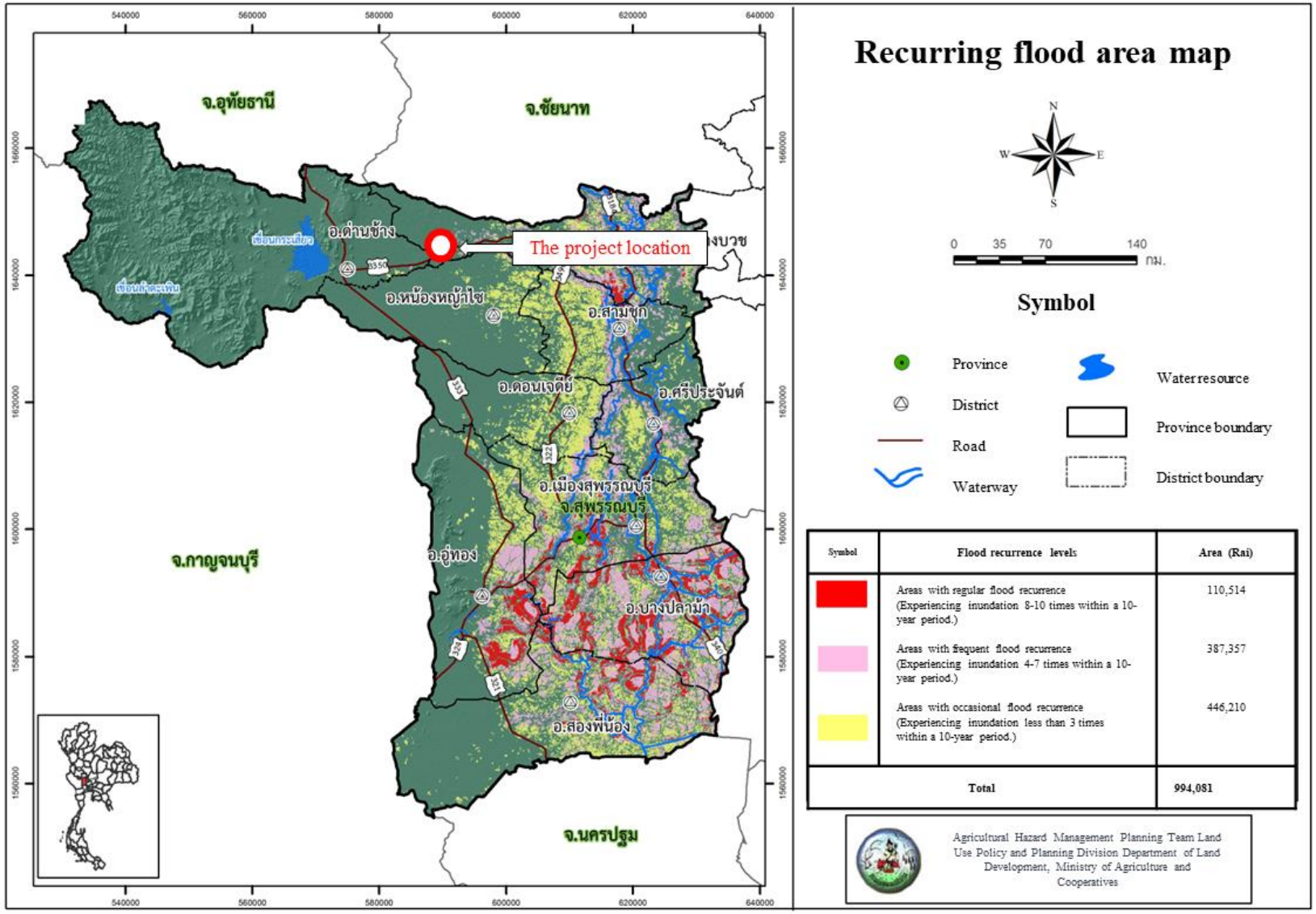


Figure 3.1.7-1 Recurring Flood Level Area in Suphanburi Province

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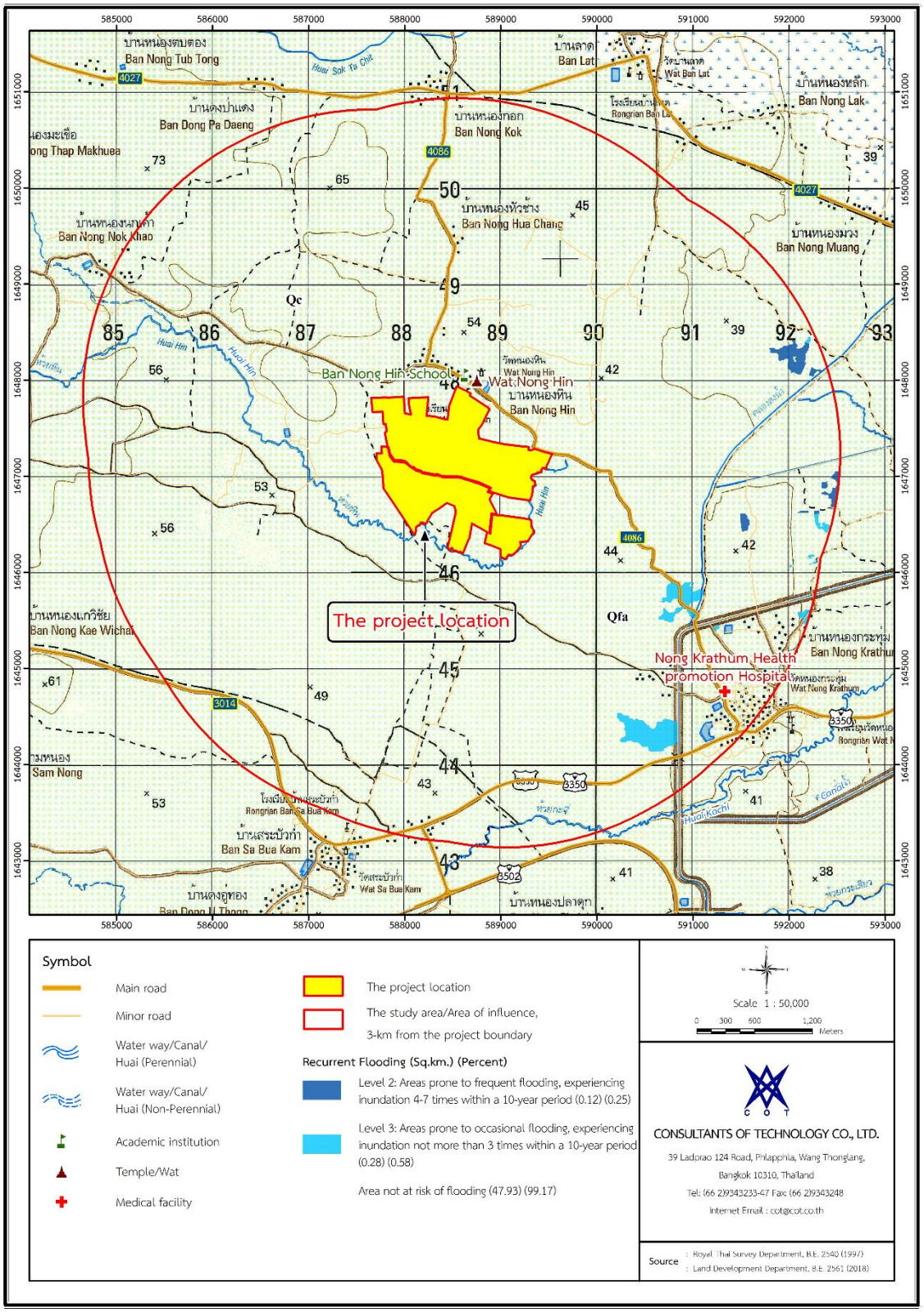


Figure 3.1.7-2 Recurring Flood Risk in the Study Area

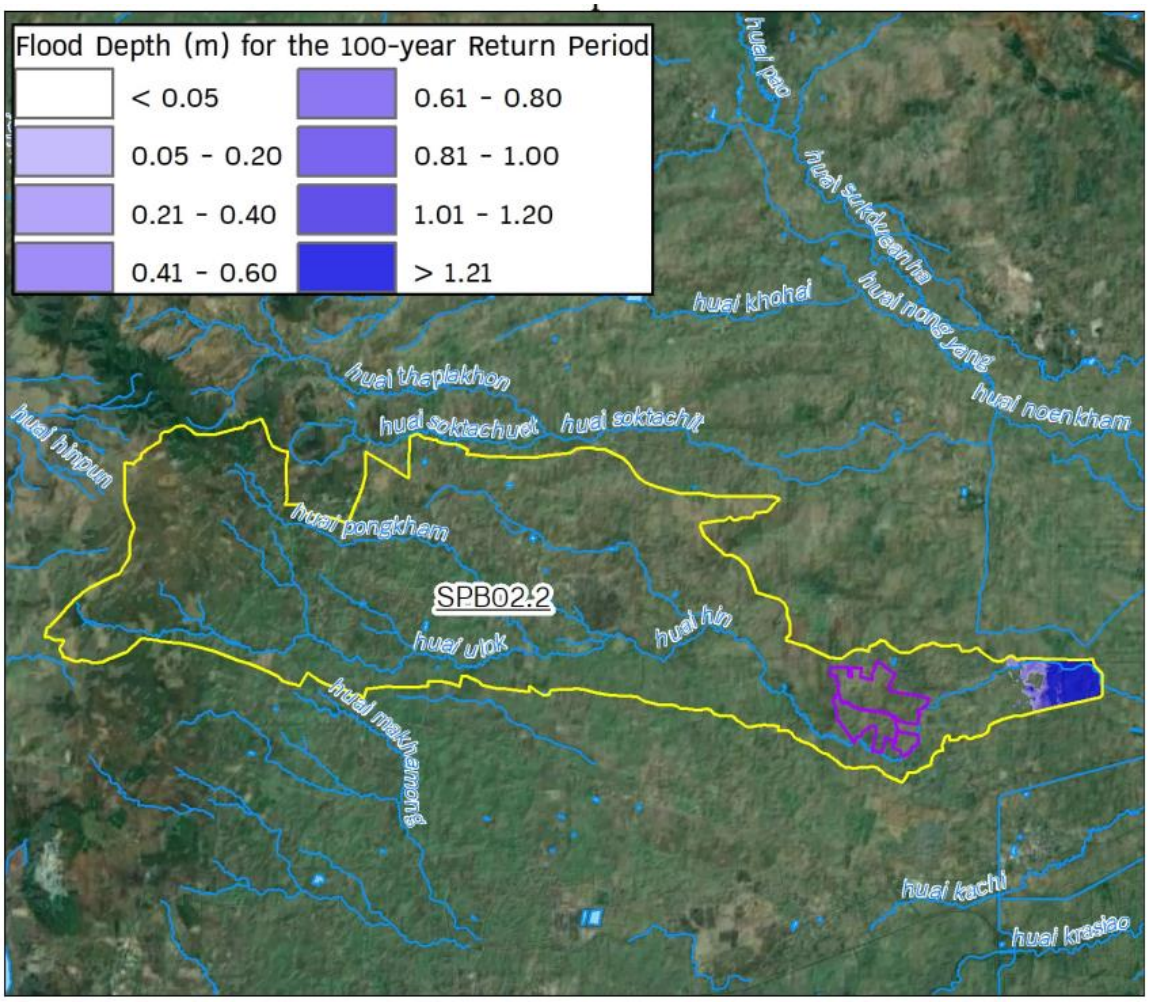


Figure 3.1.7-3 Evaluated Flood Risk Map of the Project

3.1.8 Solar Radiation

The Department of Alternative Energy Development and Efficiency has studied Thailand's solar energy potential (**Figure 3.1.8-1**) and found that the majority of the country receives the highest solar radiation during the months of April and May. The values range from 20 to 23 MJ/m^2-Day. The areas that receive the highest solar radiation throughout the year are located in the northeastern and some parts of the central region, accounting for 11% of the total country's area. When considering the proportion of Thailand's area that receives the average daily solar radiation, it can be seen that the majority of Thailand (39.8%) (**Table 3.1.8-1**) receives a total solar radiation intensity ranging from 17 to 18 MJ/m^2-Day. The average annual total solar radiation intensity for the entire country is 17.8 MJ/m^2-Day, which is relatively high. Suphanburi Province has an average annual solar radiation intensity of 18.6 MJ/m^2-Day, and in Nong Krathum Sub-district, where the Project is located, the average annual solar radiation intensity is 18.3 MJ/m^2-Day (**Table 3.1.8-2**).

Table 3.1.8-1
Proportion of Areas Receiving Total Daily Solar Radiation per Year at Various Levels

Range of average daily solar radiation intensity (MJ/m^2-day)	Percentage of area compared to the total area of the country
15-16	0.4
16-17	13.2
17-18	39.8
18-19	35.6
19-20	11.0

Source: Handbook for development and investment in renewable energy production, set 2, Ministry of Energy, accessed in April B.E. 2566 (2023)

Table 3.1.8-2
Light Intensity and Solar Energy Potential of Thailand

Region	Average Intensity (MJ/m^2-day)	Energy potential (1,000 tons of crude oil equivalent)
Country	17.8	335,853.34
South	17.6	51,984.20
North	17.5	76,382.16
Northeast	17.9	136,486.15
Central	18.2	71,000.83
Suphanburi Province	18.6	4,734.30
Nong Krathum Sub-district	18.3	-

Source: Thailand Renewable Energy Report Department of Alternative Energy Development and Efficiency Ministry of Energy, B.E. 2563 (2020), accessed April B.E. 2566 (2023).

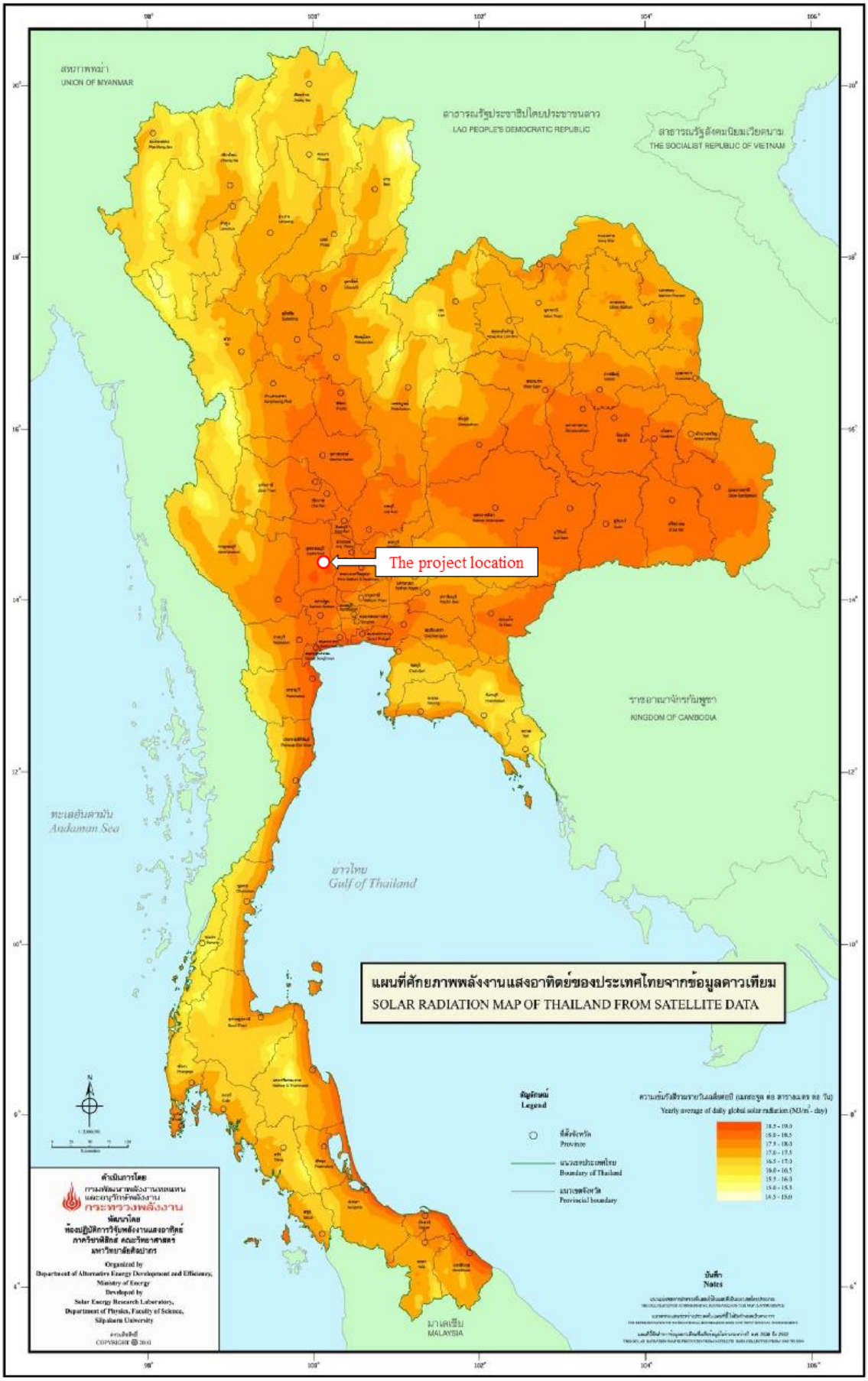


Figure 3.1.8-1 Solar Radiation Map of Thailand from Satellite Data

3.2 BIOLOGICAL CONDITIONS

3.2.1 Terrestrial Ecology

3.2.1.1 Forest Resources

(1) Secondary Data

1) National Park, Wildlife Sanctuary, and Non-hunting Area

Suphanburi Province has declared protected areas as national parks, wildlife sanctuaries, and non-hunting areas, including Phu Toei National Park, Phu Muang Forest Park, Dan Chang Arboretum, and Bueng Chawak Non-hunting Area. The nearest protected area to the Project location is Phu Toei National Park, approximately 30 kilometers from the Project location. Phu Toei National Park falls under the IUCN Management Category II, indicating its protected status. This designation as a National Park was officially granted in B.E. 2541 (1998), signifying its importance for conservation and environmental protection.

Two key biodiversity areas located approximately 20 kilometers and 50 kilometers from the Project location; Lower Central Basin and Chao Phraya River from Nonthaburi to Nakhon Sawan, respectively. The Lower Central Plain was previously a vast region consisting of natural and semi-natural swamps, nourished throughout the year by four major rivers: the Chao Phraya River, Bang Pakong River, Pasak River, and Mae Klong River. Nonetheless, in the early 20th century, significant irrigation system developments were concentrated in this area, and it is now primarily dedicated to intensive rice cultivation, with only small remaining portions of wetland ecosystems and extensive agricultural activities. Given the high population density and extensive land use, it is impractical to subject more than a small portion of the area to rigorous conservation measures. Currently, some sites within the IBA are provided with protection, including Wat Phai Lom, Wat Tan En, Bung Chawak, and Wat Ratsattha Krayaram, all designated as non-hunting areas. (Source: https://www.ibat-alliance.org/?locale=en)

2) National Reserved Forest

Suphanburi Province has an approximate total area of 3,348,755 rai, with 7 designated national parks covering a combined area of approximately 825,102.52 rai, or 24.64% of the province's total area (**Figure 3.2.1-1**). (Source: Forest Resources Management Office 10 (Ratchaburi) and was retrieved on May 8, B.E. 2566 (2023)).

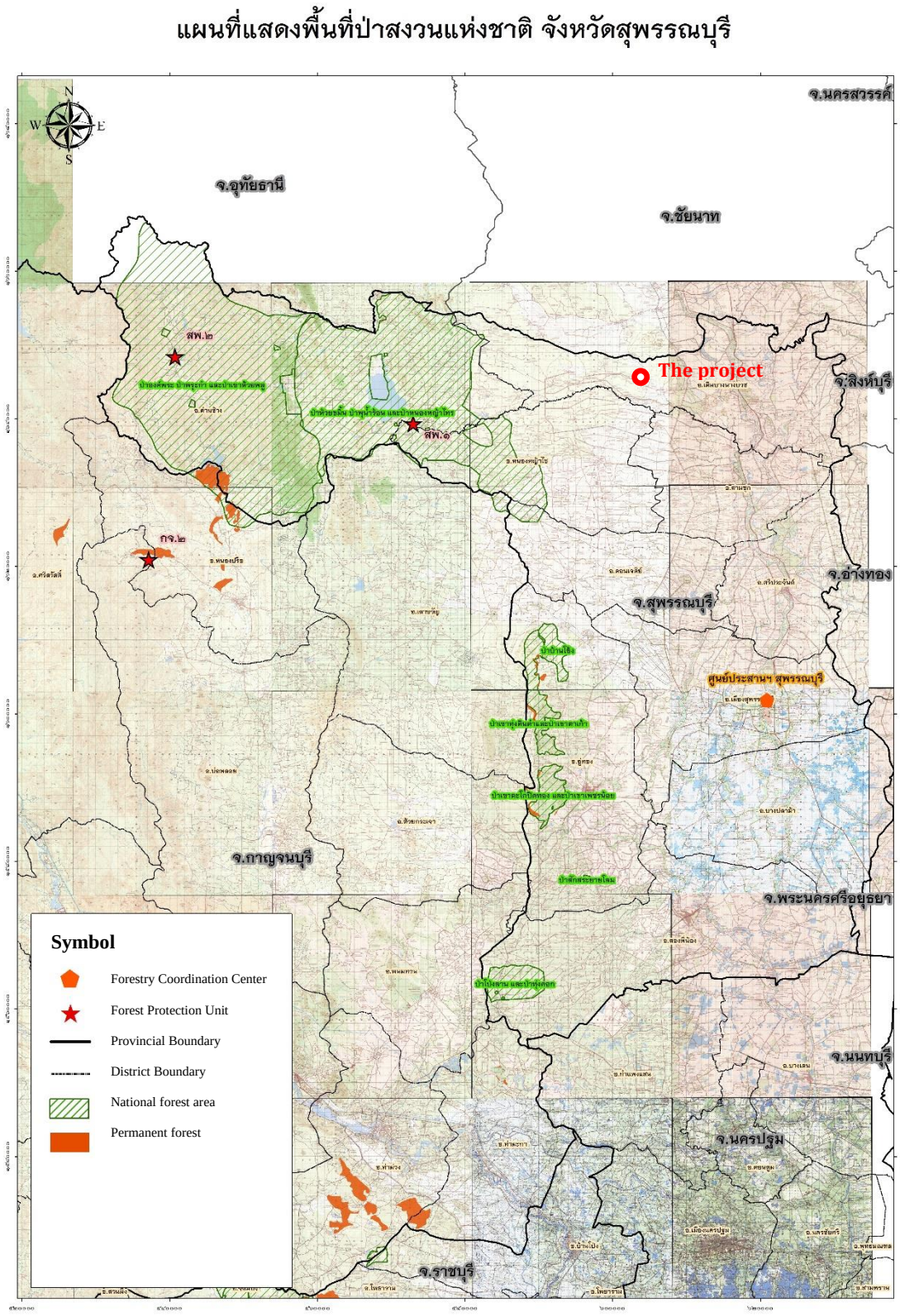


Figure 3.2.1-1 National Reserved Forest Area in Suphanburi Province

1. Khao Ong Phra Forest
2. Khao Phurakam Forest, Khao Huai Phlu Forest
3. Huai Khamin Forest, Phlu Nam Ron Forest, Nong Ya Sai Forest
4. Thung Din Dam Forest, Khao Ta Kao Forest
5. Khao Tako Pit Thong Forest, Khao Phet Noi Forest
6. Ban Khong Forest
7. Pa Sak Sra Yaisom Forest, Pong Lan Thung Khok Forest

3) Watershed Quality Area

According to the classification of watershed quality areas in Thailand (B.E. 2525 (1982)), five classes of watershed quality have been designated, namely 1, 2, 3, 4, and 5. Each class of watershed has fundamental characteristics as shown in **Table 3.2.1-1**.

Table 3.2.1-1
Classification of Watershed Quality Areas in Thailand

Class	Characteristic
1	Class 1 consists of protective forests aimed at safeguarding the upper reaches of watersheds, primarily serving as a source of water for downstream regions. These areas are typically characterized by very steep slopes, and the soil has a high susceptibility to erosion. They should be preserved as a crucial source of watershed protection, national parks, and wildlife conservation areas.
2	Class 2 are primarily commercial forests, serving both protective and economic purposes. These areas are usually situated at higher elevations with steep to very steep slopes. The soil erosion susceptibility is lower compared to Level 1 areas. These regions are essential for timber production, as well as for maintaining a source of water, preserving watersheds, national parks, wildlife conservation, and other forest-related activities.
3	Class 3 areas are hilly regions characterized by steep slopes. The soil erosion susceptibility is moderate, and these areas are suitable for various purposes, including economic forestry, grassland for animal grazing, fruit cultivation, and planting of perennial crops (fruit trees). However, strict soil conservation and watershed management measures are necessary to ensure sustainable land use practices.
4	Class 4 consists of gently sloping terrains, making them suitable for various agricultural activities such as crop cultivation, fruit tree planting, and grassland for animal grazing. However, proper soil erosion prevention measures must be implemented to safeguard the soil quality and prevent degradation.
5	Class 5 encompasses lowland plains and valleys, making them suitable for lowland cropping activities. These areas are well-suited for agriculture and community purposes without the necessity for extensive soil erosion prevention measures. They are conducive for agricultural use and community development.

Upon examining the data of the watershed quality classes within the Project study area boundaries, as conducted by the Office of Natural Resources and Environmental Policy and Planning, it is found that the study area is under Class 5 Watershed Area. This is illustrated in **Figure 3.2.1-2**.

4) Forest Resources of Suphanburi Province

The forest areas in Suphanburi Province are predominantly distributed in the northern and western parts of the province, mainly within the districts of Dan Chang, Nong Ya Sai, U Thong, and Song Phi Nong. Originally, these areas were characterized as Dry Dipterocarp Forests, but many of them have now been used by communities for various purposes, including sugarcane and rice cultivation.

Based on the land use map in the study area (**Figure 3.2.1-3**), it can be seen that most of the land use characteristics are agricultural area and not located in the national parks or wildlife sanctuaries. The Project site is primarily dedicated to agricultural activities, particularly cassava cultivation.

5) Integrated Biodiversity Assessment Tool (IBAT) Proximity Data

Based on data obtained from IBAT, proximity report, the following threatened species are potentially found within 50 km. of the Project site.

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Magnolia gustavii		MAGNOLIOPSIDA	CR	Decreasing	Terrestrial
Terniopsis ubonensis		MAGNOLIOPSIDA	CR	Unknown	Freshwater
Curcuma vamana		LILIOPSIDA	CR	Decreasing	Terrestrial
Terniopsis chanthaburiensis		MAGNOLIOPSIDA	EN	Decreasing	Freshwater
Dipterocarpus gracilis		MAGNOLIOPSIDA	VU	Decreasing	Terrestrial
Hopea odorata		MAGNOLIOPSIDA	VU	Decreasing	Terrestrial
Shorea roxburghii	White Meranti	MAGNOLIOPSIDA	VU	Decreasing	Terrestrial
Dalzellia ranongensis		MAGNOLIOPSIDA	VU	Unknown	Freshwater
Hanseniella heterophylla		MAGNOLIOPSIDA	VU	Unknown	Freshwater
Globba flagellaris		LILIOPSIDA	VU	Decreasing	Terrestrial
Paris polyphylla	Love Apple	LILIOPSIDA	VU	Decreasing	Terrestrial

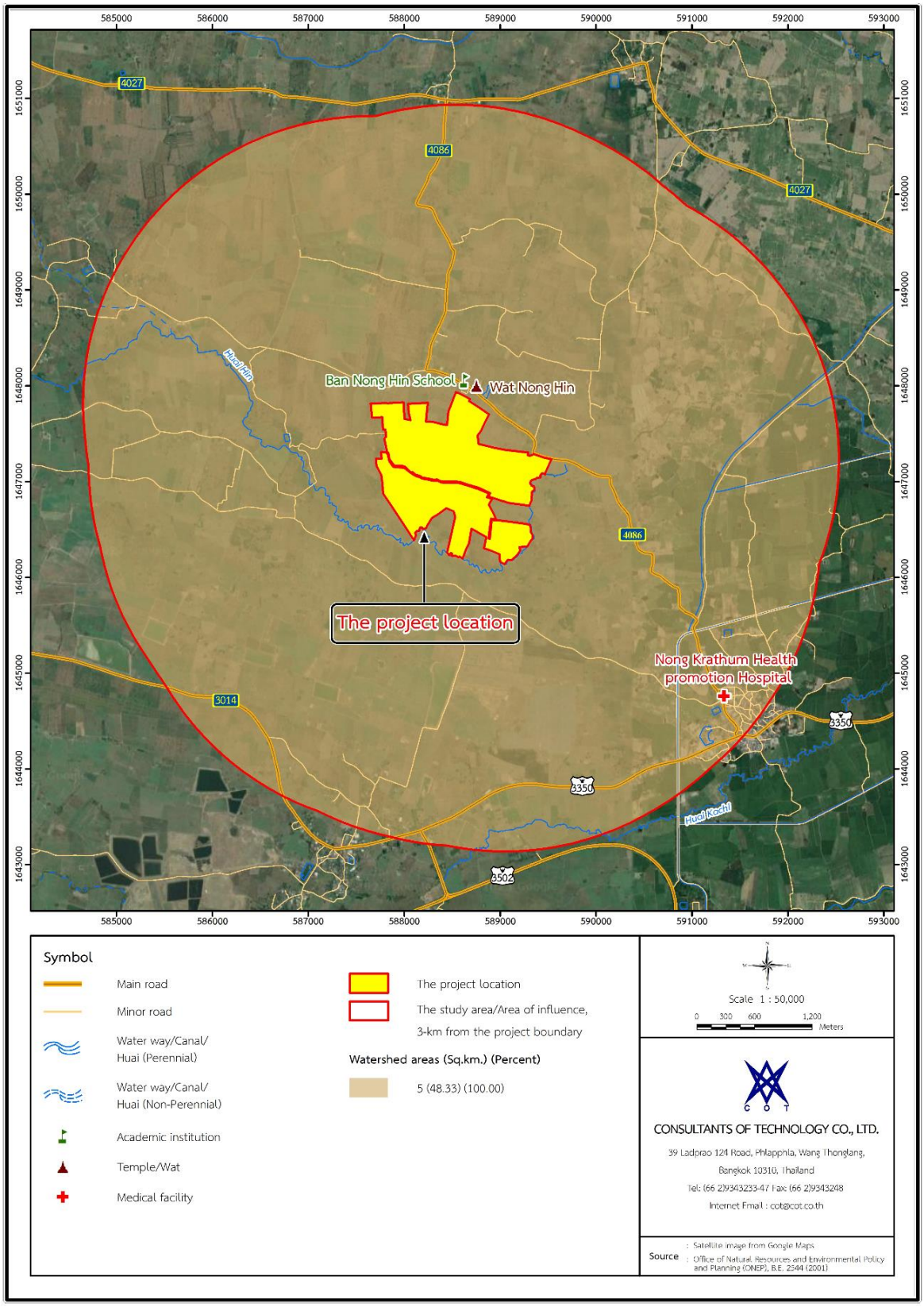


Figure 3.2.1-2 Classification of Watershed Area in the Study Area

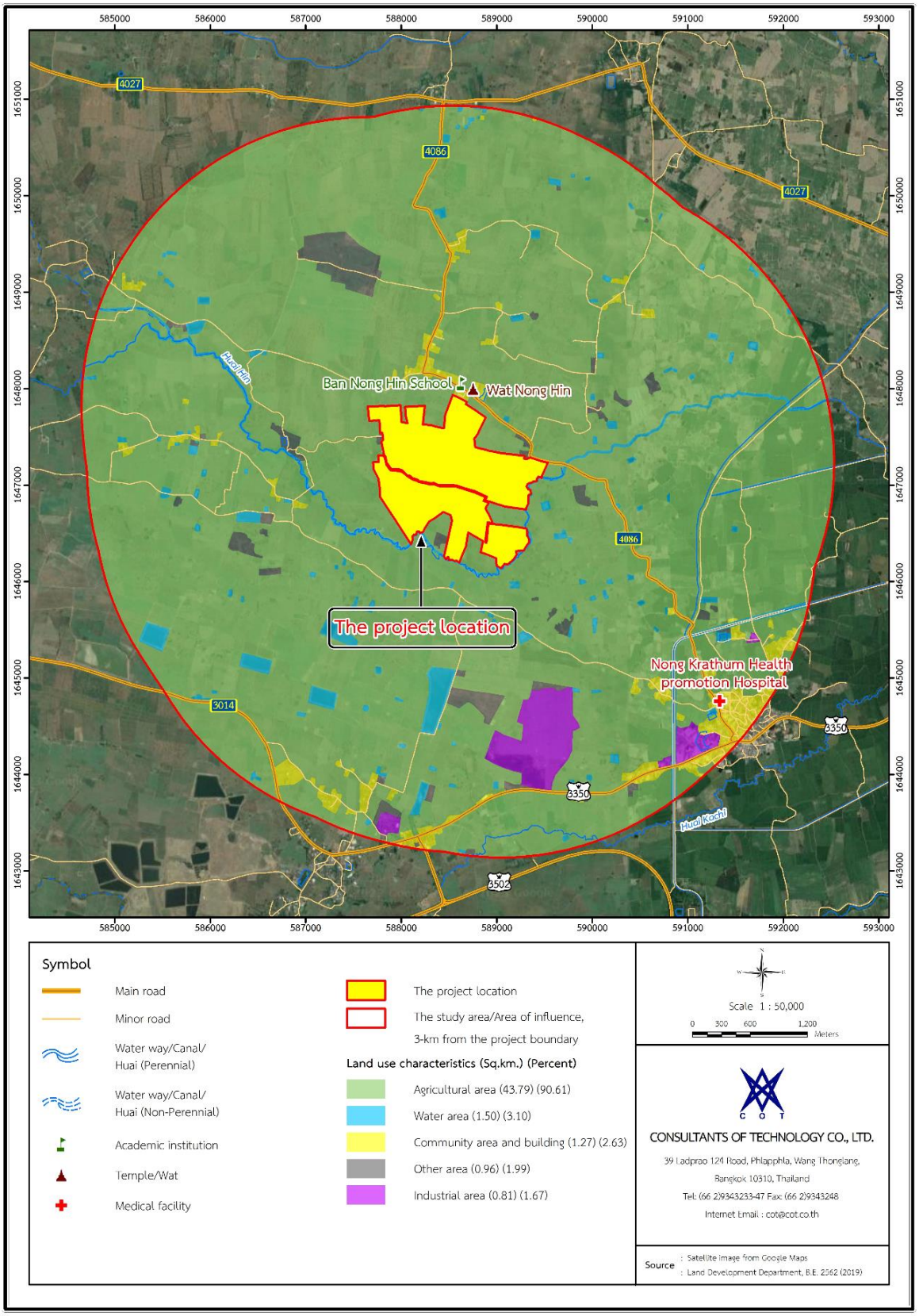


Figure 3.2.1-3 Land Use Characteristics in the Study Area

(2) Primary Data

2.1 Methodology of the Study

1) Objectives of the Study

- To investigate the current state of plants in the Project area's ecosystem.
- To provide data for assessing the environmental impact on plants in the ecosystem resulting from Project development activities, pre-constructions, during construction, and throughout Project implementation.
- To recommend prevention and mitigation measures.

2) Scope of the Study

The study involves collecting data on plants in the ecosystem within the Project area and the study area, covering a radius of 3 kilometers from the Project boundary and transmission line.

3) Research Methodology

Secondary Data: This involves studying data from research documents, reports from government agencies, educational institutions, or relevant organizations, as well as referencing other related documents. Information is gathered from geographic data through document reviews and research reports related to the forest resources in the Project area and the study area. Examples include data from the Department of National Parks, Wildlife, and Plant Conservation regarding wildlife and plant species and reports on the environmental characteristics of the Project-related area.

Field Survey Data: Field surveys of plant species in the ecosystem surrounding the Project area were conducted between June 3 and 5, B.E. 2566 (2023). The surveys were applied to two areas, the Project area, and the study area:

(a) The Project Area

a) Methodology

Conduct surveys using the observation method to study plant species, focusing on tree, shrub, undergrowth plants, and other types. This survey covered the Project area. Subsequently, the gathered data was used to compile a species list, which includes the Thai names, botanical names, families, habits, and conservation status of all identified plant species. The species were also specified whether they are native or exotic plants.

b) Specimen Collection

In cases where the species could not be identified on-site, plant specimens were collected, for dried plant specimens' preparation, along with photographs to record various characteristics, such as morphological features (e.g., leaves, flowers, and fruits) and habitat. The plant specimens were then subjected to be identified using various taxonomic methods.

c) Data Analysis

Data analysis involves plant identification, categorizing plant species and their conservation status within the Project area as follows:

1. Consulting with plant experts specializing in specific plant groups for both known and unknown plant specimens. This will be verified using taxonomic keys, botanical nomenclature, and species description from relevant sources, such as;

- International Plant Names Index (http://www.ipni.org)
- Thai plant names (https://www.dnp.go.th/botany/ mplant/index.html)
- Encyclopedia of plants in Thailand (https://www.dnp.go.th/botany/detail_wordsci.html)
- e-Flora of Thailand (https://www.dnp.go.th/botany/eflora/index.html)
- e-Flora of China (http://www.efloras.org/flora_page.aspx?flora_id=2)
- India Biodiversity Portal (https://indiabiodiversity.org/)
- Flora Malesiana (https://floramalesiana.org/new/)

2. The dried plant specimens collected from the field will be verified again by comparing to the accurately identified herbarium specimens deposited at the Bangkok Herbarium (BKF) of the National Parks, Wildlife, and Plant Conservation Department to confirm their botanical names.

3. Assessing the conservation status of plant species found within the Project area by comparing them to the list of restricted timber species as defined in the Royal Decree on Restricted Timber Species B.E. 2530 (1987) and Royal Decree on Restricted Timber Species B.E. 2565 (No. 2) (2022). These laws have already categorized the legal status of tree species. Additionally, data on identified species are cross-referenced to determine if they are in a threatened or endangered state (Threatened and Endangered species) using the Red Data List of the International Union for Conservation of Nature

(IUCN, 2023, https://www.iucnredlist.org/). This information contributes to conservation efforts and verifies the presence of species listed in the CITES Appendices (https://cites.org/eng/app/appendices.php).

(b) The Study Area

a) Methodology

Conduct surveys using the observation method to study plant species, with a focus on plant species related to land use within the 3-kilometer radius study area. The survey area was divided into 8 sections (or 8 directions from the study area's center). The survey was systematically divided to ensure comprehensive coverage of all types of land use (see **Figure 3.2.1.1-1**). The positions and characteristics of land use observed in the study area were recorded.

b) Data Analysis

Verification of land use characteristics and description of the area, including prominent plant species based on land use characteristics within the study area.

2.2 Land Use Pattern in the Study Area

The results of land use surveys conducted within a 3-kilometer radius of the Project area (**Figure 3.2.1.1-2**) indicate that the predominant land use pattern is agricultural (**Table 3.2.1.1-1**). Some examples of land use are illustrated in **Figure 3.2.1.1-3**. Apart from land used for community purposes or residential areas, the majority of land use consists of agriculture, such as cassava plantations (*Manihot esculenta*), sugarcane fields (*Saccharum officinarum*), rice paddies (*Oryza sativa* L.), livestock farms, water reservoirs, eucalyptus plantations, bamboo forests, waterways, and mango (*Mangifera indica* L.) and lychee (*Litchi chinensis* Sonn.) orchards. Other land use activities include PV solar farms. Plant species found in the study area are more or less similar to those found in the Project area. Different other plant species, usually the common ones, are for examples: *Cocos nucifera* L., *Elaeis guineensis* Jacq., and *Phoenix dactylifera* L. (Arecaceae); *Oroxylum indicum* (L.) Kurz (Bignoniaceae); *Terminalia ivorensis* A.Chev. (Combretaceae); *Sesbania grandiflora* (L.) Poir., *Tamarindus indica* L., and *Vigna unguiculata* (L.) Walp. (Fabaceae); *Ocimum tenuiflorum* L. (Lamiaceae); *Muntingia calabura* L. (Muntingiaceae); *Chrysopogon zizanioides* (L.) Roberty (Poaceae); *Capsicum annuum* L., *Capsicum frutescens* L., and *Solanum torvum* Sw. (Solanaceae).

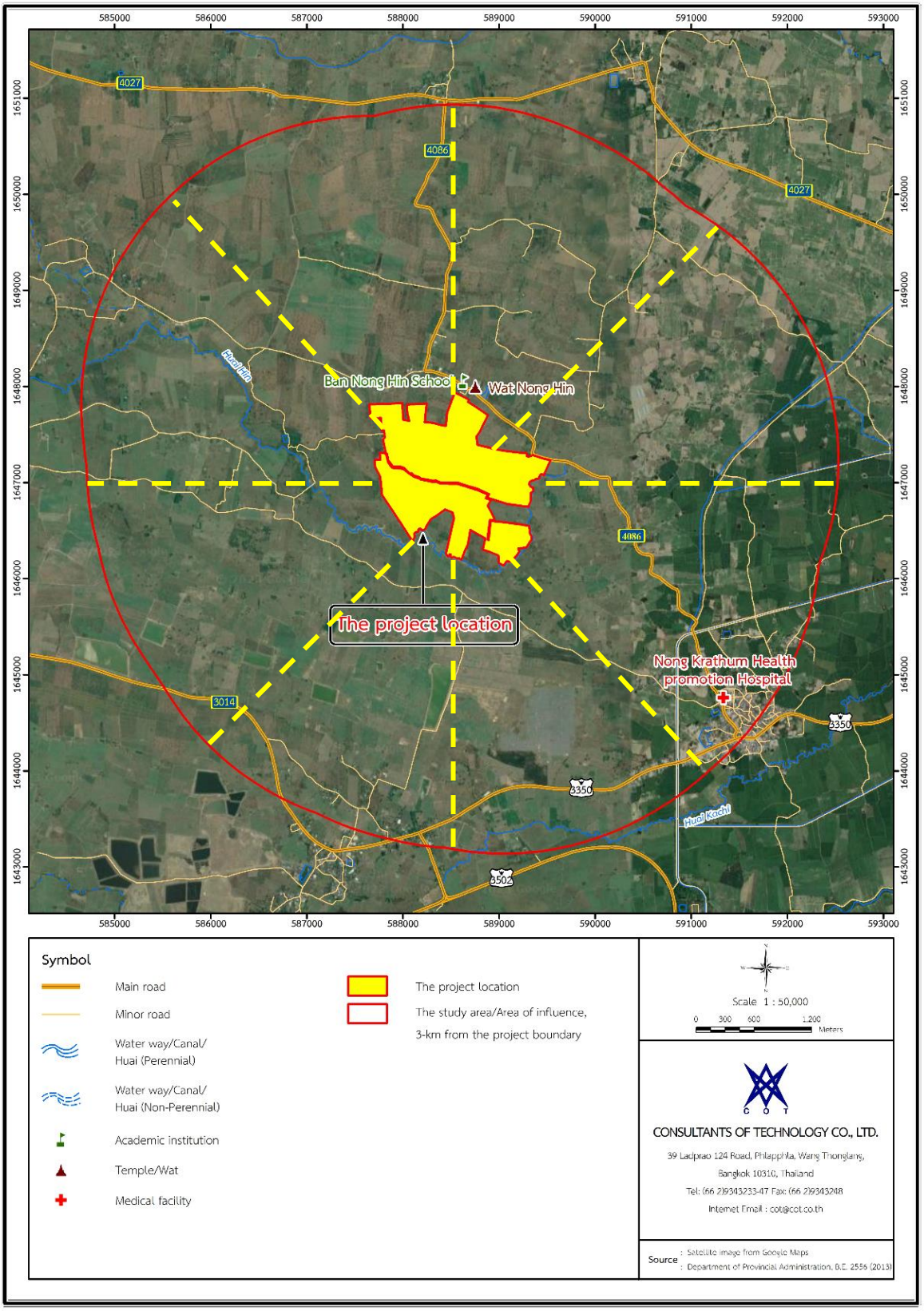


Figure 3.2.1.1-1 Field Study Sections in the Study Area

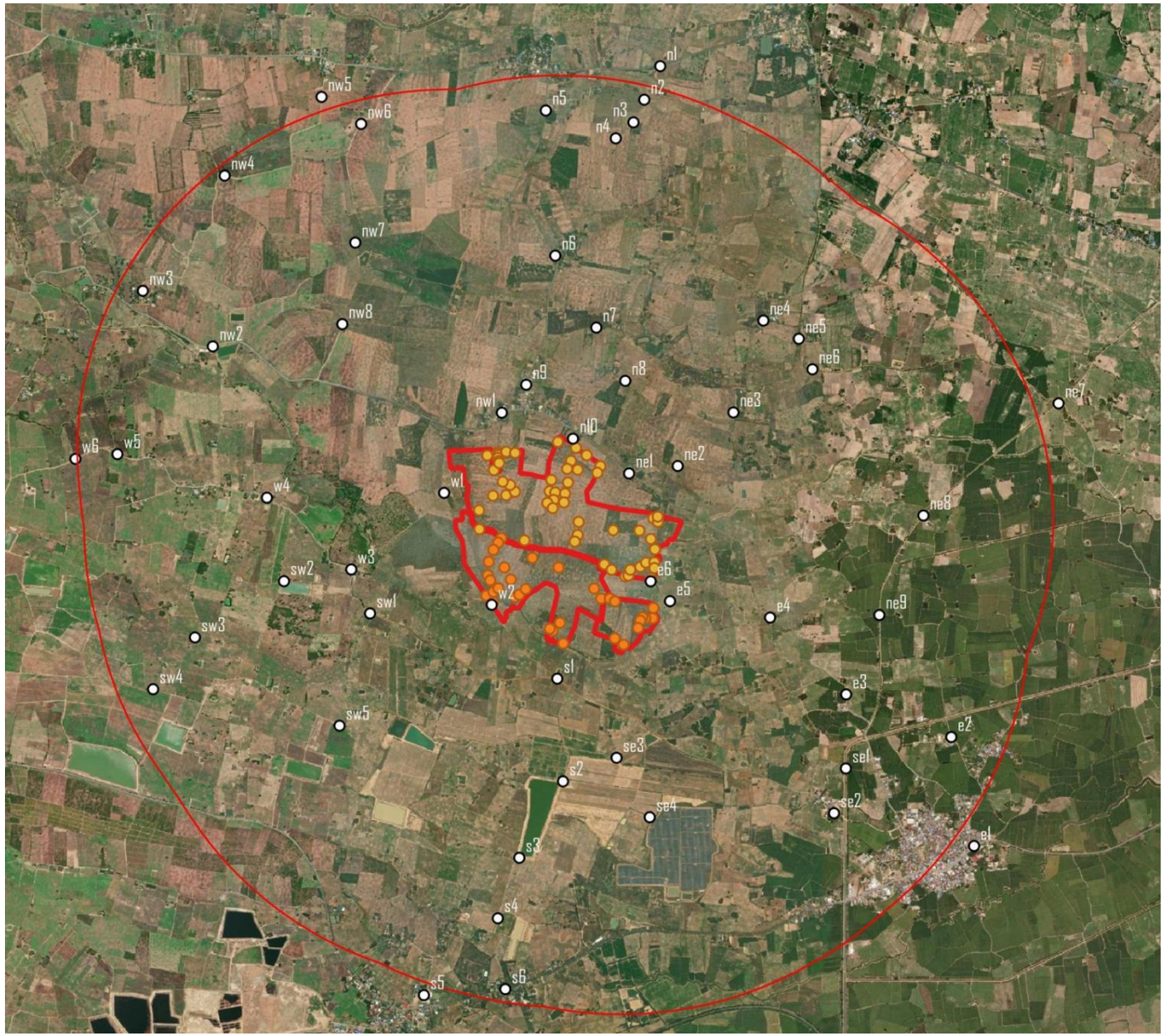


Figure 3.2.1.1-2 White Dots Show Survey Points of Forest Resource in the Study Area

Table 3.2.1.1-1
Land Use Pattern in the Study Area

Observation Point	Coordinate System (UTM)		Land Use Pattern
	Easting	Northing	
N1	99.83075	14.93236	Rice fields
			Cassava farm
			Water storage pond
			Sugarcane farm
N2	99.82954	14.92985	Space
			Sugarcane farm
			Cassava farm
			Neem plantation
N3	99.82869	14.92798	Bamboo garden
N4	99.82744	14.92692	Sugarcane plantation
			Hut
N5	99.82218	14.92904	Cassava farm
			Cassava farm
			Water storage pond
N6	99.82292	14.91812	Community area
			Cassava farm
			Livestock farm
N7	99.82598	14.91276	Cassava purchasing factory
			Livestock farm
			Cassava farm
			Space
N8	99.82072	14.90844	Eucalyptus plantation
			Livestock farm
			Agricultural planting plots
N9	99.82072	14.90844	Community area
			Eucalyptus plantation
			Sugarcane farm
N10	99.82420	14.90441	School
			Temple
W1	99.81456	14.90033	Cassava farm
			Community area
W2	99.81814	14.89194	Water storage pond
			Sugarcane farm
			Space
			Hut
			Irrigation canal
W3	99.80756	14.89461	Community area
			Water storage pond
W4	99.80121	14.89997	Cassava farm
			Sugarcane farm
			Space
W5	99.79000	14.90325	Neem plantation

Table 3.2.1.1-1
Land Use Pattern in the Study Area

Observation Point	Coordinate System (UTM)		Land Use Pattern
	Easting	Northing	
			Sugarcane farm
W6	99.78689	14.90289	Sugarcane farm
			Water storage pond
S1	99.82304	14.88636	Sugarcane farm
			Water storage pond
S2	99.82355	14.87868	Water storage pond
			Sugarcane farm
			Space
			Solar PV farm
S3	99.82017	14.87294	Water storage pond
			Sugarcane farm
S4	99.81857	14.86837	Vetiver grass farm
			Sugarcane farm
			Eucalyptus plantation
S5	99.81301	14.86257	School
			Bus Terminal
			Community area
			Temple
			Market
S6	99.81914	14.86306	Community area
			Police booth
E1	99.85434	14.87385	Temple
			Community area
E2	99.85257	14.88201	Rice field
			Rice mill
E3	99.84467	14.88523	Rice field
			Banana farm
E4	99.83898	14.89097	Neem plantation
			Sugarcane farm
E5	99.83151	14.89221	Cassava farm
			Space
E6	99.83007	14.89367	Space
			Banana farm
NW1	99.81889	14.90634	Water storage pond
			Community area
NW2	99.79719	14.9112	Multi-purpose hall
			Water storage pond
			Agricultural planting plots
NW3	99.79193	14.91553	Cassava farm
			Community area
NW4	99.79807	14.92416	Water storage pond
			Cassava farm

Table 3.2.1.1-1
Land Use Pattern in the Study Area

Observation Point	Coordinate System (UTM)		Land Use Pattern
	Easting	Northing	
NW5	99.80537	14.93032	Date Palm farm
			Cassava farm
NW6	99.80829	14.92808	Agricultural planting plots
			Water storage pond
NW7	99.80786	14.91913	Agricultural planting plots
			Sugarcane farm
NW8	99.80689	14.91302	Agricultural planting plots
			Cassava farm
NE1	99.8284	14.90181	Water storage pond
			Cassava farm
NE2	99.83206	14.90234	Factory
			Cassava farm
NE3	99.83626	14.90638	Cassava farm
			Sugarcane farm
			Community area
NE4	99.83853	14.91329	Stockyard
			Community area
NE5	99.84117	14.91193	Stockyard
			Sugarcane farm
NE6	99.84218	14.90963	Eucalyptus plantation
			Factory
NE7	99.86064	14.90707	Water storage pond
			Sugarcane farm
NE8	99.85054	14.89865	Rice field
			Space
NE9	99.84723	14.89119	Rice field
SE1	99.84471	14.87965	Rice field
			Irrigation canal
SE2	99.8438	14.87628	Community area
SE3	99.8275	14.88047	Sugarcane farm
SE4	99.82997	14.87603	Solar PV farm
			Sugarcane farm
SW1	99.80897	14.89133	Sugarcane farm
			Irrigation canal
			Community area
SW2	99.80251	14.89371	Water storage pond
			Eucalyptus plantation
SW3	99.79584	14.88952	Hut
			Sugarcane farm
SW4	99.79272	14.88561	Sugarcane farm
SW5	99.8067	14.88281	Sugarcane farm

		
Cassava farm	Cassava farm	Sugarcane farm
		
Rice field	Stockyard	Water storage pond
		
Community area	Eucalyptus plantation	PV solar farm

Figure 3.2.1.1-3 Some of Land Use Pattern in the Study Area

2.3 Results of Project Area Survey

A total of 146 species were identified from 127 genera and 45 families (**Table 3.2.1.1-2**). Current land use characteristics in the Project area is illustrated in **Figure 3.2.1.1-3** and examples of plant species found in the Project area are shown in **Figure 3.2.1.1-4**.

1) Family Poaceae consists of a total of 19 genera and 24 species. Among them, there are 3 species of bamboo: x *Thyrsocalamus liang* (an inter-generic hybrid), *Bambusa blumeana*, and *Thyrsostachys siamensis*. Additionally, there are 6 exotic grass species, including *Brachiaria mutica*, *Cenchrus brownii*, *Cenchrus echinatus*, *Chloris barbata*, *Cynodon dactylon*, and *Cenchrus polystachios*.

2) Family Fabaceae consists of a total of 17 genera and 20 species. There are 3 exotic bean species, including *Leucaena leucocephala*, *Pithecellobium dulce*, and *Tamarindus indica*. There are 9 tree bean species, namely *Millettia brandisiana*, *Senna siamea*, *Albizia lebbekoides*, *Pterocarpus macrocarpus*, *Albizia lebbeck*, *Dalbergia cochinchinensis*, *Sindora siamensis*, *Bauhinia malabarica*, and *Senna garrettiana*.

3) Family Malvaceae consists of a total of 8 genera and 10 species. The majority of flowering plants in this family are shrubs. There are 2 tree species, *Microcos tomentosa* and *Sterculia foetida*, and the exotic plant *Hibiscus sabdariffa*.

4) Family Euphorbiaceae consists of a total of 5 genera and 8 species. The majority of these plants are either creeping or shrubby, with some small-sized trees. There is 1 tree species, *Suregada multiflora*, and 2 exotic plant species, *Euphorbia heterophylla*, which is now an invasive weed, and *Manihot esculenta*, which is cultivated as an economic plant.

5) Family Asteraceae consists of a total of 7 genera and 7 species. All of them are herbs except for *Tarlmounia elliptica*, which is a climbing plant. The majority of the flowering plants in this family are weeds found in agricultural areas. There are 2 exotic plant species, *Tridax procumbens* and *Chromolaena odorata*.

6) Families of flowering plants encountered comprise 5 species each, namely:

- Family Apocynaceae includes 5 genera, primarily consisting of climbers, with an exotic plant species, *Calotropis gigantea*.

- Family Convolvulaceae includes 3 genera, all of which are climbers.
- Family Cucurbitaceae includes 5 genera, all of which are climbers, and there are 2 exotic plant species, *Citrullus lanatus* and *Cucumis melo*.

7) Families of encountered flowering plants, each comprising 4 species, include:
- The Ebenaceae family with 1 genus, all species are trees.
- The Rubiaceae family with 4 genera, ranging from herbs to trees, and an exotic plant species, *Richardia brasiliensis*.

8) Families of encountered flowering plants, each comprising 3 genera, include:
The Phyllanthaceae family with all 3 genera of the same plant species, including *Phyllanthus amarus*, an herbaceous plant; *Phyllanthus reticulatus*, a shrub; and *Phyllanthus emblica*, a tree.

9) Families of encountered flowering plants, each comprising 2 species, divide into those with trees: Bignoniaceae, Dipterocarpaceae, Capparaceae, Lauraceae, Sapindaceae, and Myrtaceae, which includes exotic plants *Eucalyptus camaldulensis* and *Psidium guajava*. The remaining families include a mix of trees, shrubs, climbers, and herbs: Lamiaceae, Menispermaceae, and Nyctaginaceae.

10) Families of encountered flowering plants, each comprising only 1 species, include a total of 20 genera, with subdivisions of tree families: Muntingiaceae, Burseraceae, Celastraceae, Meliaceae, Rhamnaceae, and Salicaceae. Subdivisions of climber families: Passifloraceae, Salvadoraceae, Simaroubaceae, and Vitaceae. The remaining families include a mix of climbers, shrubs, and trees: Aizoaceae, Annonaceae, Arecaceae, Boraginaceae, Caricaceae, Cleomaceae, Molluginaceae, Onagraceae, Plantaginaceae, Portulacaceae, and Zygophyllaceae.

Table 3.2.1.1-2

List of Botanical Species Identified from the Survey

No.	Thai Name	Botanical Name	Family	Habit	Conservation Status based on IUCN Red list	CITES	Restricted Timber
1	ผักเบี้ยหิน	*Trianthema portulacastrum* L.	Aizoaceae	H	*Not Evaluated*	-	-
2	ควยงู	*Achyranthes aspera* L.	Amaranthaceae	H	*Not Evaluated*	-	-
3	ผักโขม	*Amaranthus viridis* L.	Amaranthaceae	H	*Not Evaluated*	-	-
4	บานไม่รู้โรยป่า	*Gomphrena celosioides* Mart.	Amaranthaceae	ExH	*Not Evaluated*	-	-
5	กุ๊ก	*Lannea coromandelica* (Houtt.) Merr.	Anacardiaceae	T	Least Concern	-	-
6	มะม่วงป่า	*Mangifera caloneura* Kurz	Anacardiaceae	T	*Not Evaluated*	-	*R*
7	มะกอกป่า	*Spondias pinnata* (L.f.) Kurz	Anacardiaceae	T	*Not Evaluated*	-	-
8	กล้วยเต่า	*Polyalthia debilis* (Pierre) Finet & Gagnep.	Annonaceae	S	*Not Evaluated*	-	-
9	เครือไส้ตัน	*Amphineurion marginatum* (Roxb.) D.J.Middleton	Apocynaceae	C	*Not Evaluated*	-	-
10	รักร้อยมาลัย	*Calotropis gigantea* (L.) W.T.Aiton	Apocynaceae	ExS/ST	*Not Evaluated*	-	-
11	เถาประสงค์	*Streptocaulon juventas* (Lour.) Merr.	Apocynaceae	C	*Not Evaluated*	-	-
12	โมกมัน	*Wrightia arborea* (Dennst.) Mabb.	Apocynaceae	T	Least Concern	-	-
13	อบเชยเถา	*Zygostelma benthamii* Baill.	Apocynaceae	C	*Not Evaluated*	-	-
14	ตาล	*Borassus flabellifer* L.	Arecaceae	P	Data Deficient	-	-
15	สาบแร้งสาบกา	*Ageratum conyzoides* (L.) L.	Asteraceae	H	*Not Evaluated*	-	-
16	สาบเสือ	*Chromolaena odorata* (L.) R.M.King & H.Rob.	Asteraceae	ExH	*Not Evaluated*	-	-
17	หญ้าละออง	*Cyanthillium cinereum* (L.) H.Rob.	Asteraceae	H	*Not Evaluated*	-	-
18	พญามุตติ	*Grangea maderaspatana* (L.) Poir.	Asteraceae	H	Least Concern	-	-
19	ผักแครด	*Synedrella nodiflora* (L.) Gaertn.	Asteraceae	H	*Not Evaluated*	-	-
20	ตานหม่อน	*Tarlmounia elliptica* (DC.) H.Rob., S.C.Keeley, Skvarla & R.Chan	Asteraceae	C	*Not Evaluated*	-	-
21	ตีนตุ๊กแก	*Tridax procumbens* L.	Asteraceae	ExH	*Not Evaluated*	-	-
22	แคบิด	*Fernandoa adenophylla* (Wall. ex G.Don) Steenis	Bignoniaceae	T	*Not Evaluated*	-	-

Table 3.2.1.1-2

List of Botanical Species Identified from the Survey

No.	Thai Name	Botanical Name	Family	Habit	Conservation Status based on IUCN Red list	CITES	Restricted Timber
23	เหลืองปรีดียาธร	*Tabebuia aurea* (Silva Manso) Benth. & Hook.f. ex S.Moore	Bignoniaceae	ExT	*Not Evaluated*	II	-
24	คอมขาว	*Ehretia* sp.	Boraginaceae	ScanS	*Not Evaluated*	-	-
25	ตะคร้ำ	*Garuga pinnata* Roxb.	Burseraceae	T	*Not Evaluated*	-	*R*
26	กุ่มบก	*Crateva adansonii* DC.	Capparaceae	T	Least Concern	-	-
27	แจง	*Maerua siamensis* (Kurz) Pax	Capparaceae	T	*Not Evaluated*	-	-
28	มะละกอ	*Carica papaya* L.	Caricaceae	ExST	Data Deficient	-	-
29	มะดูก	*Siphonodon celastrineus* Griff.	Celastraceae	T	Least Concern	-	-
30	ผักเสี้ยนผี	*Cleome viscosa* L.	Cleomaceae	H	*Not Evaluated*	-	-
31	ผักบุ้งไทย	*Ipomoea aquatica* Forssk.	Convolvulaceae	CrH	Least Concern	-	-
32	สะอึก	*Ipomoea obscura* (L.) Ker Gawl.	Convolvulaceae	HC	*Not Evaluated*	-	-
33	ขยุ้มตีนหมา	*Ipomoea pes-tigridis* L.	Convolvulaceae	CrH	*Not Evaluated*	-	-
34	จิงจ้อนวล	*Merremia hirta* (L.) Merr.	Convolvulaceae	HC	*Not Evaluated*	-	-
35	จิ้งจ้อแดง	*Operculina turpethum* (L.) Silva Manso	Convolvulaceae	C	*Not Evaluated*	-	-
36	ตำลึง	*Coccinia grandis* (L.) Voigt	Cucurbitaceae	HC	*Not Evaluated*	-	-
37	มะระขี้นก	*Momordica charantia* L.	Cucurbitaceae	HC	*Not Evaluated*	-	-
38	ขี้กาแดง	*Trichosanthes scabra* Lour.	Cucurbitaceae	HC	*Not Evaluated*	-	-
39	แตงโม	*Citrullus lanatus* (Thunb.) Matsum. & Nakai	Curcubitaceae	ExHC	*Not Evaluated*	-	-
40	แตงไทย	*Cucumis melo* L.	Curcubitaceae	ExHC	*Not Evaluated*	-	-
41	หญ้าหนวดแมว	*Bulbostylis barbata* (Rottb.) C.B.Clarke	Cyperaceae	H	*Not Evaluated*	-	-
42	แห้วหมูเทียม	*Cyperus mitis* Steud	Cyperaceae	H	Least Concern	-	-
43	หญ้าแห้วหมู	*Cyperus rotundus* L.	Cyperaceae	H	Least Concern	-	-
44	พะยอม	*Anthoshorea roxburghii* (G.Don) P.S.Ashton & J.Heck.	Dipterocarpaceae	T	Near Threatened	-	R

Table 3.2.1.1-2

List of Botanical Species Identified from the Survey

No.	Thai Name	Botanical Name	Family	Habit	Conservation Status based on IUCN Red list	CITES	Restricted Timber
45	ยางเหียง	*Dipterocarpus obtusifolius* Teijsm. ex Miq.	Dipterocarpaceae	T	Near Threatened	-	R
46	-	*Diospryros* sp.	Ebenaceae	T	-	-	R
47	ล่ำตาควาย	*Diospyros coaetanea* H.R.Fletcher	Ebenaceae	T	*Not Evaluated*	-	-
48	มะเกลือ	*Diospyros mollis* Griff.	Ebenaceae	T	*Not Evaluated*	-	*R*
49	ตะโกนา	*Diospyros rhodocalyx* Kurz	Ebenaceae	T	*Not Evaluated*	-	*R*
50	เปล้าทุ่ง	*Croton bonplandianus* Baill.	Euphorbiaceae	H	*Not Evaluated*	-	-
51	เปล้าแพะ	*Croton hutchinsonianus* Hosseus	Euphorbiaceae	S/ST	*Not Evaluated*	-	-
52	เปล้าใหญ่	*Croton persimilis* Müll.Arg.	Euphorbiaceae	S/ST	*Not Evaluated*	-	-
53	หญ้ายาง	*Euphorbia heterophylla* L.	Euphorbiaceae	EXH	Least Concern	-	-
54	น้ำนมราชสีห์	*Euphorbia hirta* L.	Euphorbiaceae	H	*Not Evaluated*	-	-
55	มันสำปะหลัง	*Manihot esculenta* Crantz	Euphorbiaceae	ExS/ST	*Not Evaluated*	-	-
56	ขันทองพยาบาท	*Suregada multiflora* (A.Juss.) Baill.	Euphorbiaceae	T	*Not Evaluated*	-	-
57	โลดทะนง	*Trigonostemon reidioides* (Kurz) Craib	Euphorbiaceae	S	*Not Evaluated*	-	-
58	พฤกษ์	*Albizia lebbeck* (L.) Benth.	Fabaceae	T	Least Concern	-	R
59	คาง	*Albizia lebbekoides* (DC.) Benth.	Fabaceae	T	Least Concern	-	R
60	ถั่วลิสงนา	*Alysicarpus vaginalis* (L.) DC.	Fabaceae	H	*Not Evaluated*	-	-
61	เสี้ยวส้ม	*Bauhinia malabarica* Roxb.	Fabaceae	T	Least Concern	-	-
62	เสี้ยวเครือ	*Bauhinia saccocalyx* Pierre	Fabaceae	ST	*Not Evaluated*	-	-
63	เถาวัลย์เปรียง	*Brachypterum scandens* (Roxb.) Wight & Arn. ex Miq.	Fabaceae	C	*Not Evaluated*	-	-
64	พะยูง	*Dalbergia cochinchinensis* Pierre	Fabaceae	T	Critically Endangered	II	R
65	ถั่วปากนก	*Dunbaria punctata* (Wight & Arn.) Benth.	Fabaceae	C	*Not Evaluated*	-	-
66	กระถินยักษ์	*Leucaena leucocephala* (Lam.) de Wit	Fabaceae	ExT	*Not Evaluated*	-	-

Table 3.2.1.1-2

List of Botanical Species Identified from the Survey

No.	Thai Name	Botanical Name	Family	Habit	Conservation Status based on IUCN Red list	CITES	Restricted Timber
67	ถั่วผี	*Macroptilium lathyroides* (L.) Urb.	Fabaceae	H	*Not Evaluated*	-	-
68	กระพี้จั่น	*Millettia brandisiana* Kurz	Fabaceae	T	*Not Evaluated*	-	-
69	มะขามเทศ	*Pithecellobium dulce* (Roxb.) Benth.	Fabaceae	ExT	Least Concern	-	-
70	ประดู่ป่า	*Pterocarpus macrocarpus* Kurz	Fabaceae	T	Endangered	II	R
71	ชะอม	*Senegalia pennata* (L.) Maslin	Fabaceae	C	Least Concern	-	-
72	แสมสาร	*Senna garrettiana* (Craib) H.S.Irwin & Barneby	Fabaceae	T	*Not Evaluated*	-	-
73	ขี้เหล็ก	*Senna siamea* L.	Fabaceae	T	Least Concern	-	-
74	มะค่าแต้	*Sindora siamensis* Teijsm. ex Miq.	Fabaceae	T	Least Concern	-	R
75	มะขาม	*Tamarindus indica* L.	Fabaceae	ExT	Least Concern	-	-
76	คราม่ป่า	*Tephrosia purpurea* (L.) Pers.	Fabaceae	H	*Not Evaluated*	-	-
77	ถั่วเขียว	*Vigna radiata* (L.) R.Wilczek	Fabaceae	HC	Least Concern	-	-
78	แมงลักคา	*Mesosphaerum suaveolens* (L.) Kuntze	Lamiaceae	S	*Not Evaluated*	-	-
79	ผ่าเสี้ยน	*Vitex canescens* Kurz	Lamiaceae	T	Least Concern	-	R
80	ฝีหมอบ	*Beilschmiedia roxburghiana* Nees	Lauraceae	T	Least Concern	-	-
81	หมีเหม็น	*Litsea glutinosa* (Lour.) C.B.Rob.	Lauraceae	T	Least Concern	-	R
82	ครอบจักรวาล	*Abutilon indicum* (L.) Sweet	Malvaceae	US	*Not Evaluated*	-	-
83	กระเจานา	*Corchorus aestuans* L.	Malvaceae	H	*Not Evaluated*	-	-
84	กระเจี๊ยบแดง	*Hibiscus sabdariffa* L.	Malvaceae	ExH	*Not Evaluated*	-	-
85	เส้งดอกม่วง	*Melochia corchorifolia* L.	Malvaceae	US	Least Concern	-	-
86	พลับพลา	*Microcos tomentosa* Sm.	Malvaceae	T	Least Concern	-	-
87	หญ้าขัดใบยาว	*Sida acuta* Burm.f.	Malvaceae	US	*Not Evaluated*	-	-
88	หญ้าขัดใบป้อม	*Sida cordifolia* L.	Malvaceae	US	*Not Evaluated*	-	-
89	หญ้าขัดมอน	*Sida rhombifolia* L.	Malvaceae	US	*Not Evaluated*	-	-

Table 3.2.1.1-2

List of Botanical Species Identified from the Survey

No.	Thai Name	Botanical Name	Family	Habit	Conservation Status based on IUCN Red list	CITES	Restricted Timber
90	สำโรง	*Sterculia foetida* L.	Malvaceae	T	*Not Evaluated*	-	-
91	ขี้ครอก	*Urena lobata* L.	Malvaceae	US	Least Concern	-	-
92	สะเดา	*Azadirachta indica* A.Juss.	Meliaceae	T	Least Concern	-	R
93	เถาย่านาง	*Tiliacora triandra* (Colebr.) Diels	Menispermaceae	C	*Not Evaluated*	-	-
94	ชิงช้าชาลี	*Tinospora baenzigeri* Forman	Menispermaceae	C	*Not Evaluated*	-	-
95	ผักขวง	*Glinus oppositifolius* (L.) Aug.DC.	Molluginaceae	H	Least Concern	-	-
96	มะหาด	*Artocarpus lacucha* Buch.-Ham.	Moraceae	T	*Not Evaluated*	-	*R*
97	โพขี้นก	*Ficus rumphii* Blume	Moraceae	T	*Not Evaluated*	-	-
98	ข่อย	*Streblus asper* Lour.	Moraceae	T	Least Concern	-	-
99	ตะขบฝรั่ง	*Muntingia calabura* L.	Muntingiaceae	ExST	*Not Evaluated*	-	-
100	ยูคาลิปตัส	*Eucalyptus camaldulensis* Dehnh.	Myrtaceae	ExT	Near Threatened	-	-
101	ฝรั่ง	*Psidium guajava* L.	Myrtaceae	ExST	Least Concern	-	-
102	ผักโขมหินดอกม่วง	*Boerhavia diffusa* L.	Nyctaginaceae	H	*Not Evaluated*	-	-
103	ผักโขมหินดอกขาว	*Boerhavia erecta* L.	Nyctaginaceae	H	*Not Evaluated*	-	-
104	เทียนนา	*Ludwigia hyssopifolia* (G.Don) Exell	Onagraceae	H	Least Concern	-	-
105	กระทกรก	*Passiflora foetida* L.	Passifloraceae	ExC	*Not Evaluated*	-	-
106	ลูกใต้ใบ	*Phyllanthus amarus* Schumach. & Thonn.	Phyllanthaceae	H	*Not Evaluated*	-	-
107	มะขามป้อม	*Phyllanthus emblica* L.	Phyllanthaceae	T	Least Concern	-	-
108	ลูกหมึก	*Phyllanthus reticulatus* Poir.	Phyllanthaceae	S/ST	Least Concern	-	-
109	กรดน้ำ	*Scoparia dulcis* L.	Plantaginaceae	ExH	*Not Evaluated*	-	-
110	ไผ่เลี้ยง	× *Thyrsocalamus liang* Sungkaew & W.L.Goh	Poaceae	B	*Not Evaluated*	-	-
111	ไผ่สีสุก	*Bambusa blumeana* Schult.f.	Poaceae	B	*Not Evaluated*	-	-
112	หญ้าขี้หมา	*Bothriochloa bladhii* (Retz.) S.T.Blake	Poaceae	G	*Not Evaluated*	-	-

Table 3.2.1.1-2

List of Botanical Species Identified from the Survey

No.	Thai Name	Botanical Name	Family	Habit	Conservation Status based on IUCN Red list	CITES	Restricted Timber
113	หญ้าตดเลือด	*Bothriochloa pertusa* (L.) A.Camus	Poaceae	G	*Not Evaluated*	-	-
114	หญ้าบุ้ง	*Cenchrus brownii* Roem. & Schult.	Poaceae	ExG	*Not Evaluated*	-	-
115	หญ้าสอนกระจับ	*Cenchrus echinatus* L.	Poaceae	ExG	Least Concern	-	-
116	หญ้าขจรจบ	*Cenchrus polystachios* (L.) Morrone	Poaceae	ExG	*Not Evaluated*	-	-
117	หญ้ารังนก	*Chloris barbata* Sw.	Poaceae	ExG	*Not Evaluated*	-	-
118	หญ้าแพรก	*Cynodon dactylon* (L.) Pers.	Poaceae	ExG	*Not Evaluated*	-	-
119	หญ้าปากควาย	*Dactyloctenium aegyptium* (L.) Willd.	Poaceae	G	*Not Evaluated*	-	-
120	หญ้าแหวน	*Dichanthium caricosum* (L.) A.Camus	Poaceae	G	*Not Evaluated*	-	-
121	หญ้าตีนนกช่อขน	*Digitaria ciliaris* (Retz.) Koel.	Poaceae	G	*Not Evaluated*	-	-
122	หญ้านกสีชมพู	*Echinochloa colona* (L.) Link	Poaceae	G	Least Concern	-	-
123	หญ้าไข่เห็บเล็ก	*Eragrostis tenella* (L.) P.Beauv. ex Roem. & Schult.	Poaceae	G	*Not Evaluated*	-	-
124	หญ้าหนวดฤๅษี	*Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult.	Poaceae	G	*Not Evaluated*	-	-
125	หญ้าคา	*Imperata cylindrica* (L.) Raeusch.	Poaceae	G	*Not Evaluated*	-	-
126	หญ้าดอกขาว	*Leptochloa chinensis* (L.) Nees	Poaceae	G	*Not Evaluated*	-	-
127	หญ้าขันกาด	*Panicum repens* L.	Poaceae	G	Least Concern	-	-
128	แขม	*Phragmites karka* (Retz.) Trin. ex Steud.	Poaceae	G	Least Concern	-	-
129	อ้อย	*Saccharum officinarum* L.	Poaceae	G	*Not Evaluated*	-	-
130	หญ้าขน	*Urochloa mutica* (Forssk.) T.Q.Nguyen	Poaceae	ExG	Least Concern	-	-
131	หญ้าสลอย	*Urochloa subquadripara* (Trin.) R.D.Webster	Poaceae	G	Least Concern	-	-
132	เลา	*Saccharum spontaneum* L.	Poaceae	G	Least Concern	-	-
133	ไผ่รวก	*Thyrsostachys siamensis* Gamble	Poaceae	B	*Not Evaluated*	-	-
134	ผักเบี้ยใหญ่	*Portulaca oleracea* L.	Portulacaceae	H	*Not Evaluated*	-	-
135	พุทรา	*Ziziphus mauritiana* Lam.	Rhamnaceae	ExST	Least Concern	-	-

Table 3.2.1.1-2

List of Botanical Species Identified from the Survey

No.	Thai Name	Botanical Name	Family	Habit	Conservation Status based on IUCN Red list	CITES	Restricted Timber
136	ยอป่า	*Morinda coreia* Buch.-Ham.	Rubiaceae	T	*Not Evaluated*	-	-
137	หญ้าลิ้นงู	*Oldenlandia corymbosa* L.	Rubiaceae	H	*Not Evaluated*	-	-
138	คัดเค้า	*Oxyceros sp.*	Rubiaceae	ST	*Not Evaluated*	-	-
139	หญ้าท่าพระ	*Richardia brasiliensis* Gomes	Rubiaceae	ExH	*Not Evaluated*	-	-
140	กรวยป่า	*Casearia grewiifolia* Vent.	Salicaceae	T	Least Concern	-	-
141	หนามพุงดอ	*Azima sarmentosa* (Blume) Benth. & Hook. f.	Salvadoraceae	C	Least Concern	-	
142	ตะคร้อ	*Schleichera oleosa* (Lour.) Merr.	Sapindaceae	T	Least Concern	-	R
143	ขี้หนอน	*Zollingeria dongnaiensis* Pierre	Sapindaceae	T	Data Deficient	-	-
144	หนามคนทา	*Harrisonia perforata* (Blanco) Merr.	Simaroubaceae	ScanS	Least Concern	-	-
145	เถาคันขาว	*Causonis trifolia* (L.) Mabb. & J.Wen	Vitaceae	C	*Not Evaluated*	-	-
146	หนามกระสุน	*Tribulus terrestris* L.	Zygophyllaceae	H	Least Concern	-	-
146 Species, 127 Genera, 45 Families						**-**	**17**

Remark: B = bamboo, C = climber, CrH = creeping herb, Ex = Exotic, G = grass,
H = herb, HC = herbaceous climber, P = palm, S = shrub, S/ST = shrub/shrubby tree,
ScanS = scandent shrub, ST = shrubby tree, T = tree, US = undershrub, US/S = undershrub/shrub,
EX = Extinct, EW = Extinct in the wild, CR = Critically Endangered, EN = Endangered, VU = Vulnerable,
NT = Near Threatened, LC = Least Concerned, DD = Data Deficient, NE = Not Evaluated, - = Not in status
R = Restricted Timber Species (Royal Decree on Restricted Timber Species B.E. 2530 (1987) and Royal Decree on Restricted Timber Species B.E. 2565 (No. 2) (2022)).
II = Appendix II, includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.



Figure 3.2.1.1-3 Current Project Area Condition (pictures taken during survey, June 3rd to 5th, B.E. 2566 (2023))

			
ผักเบี้ยหิน (*Trianthema portulacastrum*)	บานไม่รู้โรยป่า (*Gomphrena celosioides*)	รักร้อยมาลัย (*Calotropis gigantean*)	สาบแร้งสาบกา (*Ageratum conyzoides*)
			
แคบิด (*Fernandoa adenophylla*)	โมกมัน (*Wrightia arborea*)	หญ้าท่าพระ (*Richardia brasiliensis*)	พะยอม (*Anthoshorea roxburghii*)

			
สะอึก (*Ipomoea obscura*)	จิงจ้อแดง (*Operculina turpethum*)	มะระขี้นก (*Momordica charantia*)	หญ้าแห้วหมู (*Cyperus rotundus*)
			
ยางเหียง (*Dipterocarpus obtusifolius*)	พฤกษ์ (*Albizia lebbeck*)	พะยูง (*Dalbergia cochinchinensis*)	ประดู่ป่า (*Pterocarpus macrocarpus*)

			
พลับพลา (*Microcos tomentosa*)	ข่อย (*Streblus asper*)	หญ้าปากควาย (*Dactyloctenium aegyptium*)	หญ้านกสีชมพู (*Echinochloa colona*)
			
เปล้าทุ่ง (*Croton bonplandianus*)	หญ้าลิ้นงู (*Oldenlandia corymbosa*)	ตะคร้อ (*Schleichera oleosa*)	หนามกระสุน (*Tribulus terrestris*)

Figure 3.2.1.1-4 Plant Species in the Study Area

2.4 Conclusions

Based on the survey, the plant species exhibited various growth forms, totaling 12 patterns (**Table 3.2.1.1-3**). The most common growth form was trees, with 44 species, of which 5 species were introduced from different countries. When considering the Conservation status based on the International Union for Conservation of Nature (IUCN) Red List (**Table 3.2.1.1-4**), it was observed that the majority of plant species in the Project area have not been evaluated for conservation status (Not Evaluated), totaling 94 species. Most of them are common plants, with several species found in various ecosystems. These ecosystems are well-preserved, allowing them to naturally propagate. Many of these species are either exotic or native plants and are considered weeds in agricultural areas.

There are 44 plant species classified as "Least Concerned," indicating that they are not currently threatened, and they are commonly found.

Within the Project area, three plant species are categorized as "Near Threatened," including *Anthoshorea roxburghii*, *Dipterocarpus obtusifolius*, and *Eucalyptus camaldulensis*. Notably, *Anthoshorea roxburghii* and *Dipterocarpus obtusifolius*, which are native species, have been significantly depleted and utilized within the Project area. On the other hand, *Eucalyptus camaldulensis* is an exotic species.

Threatened plant species were also identified, categorized into 2 levels: 1) Critically Endangered – 1 species found, namely *Dalbergia cochinchinensis*, and 2) Endangered –species found, namely *Pterocarpus macrocarpus*. However, it is important to note that the *Dalbergia cochinchinensis* found in the Project area are cultivated and are not naturally occurring in the area.

Currently, the majority of the Project area continues to be utilized for agricultural purposes, particularly cassava cultivation (*Manihot esculenta*). However, when considering the remaining plant species within the Project area, it can be assessed that the primary community plant habitat is deciduous dipterocarp forest. In this area, plant species such as *Anthoshorea roxburghii* and *Dipterocarpus obtusifolius* are commonly found.

Table 3.2.1.1-3

Summary of Habit, Number of Species, and Number of Exotic Plant Specie

Habit	Number of Species	Number of exotic species
B (bamboo)	3	-
C (climber)	12	1
CrH (creeping herb)	2	-
G (grass)	15	6
H (herb)	25	7
HC (herbaceous climber)	6	2
P (palm)	1	-
S (shrub)	4	2
ScanS (scandent shrub)	4	-
ST (shrub/shrubby tree)	2	4
T (tree)	39	5
US/S (undershrub/shrub)	6	-
(Total) 12	**119**	**27**

Table 3.2.1.1-4

Conservation Status according to the IUCN Red list and the Number of Species

IUCN Red list	Number of Species
CR (Critically Endangered)	1
DD (Data Deficient)	2
EN (Endangered)	2
LC (Least Concerned)	44
NE (Not Evaluated)	94
NT (Near Threatened)	3

Legal Status of Plant Species in the Project Area

Within the Project area and in accordance with the Royal Forest Conservation Act (Revised Edition) B.E. 2565, the survey revealed the presence of 17 plant species categorized as "Type A - common restricted timber species" in the List of Restricted Timber (Version 2), latest edition (**Table 3.2.1.1-5**). These species are also regulated under the Forest Act (Revised Edition) B.E. 2562, amended from the Forest Act B.E. 2484, Royal Forest Conservation Act B.E. 2530, and the Announcement of the National Council for Peace and Order No. 106/2557 within the Project area. Consequently, the Project is required to remove these trees from the area, as land rights and ownership conform to land laws. It has been declared that any plant species growing on land with rights or ownership under land laws are not considered restricted timber unless otherwise specified by a Royal Decree. The law states, "Any plant species that grows in the forest shall be designated as a restricted timber species based on a Royal Decree, for all types of plant species growing on land with rights or ownership under land laws shall not be considered restricted timber. Alternatively, plants cultivated on land with permission to utilize, as specified in the document indicating rights approved by the Cabinet, shall not be considered restricted timber."

Table 3.2.1.1-5

Number of Restricted Timber Species in the Project Area

Type of Restricted	Number of Species
Type A	17
Type B	0

Remark: Type A - refers to common restricted timber species (Timber species for which any timber-related activities require permission from government officials or are subject to grant by virtue of this Royal Decree.)

Type B - refers to specially restricted timber species (Rare or reserved timber species for which timber-related activities are not allowed unless approved by a minister in special cases.)

Commercial Status of CITES-Listed Species

Regarding the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), there are six plant species mentioned in Appendix I, II, and III (valid from 21 May 2023) found in the Project area (Appendices I, II, and III). These are plant species included in the CITES Appendices. Specifically, there are three species listed in Appendix II, which include *Tabebuia aurea* (Silva Manso) Benth. & Hook.f. ex S.Moore, *Dalbergia cochinchinensis* Pierre, and *Pterocarpus macrocarpus* Kurz. For these species, CITES Appendix II covers species that are not necessarily threatened with extinction but are subject to trade controls to prevent overutilization that may affect their survival. Additionally, species that resemble these listed species (look-alike species) are also covered. Exporting countries must issue export permits to certify that each export will not adversely affect the species' survival in the wild.

2.5 Observations/Issues

Based on the data collected on flora within the Project area and land use practices within a 3-kilometer radius from the Project boundary, one observations/issues have been identified: large trees of various species, such as *Anthoshorea roxburghii*, *Dipterocarpus obtusifolius*, *Mangifera caloneura*, *Lannea coromandelica*, and *Azadirachta indica*, have been observed to have been felled for their timber without clear knowledge of who was responsible.

3.2.1.2 Wildlife Resources

(1) Secondary Data

Based on data obtained from IBAT, proximity report, the following threatened species are potentially found within 50 km. of the Project site.

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Chitra chitra	Asian Narrowheaded, Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Crocodylus siamensis	Siamese Crocodile	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Epalzeorhynchos bicolor	Redtail Sharkminnow	ACTINOPTERYGII	CR	Unknown	Freshwater
Heosemys grandis	Giant Asian Pond Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Heosemys annandalii	Yellow-headed Temple Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Indotestudo elongata	Elongated Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Manis javanica	Sunda Pangolin	MAMMALIA	CR	Decreasing	Terrestrial
Nemacheilus troglocataractus		ACTINOPTERYGII	CR	Decreasing	Freshwater
Pangasius sanitwongsei	Giant Pangasius	ACTINOPTERYGII	CR	Decreasing	Freshwater
Probarbus jullieni	Jullien's Golden Carp	ACTINOPTERYGII	CR	Decreasing	Freshwater
Catlocarpio siamensis	Giant Carp	ACTINOPTERYGII	CR	Decreasing	Freshwater
Datnioides pulcher	Siamese Tiger Perch	ACTINOPTERYGII	CR	Decreasing	Freshwater
Aythya baeri	Baer's Pochard	AVES	CR	Decreasing	Freshwater
Gyps bengalensis	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
Sarcogyps calvus	Red-headed Vulture	AVES	CR	Decreasing	Terrestrial
Eurochelidon sirintarae	White-eyed River Martin	AVES	CR	Decreasing	Terrestrial, Freshwater
Emberiza aureola	Yellow-breasted Bunting	AVES	CR	Decreasing	Terrestrial, Freshwater
Gyps tenuirostris	Slender-billed Vulture	AVES	CR	Decreasing	Terrestrial
Panthera pardus ssp. delacouri	Indochinese Leopard	MAMMALIA	CR	Decreasing	Terrestrial
Pelochelys cantorii	Asian Giant Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Marine, Freshwater
Siamophryne troglodytes	Tenasserim Cave Frog	AMPHIBIA	CR	Decreasing	Terrestrial, Freshwater
Laubuka caeruleostigmata	Flying Minnow	ACTINOPTERYGII	EN	Decreasing	Freshwater
Cuon alpinus	Dhole	MAMMALIA	EN	Decreasing	Terrestrial

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Cuora amboinensis	Southeast Asian Box Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Discherodontus halei		ACTINOPTERYGII	EN	Decreasing	Freshwater
Elephas maximus	Asian Elephant	MAMMALIA	EN	Decreasing	Terrestrial
Hylobates lar	Lar Gibbon	MAMMALIA	EN	Decreasing	Terrestrial
Manouria impressa	Impressed Tortoise	REPTILIA	EN	Decreasing	Terrestrial
Panthera tigris	Tiger	MAMMALIA	EN	Decreasing	Terrestrial
Fluvitrygon signifer	White-edge Whipray	CHONDRICHTHYES	EN	Decreasing	Freshwater
Siebenrockiella crassicollis	Black Marsh Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nycticebus bengalensis	Bengal Slow Loris	MAMMALIA	EN	Decreasing	Terrestrial
Trachypithecus germaini	Indochinese Silvered Langur	MAMMALIA	EN	Decreasing	Terrestrial
Hylobates lar ssp. carpenteri	Carpenter's Lar	MAMMALIA	EN	Decreasing	Terrestrial
Viverra megaspila	Large-spotted Civet	MAMMALIA	EN	Decreasing	Terrestrial
Fluvitrygon oxyrhynchus	Marbled Whipray	CHONDRICHTHYES	EN	Decreasing	Freshwater
Trachypithecus crepusculus	Indochinese Gray Langur	MAMMALIA	EN	Decreasing	Terrestrial
Fluvitrygon kittipongi	Roughback Whipray	CHONDRICHTHYES	EN	Decreasing	Freshwater
Cyclemys oldhamii	Southeast Asian Leaf Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Pangasianodon hypophthalmus	Striped Catfish	ACTINOPTERYGII	EN	Decreasing	Freshwater
Urogymnus polylepis	Giant Freshwater Whipray	CHONDRICHTHYES	EN	Decreasing	Marine, Freshwater
Pavo muticus	Green Peafowl	AVES	EN	Decreasing	Terrestrial
Berenicornis comatus	White-crowned Hornbill	AVES	EN	Decreasing	Terrestrial
Aquila nipalensis	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
Leptoptilos dubius	Greater Adjutant	AVES	EN	Decreasing	Terrestrial, Freshwater
Calostoma insigne		AGARICOMYCETES	EN	Decreasing	Terrestrial
Bos gaurus	Gaur	MAMMALIA	VU	Decreasing	Terrestrial
Helarctos malayanus	Sun Bear	MAMMALIA	VU	Decreasing	Terrestrial
Hipposideros halophyllus	Thailand Leaf nosed Bat	MAMMALIA	VU	Decreasing	Terrestrial
Lutrogale perspicillata	Smooth coated Otter	MAMMALIA	VU	Decreasing	Terrestrial, Marine, Freshwater
Macaca arctoides	Stump-tailed Macaque	MAMMALIA	VU	Decreasing	Terrestrial
Neofelis nebulosa	Clouded Leopard	MAMMALIA	VU	Decreasing	Terrestrial

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Panthera pardus	Leopard	MAMMALIA	VU	Decreasing	Terrestrial
Pteropus lylei	Lyle's Flying Fox	MAMMALIA	VU	Decreasing	Terrestrial
Ursus thibetanus	Asiatic Black Bear	MAMMALIA	VU	Decreasing	Terrestrial
Macaca leonina	Northern Pig tailed Macaque	MAMMALIA	VU	Decreasing	Terrestrial
Hylobates lar ssp. entelloides	Central Lar	MAMMALIA	VU	Decreasing	Terrestrial
Arctictis binturong	Binturong	MAMMALIA	VU	Decreasing	Terrestrial
Rusa unicolor	Sambar	MAMMALIA	VU	Decreasing	Terrestrial
Aonyx cinereus	Asian Small clawed Otter	MAMMALIA	VU	Decreasing	Terrestrial, Marine, Freshwater
Wallago attu		ACTINOPTERYGII	VU	Decreasing	Freshwater
Garra flavatra		ACTINOPTERYGII	VU	Unknown	Freshwater
Oxygaster pointoni		ACTINOPTERYGII	VU	Decreasing	Freshwater
Epalzeorhynchos munense	Red Fin Shark	ACTINOPTERYGII	VU	Decreasing	Freshwater
Naja siamensis	Black And White Spitting Cobra	REPTILIA	VU	Decreasing	Terrestrial
Ophiophagus hannah	King Cobra	REPTILIA	VU	Decreasing	Terrestrial
Betta splendens	Siamese Fighting Fish	ACTINOPTERYGII	VU	Decreasing	Freshwater
Cirrhinus microlepis	Small Scaled Mud Carp	ACTINOPTERYGII	VU	Decreasing	Freshwater
Brotia subgloriosa		GASTROPODA	VU	Unknown	Freshwater
Magnolia thailandica		MAGNOLIOPSIDA	VU	Decreasing	Terrestrial
Brotia annamita		GASTROPODA	VU	Unknown	Freshwater
Elaphe taeniura	Cave Racer	REPTILIA	VU	Decreasing	Terrestrial
Python bivittatus	Burmese Python	REPTILIA	VU	Decreasing	Terrestrial
Buceros bicornis	Great Hornbill	AVES	VU	Decreasing	Terrestrial
Rhyticeros undulatus	Wreathed Hornbill	AVES	VU	Decreasing	Terrestrial
Halcyon pileata	Black-capped Kingfisher	AVES	VU	Decreasing	Terrestrial, Marine, Freshwater
Sterna aurantia	River Tern	AVES	VU	Decreasing	Terrestrial, Marine, Freshwater
Clanga clanga	Greater Spotted Eagle	AVES	VU	Decreasing	Terrestrial, Freshwater
Aquila heliaca	Eastern Imperial Eagle	AVES	VU	Decreasing	Terrestrial, Freshwater
Arctonyx collaris	Greater Hog Badger	MAMMALIA	VU	Decreasing	Terrestrial
Capricornis sumatraensis	Mainland Serow	MAMMALIA	VU	Decreasing	Terrestrial

(2) Primary Data

2.1 Methodology of the Study

1) Objectives of the Study

- To investigate and understand the current conditions and biological diversity of wildlife resources in the study area.
- To assess the impacts on wildlife habitat, food sources, shelter, and wildlife movement pathways (wildlife corridors) resulting from project development activities.
- To propose environmental impact prevention and mitigation measures.

2) Scope of the Study

Scope of the wildlife survey will cover both within the Project area, transmission line and the study area (3 kilometers from the Project boundary) (**Figure 3.2.1.2-1**). It encompasses environmental data on wildlife, including species identification, legal status, and conservation status according to CITES.

3) Research Methodology

Secondary Data: Collect wildlife data from relevant agencies, research documents, and studies related to wildlife in the project and study area, such as data from the National Park Authority, Department of National Parks, Wildlife, and Plant Conservation, and reports on the area's environmental characteristics and lists of wildlife species in the area and nearby regions.

Field Survey Data: Conduct field surveys of wildlife resources in four primary categories: mammals, birds, reptiles and amphibians, and aquatic and terrestrial invertebrates. For both the Project area and the study area.

The survey aligns with the behaviors of each wildlife group. In case that there are diverse types of terrain, survey area shall be divided into specific areas, including regenerating areas, agricultural areas, water sources, and communities, to identify wildlife habitat and current conditions accurately. This includes determining the location of wildlife survey points and survey methods. (Source: Guidelines for Environmental Impact Assessment Reports in Terrestrial Ecology (Forest Resources and Wildlife), ONEP B.E. 2564 (2021)). In this study, the survey aims to collect comprehensive data using both direct and indirect survey methods. Details of methods are as follows:

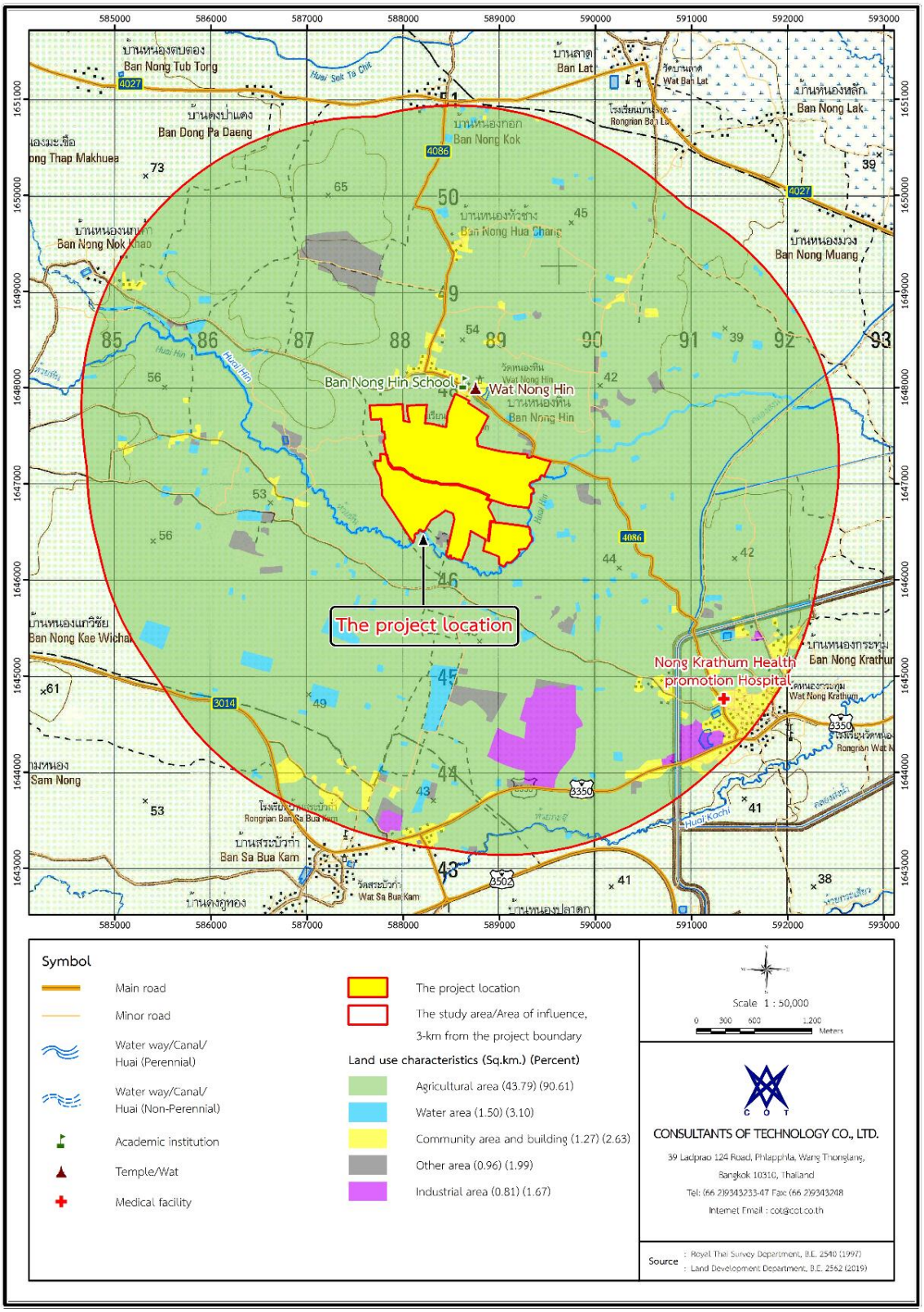


Figure 3.2.1.2-1 The Project Area and the Study Area

(a) Direct Survey Methods

Carry out direct survey methods along established routes, covering various environmental conditions. The survey was conducted in both the Project area and the study area using three methods:

1. Line Transect Study in the project area, where transect lines were laid out following predefined paths at intervals of 200 meters for a systematic and comprehensive study covering the entire project area. The animal group surveyed using this method includes reptiles and mammals that crawl or move close to the ground (**Figure 3.2.1.2-2**).
2. Bird surveys were conducted using the Point Count method.
3. Amphibian surveys were conducted in water sources within the Project area and study area.

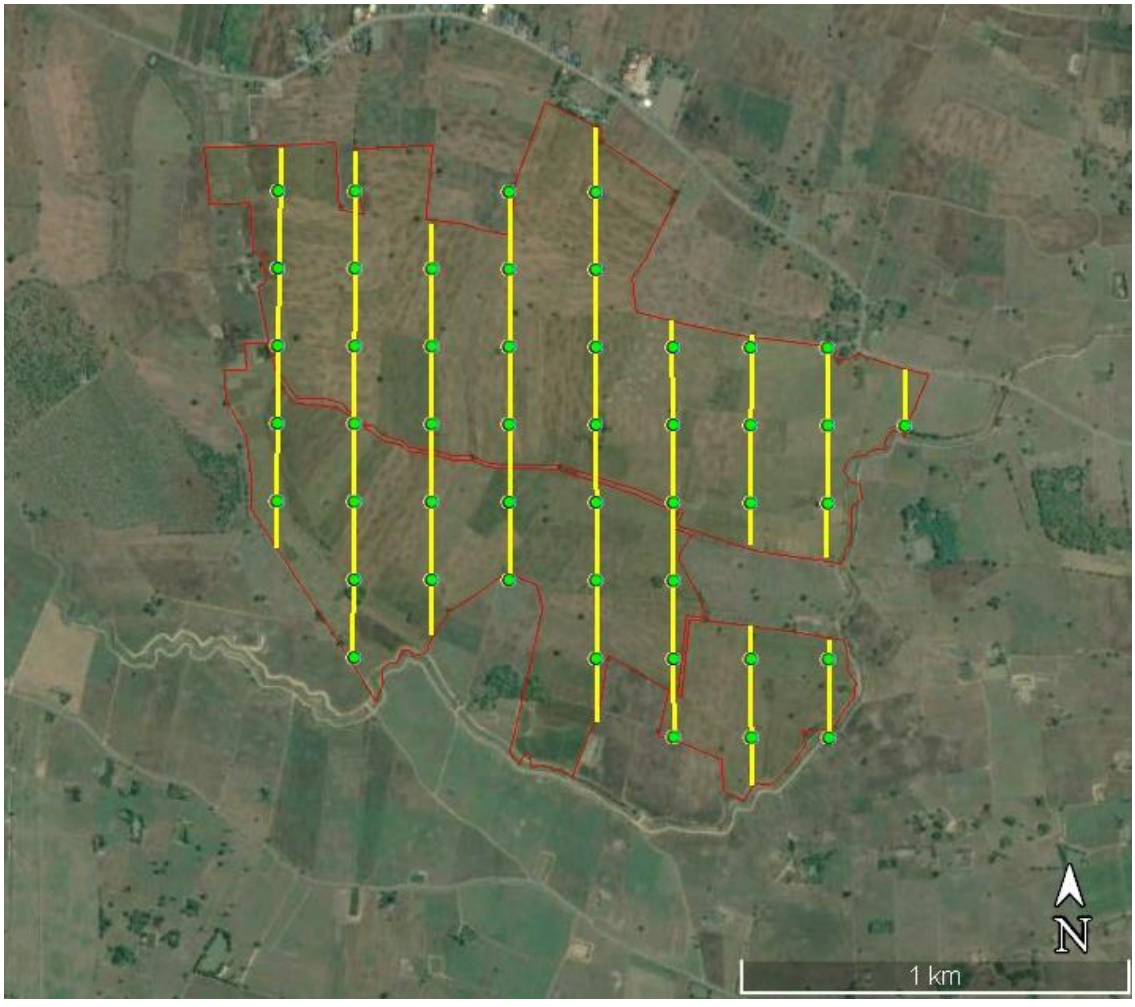


Figure 3.2.1.2-2 Line Transect in the Study Area

This includes point count surveys to identify wildlife species and other indicators. The details are as follows:

a) Observation Method: This method involves visual observation using the naked eye, binoculars, and telescopes for long-distance observation. It includes observing wildlife and recording species and the number of individuals encountered.

b) Active Searching Method: Active searching involves locating wildlife and their tracks in various environmental conditions. This includes searching for signs of wildlife, such as burrows, under logs/wood debris, and on trees. Some digging may be required to locate certain burrowing or crawling species, as well as searching for aquatic and terrestrial invertebrates, especially in concealed water sources. This method enhances the chances of finding various wildlife species and their life stages.

- Mammals: These animals search for food and traces in various environmental conditions, including examining materials that may serve as shelter, such as wood debris, beneath fallen trees, and on tree branches. The survey used the method of walking in a straight line (Line transect), a distance of 200 meters. (**Figure 3.2.1-2**)

- Birds: Conduct bird survey along routes (Roadside Survey/Line Transect Survey) with designated bird counting points distributed throughout different habitat areas (Point count). This survey method aims to cover the entire study area using both binoculars and telescopes for long-distance viewing which has a survey radius of 20 meters. It involves identifying bird species and recording the number of individuals encountered. Conduct bird survey during two periods: in the morning from 06:00 to 10:00 and in the afternoon to evening from 15:00 to 18:00. These times are chosen as they coincide with when birds are most active, foraging, and returning to their nests, maximizing the chances of observations. Additionally, further surveys shall conduct during nighttime using spotlights to identify and classify bird species that are active during the night.

In addition, bird survey was also conducted during the migratory bird season (November 29th, B.E. 2566 (2023) from 6.00 AM to 9.00 PM). The survey areas were divided into two zones: the Project area and the study area within a 3-kilometer radius from the Project's boundary. Additionally, surveys were extended along power lines to increase the chances of observing and encountering birds in the area.

- Reptiles: These animals search for food in various environmental conditions, including examining materials that may serve as shelter, such as wood debris, and climbing trees. Some reptiles, like snakes, are also checked for species

identification from roadkill on roads and highways. Conduct survey during nighttime, specifically from 18:00 to 21:00 at which reptiles can be generally found due to its behavior. The survey used the method of walking in a straight line (Line transect), a distance of 200 meters. (**Figure 3.2.1.2-2**)

- Amphibians: These animals search for food in various types of water sources and stagnant water points. In the study both adult and tadpole stages will be searched using light sources along water sources and by listening to their mating calls. Conduct survey during nighttime, specifically from 18:00 to 21:00 at which reptiles can be generally found due to its behavior.

The survey aims to identify mammal species and traces based on the environmental characteristics of each area. This helps classify wildlife species according to their habitat characteristics within the study area and assess their impact on the environment.

(b) Indirect Survey Methods

This method involves gathering information about wildlife species observed from local residents residing within the survey area. This data serves as supplementary information to direct surveys since certain wildlife species have low population densities, hide or exhibit specific behaviors during certain times.

(c) Data Analysis

Perform data analysis by categorizing and compiling the species into a list, organized according to the taxonomic hierarchy, including order, family, common name, and scientific name. The status of wildlife species can be assessed based on the following criteria:

- Legal Status: In accordance with the Wildlife Preservation and Protection Act of B.E. 2562 (2019), wildlife species are categorized into three types: reserved wildlife, protected wildlife, and wildlife not protected by the law.
- Current Status: According to Thailand's Biological Resource Management Policy, as of B.E. 2560 (2017), and the IUCN Red List (2023), wildlife species are categorized into nine types:
  * Extinct (EX) – Completely extinct
  * Extinct in the Wild (EW)
  * Critically Endangered (CR)

* Endangered (EN)
* Vulnerable (VU)
* Near Threatened (NT)
* Least Concern (LC)
* Data Deficient (DD)
* Not Evaluated (NE)

- Status under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): This international agreement classifies wildlife and plant species into Appendices I-III, regulating and prohibiting their trade. It identifies species in the appendices based on trade and conservation considerations.

2.2 Results of Wildlife Survey During the Rainy Season

The wildlife resource survey for the Breeze and Shine Power Plant Project was conducted once (during the rainy season) from June 23rd to 25th, B.E. 2566 (2023). The survey area was divided into two zones: the Project area and the study area, as illustrated in **Figure 3.2.1.2-1**.

1) Land Use Pattern

From the survey, it was found that the overall condition of the area is predominantly agricultural, encompassing both paddy fields and sugarcane and cassava plantations along the route. In addition, there are scattered community areas, mostly serving as residential spaces for the local population. Various government facilities, such as schools, as well as religious sites like temples, are also present.

As for water resources within the Project area, they are primarily human-made bodies of water, including medium-sized excavated ponds and irrigation canals. Some areas serve as temporary water sources.

It should be noted that the designated land use has been categorized into three types: community areas, agricultural areas, and water resource areas, as illustrated in **Figure 3.2.1.2-3 Figure 3.2.1.2-4** and **Figure 3.2.1.2-5**.

	
Agricultural area	Agricultural area
	
Water resource area (Stagnant water)	Water resource area (Stagnant water)

Figure 3.2.1.2-3 Current Land Use Characteristics of Wildlife Survey Area (within the Project Area)

	
Community area	Community area
	
Agricultural area	Agricultural area
	
Water resource area	Water resource area

Figure 3.2.1.2-4 Current Land Use Characteristics of Wildlife Survey Area (in the Study Area)

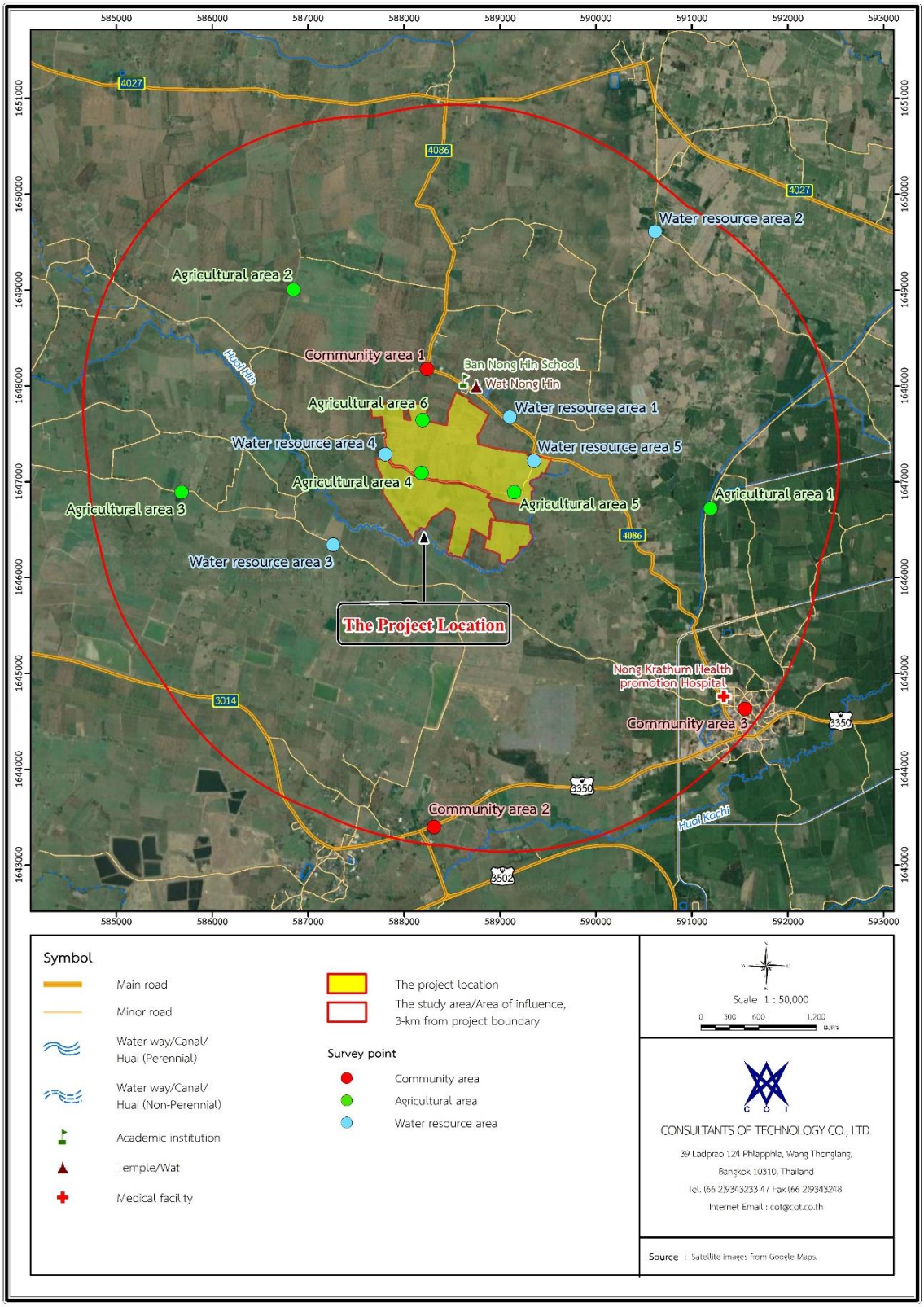


Figure 3.2.1.2-5 Wildlife Survey Points at the Project Location and Study Area, Radius 3 kilometers from the Project's Boundary

2) Result of Survey

A total of 89 species of wildlife were identified, belonging to 75 genera and 52 families, across 21 orders. This information was gathered through interviews and discussions, resulting in the identification of 7 species. The wildlife species were categorized as follows: 3 species of mammals, 64 species of birds, 13 species of reptiles, and 9 species of amphibians. Within the Project area, a total of 33 wildlife species were found, while within the 3-kilometer radius study area, 75 species were identified. These findings are presented in **Table 3.2.1.2-1** and **Table 3.2.1.2-2**. **Figure 3.2.1.2-6** shows wildlife survey activities of the study.

Table 3.2.1.2-1
Taxonomic Level and Number of Wildlife Surveyed

Wildlife Category	Species	Genera	Families	Order
Mammals	3	2	2	3
Birds	64	53	36	16
Reptiles	13	12	9	1
Amphibians	9	8	5	1
Total	89	75	52	21



Figure 3.2.1.2-6 Survey of Wildlife in the Project Area

Table 3.2.1.2-2
List of Names, Abundance and Status of Wild Animals in the Study Area

No.	Thai Name	Scientific Name	Family	Order	Seasonal Status	Wildlife Preservation Act [1/]	IUCN 2023 [2/]	ONEP [3/]	CITES [4/]	Study area			Project area		Remark
										agricultural	Water source	community	agricultural	Stagnant water	
Mammals															
1	ค้างคาวกินแมลง	-	-	Chiroptera	-	-	-	-	-	/	-	-	-	-	
2	กระรอกหลากสี	*Callosciurus finlaysonii*	Sciuridae	Rodentia	-	-	LC	LC	-	-	-	/	-	-	
3	หนู	*Rattus* sp.	Muridae	Rodentia	-	-	LC	LC	-	-	-	-	-	-	questionnaire
Birds															
1	นกเอี้ยงหงอน	*Acridotheres grandis*	Sturnidae	Passeriformes	R	PW	LC	LC	-	/	-	/	/	-	
2	นกเอี้ยงสาริกา	*Acridotheres tristis*	Sturnidae	Passeriformes	R	PW	LC	LC	-	/	-	/	-	-	
3	นกขมิ้นน้อยธรรมดา	*Aegithina tiphia*	Aegithinidae	Passeriformes	R	PW	LC	LC	-	/	-	/	-	-	
4	นกกวัก	*Amaurornis phoenicurus*	Rallidae	Gruiformes	R/WV	PW	LC	LC	-	/	/	-	-	-	
5	นกปากห่าง	*Anastomus oscitans*	Ciconiidae	Ciconiiformes	R	-	LC	LC	-	/	-	-	/	-	
6	นกเด้าดินทุ่งเล็ก	*Anthus rufulus*	Motacillidae	Passeriformes	R	PW	LC	LC	-	/	/	-	/	-	
7	นกแอ่นบ้าน	*Apus affinis*	Apodidae	Caprimulgiformes	R	PW	LC	LC	-	-	/	-	-	-	
8	นกยางโทนใหญ่	*Ardea alba*	Ardeidae	Pelecaniformes	R/WV	PW	LC	LC	-	/	-	-	/	/	
9	นกยางโทนน้อย	*Ardea intermedia*	Ardeidae	Pelecaniformes	-	PW	LC	LC	-	-	-	-	/	/	
10	นกกระสาแดง	*Ardea purpurea*	Ardeidae	Pelecaniformes	R/WV	PW	LC	VU	-	-	/	-	-	-	
11	นกยางกรอกพันธุ์ชวา	*Ardeola speciosa*	Ardeidae	Pelecaniformes	R	PW	LC	LC	-	/	-	/	/	/	
12	นกแอ่นพง	*Artamus fuscus*	Artamidae	Passeriformes	R	PW	LC	LC	-	/	-	/	-	-	
13	นกยางควาย	*Bubulcus coromandus*	Ardeidae	Pelecaniformes	R/WV	PW	LC	LC	-	/	-	-	/	/	
14	เหยี่ยวปีกแดง	*Butastur liventer*	Accipitridae	Accipitriformes	R	PW	LC	NT	II	/	-	-	-	-	
15	นกอีวาบตั๊กแตน	*Cacomantis merulinus*	Cuculidae	Cuculiformes	R	PW	LC	LC	-	-	-	/	-	-	
16	นกตบยุงหางยาว	*Caprimulgus macrurus*	Caprimulgidae	Caprimulgiformes	R	PW	LC	LC	-	-	-	-	/	-	
17	นกกะปูดใหญ่	*Centropus bengalensis*	Cuculidae	Cuculiformes	R	PW	LC	LC	-	-	/	-	/	/	
18	นกกินปลีอกเหลือง	*Cinnyris jugularis*	Nectariniidae	Passeriformes	R	PW	LC	LC	-	-	-	/	-	-	
19	นกยอดข้าวหางแพนลาย	*Cisticola juncidis*	Cisticolidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	
20	นกพิราบป่า	*Columba livia*	Columbidae	Columbiformes	R	-	LC	-	-	/	/	/	/	/	
21	นกกางเขนบ้าน	*Copsychus saularis*	Muscicapidae	Passeriformes	R	PW	LC	LC	-	/	-	/	-	-	
22	อีกา	*Corvus macrorhynchos*	Corvidae	Passeriformes	R	PW	LC	LC	-	-	/	-	-	-	
23	นกแอ่นตาล	*Cypsiurus balasiensis*	Apodidae	Caprimulgiformes	R	PW	LC	LC	-	-	-	/	-	-	
24	เป็ดแดง	*Dendrocygna javanica*	Anatidae	Anseriformes	R	PW	LC	LC	-	/	/	-	-	-	
25	นกสีชมพูสวน	*Dicaeum cruentatum*	Dicaeidae	Passeriformes	R	PW	LC	LC	-	-	-	/	-	-	
26	นกแซงแซวหางปลา	*Dicrurus macrocercus*	Dicruridae	Passeriformes	R/WV	PW	LC	LC	-	/	-	/	-	-	
27	นกยางเปีย	*Egretta garzetta*	Ardeidae	Pelecaniformes	R/WV	PW	LC	LC	-	-	/	/	/	/	
28	เหยี่ยวขาว	*Elanus caeruleus*	Accipitridae	Accipitriformes	R	PW	LC	LC	II	/	-	-	-	-	
29	นกกาเหว่า	*Eudynamys scolopaceus*	Cuculidae	Cuculiformes	R	PW	LC	LC	-	/	-	/	-	-	
30	นกเขาชวา	*Geopelia striata*	Columbidae	Columbiformes	R	-	LC	LC	-	/	/	/	/	-	
31	นกเอี้ยงด่าง	*Gracupica contra*	Sturnidae	Passeriformes	R	PW	LC	LC	-	/	-	/	/	-	
32	นกกิ้งโครงคอดำ	*Gracupica nigricollis*	Sturnidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	
33	นกกะเต็นอกขาว	*Halcyon smyrnensis*	Alcedinidae	Coraciiformes	R	PW	LC	LC	-	/	-	-	/	-	
34	นกตีนเทียน	*Himantopus himantopus*	Recurvirostridae	Charadriiformes	R/WV	PW	LC	LC	-	/	-	-	-	-	
35	นกแอ่นใหญ่หัวตาขาว	*Hirundapus giganteus*	Apodidae	Caprimulgiformes	R/WV	PW	LC	LC	-	/	-	/	-	-	
36	นกยางไฟหัวดำ	*Ixobrychus sinensis*	Ardeidae	Pelecaniformes	R	PW	LC	LC	-	/	-	-	-	-	
37	นกกระติ๊ดขี้หมู	*Lonchura punctulata*	Estrildidae	Passeriformes	R	PW	LC	LC	-	/	-	/	/	-	
38	นกจาบคาหัวสีส้ม	*Merops leschenaulti*	Meropidae	Coraciiformes	R/WV	PW	LC	LC	-	/	/	/	-	-	
39	นกจาบคาเล็ก	*Merops orientalis*	Meropidae	Coraciiformes	R	PW	LC	LC	-	/	-	-	-	-	
40	นกพริก	*Metopidius indicus*	Jacanidae	Charadriiformes	R	PW	LC	LC	-	/	/	-	-	-	
41	นกกาน้ำเล็ก	*Microcarbo niger*	Phalacrocoracidae	Suliformes	R	-	LC	-	-	/	-	-	-	-	
42	นกจาบฝนปีกแดง	*Mirafra erythrocephala*	Alaudidae	Passeriformes	R	PW	LC	LC	-	/	-	-	/	/	
43	นกกาบบัว	*Mycteria leucocephala*	Ciconiidae	Ciconiiformes	R/WV	PW	LC	NT	-	-	-	-	-	-	questionnaire
44	นกกระจิบธรรมดา	*Orthotomus sutorius*	Cisticolidae	Passeriformes	R	PW	LC	LC	-	/	-	-	/	-	
45	นกกระจอกใหญ่	*Passer domesticus*	Passeridae	Passeriformes	R	PW	LC	-	-	-	-	/	-	-	
46	นกกระจอกตาล	*Passer flaveolus*	Passeridae	Passeriformes	R	PW	LC	LC	-	/	-	/	/	-	
47	นกกระจอกบ้าน	*Passer montanus*	Passeridae	Passeriformes	R	-	LC	LC	-	/	-	/	-	-	
48	นกบั้งรอกใหญ่	*Phaenicophaeus tristis*	Cuculidae	Cuculiformes	R	PW	LC	LC	-	/	-	-	-	-	
49	นกข้อนหอยดำเหลือบ	*Plegadis falcinellus*	Pelecaniformes	Plegadis	R	PW	LC	LC	-	/	-	-	-	-	

Table 3.2.1.2-2
List of Names, Abundance and Status of Wild Animals in the Study Area

No.	Thai Name	Scientific Name	Family	Order	Seasonal Status	Wildlife Preservation Act 1/	IUCN 2023 2/	ONEP 3/	CITES 4/	Study area			Project area		Remark
										agricultural	Water source	community	agricultural	Stagnant water	
50	นกกระจาบทอง	*Ploceus hypoxanthus*	Ploceidae	Passeriformes	R	PW	NT	NT	-	/	-	-	-	-	
51	นกกระจาบธรรมดา	*Ploceus philippinus*	Ploceidae	Passeriformes	R	PW	LC	LC	-	-	/	/	-	-	
52	นกกระจิบหญ้าท้องเหลือง	*Prinia flaviventris*	Cisticolidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	
53	นกกระจิบหญ้าสีเรียบ	*Prinia inornata*	Cisticolidae	Passeriformes	R	PW	LC	LC	-	/	/	-	-	-	
54	นกตีทอง	*Psilopogon haemacephalus*	Megalaimidae	Piciformes	R	PW	LC	LC	-	/	-	-	-	-	
55	นกโพระดกธรรมดา	*Psilopogon lineatus*	Megalaimidae	Piciformes	R	PW	LC	LC	-	/	-	-	-	-	
56	นกปรอดสวน	*Pycnonotus blanfordi*	Pycnonotidae	Passeriformes	R	PW	LC	LC	-	/	-	/	/	/	
57	นกปรอดหน้านวล	*Pycnonotus goiavier*	Pycnonotidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	
58	นกอีแพรดแถบอกดำ	*Rhipidura javanica*	Rhipiduridae	Passeriformes	R	PW	LC	LC	-	/	-	/	/	-	
59	นกโป่งวิด	*Rostratula benghalensis*	Rostratulidae	Charadriiformes	R	PW	LC	LC	-	/	-	-	-	-	
60	นกเขาใหญ่	*Spilopelia chinensis*	Columbidae	Columbiformes	R	-	LC	LC	-	/	-	/	-	-	
61	นกเขาไฟ	*Streptopelia tranquebarica*	Columbidae	Columbiformes	R	PW	LC	LC	-	/	-	/	-	/	
62	นกแสก	*Tyto javanica*	Strigiformes	Tyto	R	PW	LC	NT	II	/	-	-	/	-	
63	นกกะรางหัวขวาน	*Upupa epops*	Upupidae	Bucerotiformes	R	PW	LC	LC	-	-	-	/	-	-	
64	นกกระแตแต้แว้ด	*Vanellus indicus*	Charadriidae	Charadriiformes	R	PW	LC	LC	-	/	-	-	/	/	
						Reptiles									
1	กิ้งก่าหัวสีฟ้า	*Calotes mystaceus*	Agamidae	Squamata	-	PW	LC	LC	-	-	-	-	-	-	questionnaire
2	กิ้งก่าหัวแดง	*Calotes versicolor*	Agamidae	Squamata	-	PW	-	LC	-	-	-	/	-	-	
3	งูก้นขบ	*Cylindrophis ruffus*	Cylindrophiidae	Squamata	-	-	LC	LC	-	-	/	-	-	-	
4	จิ้งเหลนบ้าน	*Eutropis multifasciata*	Scincidae	Squamata	-	-	LC	LC	-	-	/	-	/	-	
5	ตุ๊กแกบ้าน	*Gekko gecko*	Gekkonidae	Squamata	-	-	LC	LC	-	/	-	-	-	-	
6	จิ้งจกหางหนาม	*Hemidactylus frenatus*	Gekkonidae	Squamata	-	-	LC	LC	-	/	-	/	/	-	
7	งูปลิง	*Hypsiscopus plumbea*	Homalopsidae	Squamata	-	-	LC	LC	-	-	/	-	-	-	
8	แย้เหนือ	*Leiolepis belliana* subsp. *ocellata*	Agamidae	Squamata	-	-	LC	LC	-	-	-	/	-	-	
9	งูเหลือม	*Malayopython reticulatus*	Pythonidae	Squamata	-	PW	LC	LC	II	-	-	-	-	-	questionnaire
10	งูสิงบ้าน	*Ptyas korros*	Colubridae	Squamata	-	PW	NT	LC	-	-	-	-	-	-	questionnaire
11	งูไซ	*Subsessor bocourti*	Homalopsidae	Squamata	-	-	LC	LC	-	-	-	-	-	-	questionnaire
12	เหี้ย	*Varanus salvator* subsp. *macromaculatus*	Varanidae	Squamata	-	PW	LC	LC	II	/	-	-	/	/	
13	งูแสงอาทิตย์	*Xenopeltis unicolor*	Xenopeltidae	Squamata	-	PW	LC	LC	-	/	-	-	-	-	
						Amphibians									
1	คางคกบ้าน	*Duttaphrynus melanostictus*	Bufonidae	Anura	-	-	LC	LC	-	-	-	-	-	-	questionnaire
2	กบหนอง	*Fejervarya limnocharis*	Dicroglossidae	Anura	-	-	LC	LC	-	-	/	-	-	/	
3	กบนา	*Hoplobatrachus rugulosus*	Dicroglossidae	Anura	-	-	LC	LC	-	-	-	-	-	/	
4	กบบัว	*Hylarana erythraea*	Ranidae	Anura	-	-	LC	LC	-	-	/	-	-	/	
5	อึ่งอ่างบ้าน	*Kaloula pulchra*	Microhylidae	Anura	-	-	LC	LC	-	-	/	-	-	-	
6	อึ่งน้ำเต้า	*Microhyla mukhlesuri*	Microhylidae	Anura	-	-	LC	-	-	-	-	-	-	/	
7	เขียดจะนา	*Occidozyga lima*	Dicroglossidae	Anura	-	-	LC	LC	-	-	-	-	-	/	
8	เขียดทราย	*Occidozyga martensii*	Dicroglossidae	Anura	-	-	LC	LC	-	-	-	-	-	/	
9	ปาดบ้าน	*Polypedates leucomystax*	Rhacophoridae	Anura	-	-	LC	LC	-	-	-	-	-	/	
Total						**62 PW**	**85 LC, 2 NT**	**79 LC, 4 NT, 1 VU**	**5**	**54**	**20**	**15**	**11**	**16**	**6**

Remark: Seasonal Status; R = Resident, WV = Winter visitor, PM = Passage migrant

1/ Wildlife Preservation Act B.E. 2562 (2019)
PW refers to Protected wildlife according to the Wildlife Preservation Act B.E. 2562 (2019)
- refers to not protected wildlife

2/ International Union Conservation of Nature; IUCN (2022)
NT = Near Threatened,
LC = Least Concern

3/ Thailand's Biological Resource Management Policy, as of B.E. 2560 (2017)
VU = Vulnerable,
NT = Near Threatened,
LC = Least Concern

4/ The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
II refers to Appendix II, includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

(a) Mammals, a total of 3 species from 2 genera, 2 families, and 3 orders. From a survey, 1 species was recorded, *Rattus* sp. Among them, the squirrel genus was found, including *Callosciurus finlaysonii*, a small-sized mammal. In addition, insect-eating bats from Order Chiroptera were discovered during foraging at dusk. The specific species could not be determined. The encountered mammals in this survey demonstrated a good ability to adapt to human-disturbed areas, featuring agile and quick movements (**Figure 3.2.1.2-7**).



กระรอกหลากสี (*Callosciurus finlaysonii*)

Figure 3.2.1.2-7 Mammal Found During the Survey

(b) Birds, a total of 64 species from 53 genera, 36 families, and 16 orders were found. Examples include *Dendrocygna javanica*, *Anthus rufulus*, *Rostratula benghalensis*, *Centropus bengalensis*, *Mirafra erythrocephala*, *Ardea alba*, *Ploceus philippinus*, and others. Additionally, bird predators were observed, such as *Elanus caeruleus*, *Butastur liventer*, and *Tyto javanica*. The community interviews revealed the presence of *Mycteria leucocephala* in the study area (**Figure 3.2.1.2-8**).

(c) Reptiles, a total of 13 species from 12 genera, 9 families, and 1 order were found. All were encountered within the Project area. Family Gekkonidea, two species were identified: *Hemidactylus platyurus* and *Gekko gecko*. Family Agamidae included *Calotes versicolor* and *Leiolepis belliana* subsp. *ocellata*. Family Scincidae included *Eutropis multifasciata*. Family Cylindrophiidae included *Cylindrophis ruffus*. Family Homalopsidae included *Hypsiscopus plumbea* was also found, as was *Xenopeltis unicolor* from Family Xenopeltidae. The community interviews also revealed additional species, such as *Calotes mystaceus*, *Varanus salvator* subsp. *macromaculatus*, *Ptyas korros*, *Subsessor bocourti*, and *Malayopython reticulatus* (**Figure 3.2.1.2-9**).

(d) Amphibians, a total of 9 species from 8 genera, 5 families, and 1 order were found. All belonged to Order Anura. Within Family Bufonidae, *Duttaphrynus melanostictus* was identified. From Family Microhylidae, *Microhyla mukhlesuri* and *Kaloula pulchra* were observed. Family Dicroglossidae included *Occidozyga martensii*, *Occidozyga lima*, *Hoplobatrachus rugulosus*, and *Fejervarya limnocharis*. Family Ranidae presented *Hylarana erythraea*, and Family Rhacophoridae included *Polypedates leucomystax* (**Figure 3.2.1.2-10**).

	
นกกระจิบหญ้าสีเรียบ (*Prinia inornata*)	นกกะรางหัวขวาน (*Upupa epops*)
	
นกกระสาแดง (Ardea purpurea)	นกเอี้ยงด่าง (Gracupica contra)
	
นกแอ่นพง (Artamus fuscus)	นกเอี้ยงหงอน (Acridotheres grandis)
	
นกยางโทนใหญ่ (*Ardea alba*)	นกปากห่าง (Anastomus oscitans)
	
นกกางเขนบ้าน (Copsychus saularis)	นกขมิ้นน้อยธรรมดา (*Aegithina tiphia*)

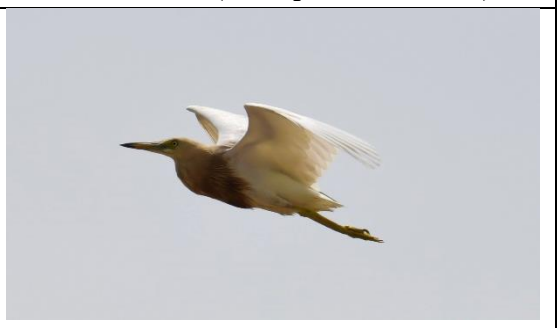
	
เหยี่ยวปีกแดง (Butastur liventer)	นกกาน้ำเล็ก (Microcarbo niger)
	
นกจาบฝนปีกแดง (Mirafra erythrocephala)	นกจาบคาหัวสีส้ม (Merops leschenaulti)
	
นกพริก (Metopidius indicus)	นกยางกรอกพันธุ์ชวา (Ardeola speciosa)
	
นกกระจอกใหญ่ (Passer domesticus)	เหยี่ยวขาว (Elanus caeruleus)
	
นกโป่งวิด (Rostratula benghalensis)	นกช้อนหอยดำเหลือบ (Plegadis falcinellus)

Figure 3.2.1.2-8 Birds Found During the Survey

	
งูแสงอาทิตย์ (Xenopeltis unicolor)	งูก้นขบ (Cylindrophis ruffus)
	
กิ้งก่าหัวแดง (Calotes versicolor)	เหี้ย (Varanus salvator subsp. macromaculatus)
	
จิ้งจกหางหนาม (Hemidactylus frenatus)	จิ้งเหลนบ้าน (Eutropis multifasciata)

Figure 3.2.1.2-9 Reptiles Found During the Survey

	
กบบัว (Hylarana erythraea)	อึ่งอ่างบ้าน (Kaloula pulchra)
	
อึ่งน้ำเต้า (Microhyla mukhlesuri)	เขียดจะนา (Occidozyga lima)
	
กบหนอง (Fejervarya limnocharis)	เขียดทราย (Occidozyga martensii)

Figure 3.2.1.2-10 Amphibians Found During the Survey

2.3 Results of Survey during Migratory Bird Season

The bird survey of the Breeze and Shine Power Plant project was conducted once during the migratory bird season on November 29th, B.E. 2566 (2023). The survey involved direct observation and inquiries with the local residents regarding rare or significant wildlife species that might be found in the area (**Figure 3.2.1.2-11**). For the direct survey, the area was divided into two zones: the Project area and the study area within a 3-kilometer radius from the Project's boundary. Additionally, surveys were conducted along the transmission line, as illustrated in **Figure 3.2.1.2-12**. A total of 74 bird species were observed, with additional 24 bird's species were identified.



Figure 3.2.1.2-11 Birds Survey During Migratory Season (within the Project Area)

1) Classification of Bird Species

From the survey, a total of 74 bird species were observed, belonging to 56 genera, 36 families, and 14 orders. Within the project area, 44 species were identified, with 30 found in agricultural areas and 33 in water source areas (**Figure 3.2.1.2-12**).

(a) Seasonal Status

In the study area, 3 km radius from the Project's boundary, 64 species were observed. Out of 64 species, there were 43 species that observed along the route of transmission line, 31 species in agricultural areas, 23 species in community areas, and 4 species in water source areas, as indicated in **Table 3.2.1.2-12**.

Six migratory birds were observed; *Halcyon pileate, Ficedula albicilla, Acrocephalus orientalis, Acrocephalus bistrigiceps, Saxicola stejnegeri,* and *Lanius cristatus.* 53 species of resident birds were observed include; *Anhinga melanogaster, Elanus caeruleus, Butastur liventer, Anthus rufulus, Microcarbo niger, Pycnonotus aurigaster, Anastomus oscitans, Francolinus pintadeanus, Eudynamys scolopaceus, Coracias benghalensis, and others.*

There were 15 species of resident birds that are also migratory include; *Pernis ptilorhynchus, Dicrurus leucophaeus, Dicrurus macrocercus, Amaurornis phoenicurus, Alcedo atthis, Mycteria leucocephala, Muscicapa dauurica, Merops philippinus, Hirundo rustica, Egretta garzetta, Ardea alba, Bubulcus coromandus, Lanius collurioides, Gallinula chloropus,* and others. Furthermore, predatory birds such as the *Elanus caeruleus, Nisaetus cirrhatus,* and *Pernis ptilorhynchus* were also found in the area.

(b) Conservation Status and Legal Status

Regarding the conservation status and legal status of the surveyed birds, a summary can be drawn as shown in **Table 3.2.1.2-12**, with the following details:

According to the Wildlife Conservation and Protection Act B.E. 2562 (2019), a total of birds 68 species of protected wildlife were found, including *Tachybaptus ruficollis, Streptopelia tranquebarica, Acridotheres grandis, Vanellus indicus, Passer flaveolus, Lonchura atricapilla, Halcyon smyrnensis, Gracupica nigricollis, Merops philippinus, and Psilopogon haemacephalus*

Table 3.2.1.2-12
List of Names, Abundance and Status of Birds in the Study Area

No.	Thai Name	Scientific Name	Family	Order	Seasonal Status	Wildlife Preservation Act [1/]	IUCN 2023 [2/]	ONEP [3/]	CITES [4/]	Study area				Project area	
										Transmission lines	agricultural	Water source	community	agricultural	Puddle of water
1	เหยี่ยวขาว	*Elanus caeruleus*	Accipitridae	Accipitriformes	R	PW	LC	LC	II	-	-	-	-	-	/
2	เหยี่ยวปีกแดง	*Butastur liventer*	Accipitridae	Accipitriformes	R	PW	LC	LC	II	/	-	-	-	-	-
3	เหยี่ยวผึ้ง	*Pernis ptilorhynchus*	Accipitridae	Accipitriformes	R/WV/PM	PW	LC	LC	II	-	/	-	-	-	-
4	นกเขาใหญ่	*Spilopelia chinensis*	Columbidae	Columbiformes	R	-	LC	LC	-	/	-	-	/	/	/
5	นกเขาไฟ	*Streptopelia tranquebarica*	Columbidae	Columbiformes	R	PW	LC	LC	-	/	-	-	/	-	-
6	นกเขาชวา	*Geopelia striata*	Columbidae	Columbiformes	R	-	LC	LC	-	/	/	-	/	/	/
7	นกเด้าดินทุ่งเล็ก	*Anthus rufulus*	Motacillidae	Passeriformes	R	PW	LC	LC	-	-	-	-	/	/	/
8	นกเป็ดผีเล็ก	*Tachybaptus ruficollis*	Podicipedidae	Podicipediformes	R	PW	LC	LC	-	-	-	/	-	-	-
9	นกเอี้ยงด่าง	*Gracupica contra*	Sturnidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	/	-
10	นกเอี้ยงสาริกา	*Acridotheres tristis*	Sturnidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	-
11	นกเอี้ยงหงอน	*Acridotheres grandis*	Sturnidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	/	-
12	นกแซงแซวสีเทา	*Dicrurus leucophaeus*	Dicruridae	Passeriformes	R/WV	PW	LC	LC	-	/	-	-	-	-	-
13	นกแซงแซวหางปลา	*Dicrurus macrocercus*	Dicruridae	Passeriformes	R/WV	PW	LC	LC	-	/	/	-	/	/	/
14	นกแอ่นตาล	*Cypsiurus balasiensis*	Apodidae	Caprimulgiformes	R	PW	LC	LC	-	-	-	-	-	/	/
15	นกแอ่นบ้าน	*Apus affinis*	Apodidae	Caprimulgiformes	R	PW	LC	LC	-	-	-	-	-	/	/
16	นกแอ่นพง	*Artamus fuscus*	Artamidae	Passeriformes	R	PW	LC	LC	-	/	-	-	/	/	/
17	นกโพระดกธรรมดา	*Psilopogon lineatus*	Megalaimidae	Piciformes	R	PW	LC	LC	-	-	-	-	-	-	/
18	นกกระแตแต้แว้ด	*Vanellus indicus*	Charadriidae	Charadriiformes	R	PW	LC	LC	-	/	/	-	-	-	/
19	นกกระจอกใหญ่	*Passer domesticus*	Passeridae	Passeriformes	R	PW	LC	LC	-	-	/	-	/	/	-
20	นกกระจอกตาล	*Passer flaveolus*	Passeridae	Passeriformes	R	PW	LC	LC	-	-	-	-	/	/	-
21	นกกระจอกบ้าน	*Passer montanus*	Passeridae	Passeriformes	R	-	LC	LC	-	-	-	-	/	-	-
22	นกกระจาบธรรมดา	*Ploceus philippinus*	Ploceidae	Passeriformes	R	PW	LC	LC	-	-	/	-	-	-	-
23	นกกระจิบธรรมดา	*Orthotomus sutorius*	Cisticolidae	Passeriformes	R	PW	LC	LC	-	-	-	-	-	/	-
24	นกกระจิบหญ้าท้องเหลือง	*Prinia flaviventris*	Cisticolidae	Passeriformes	R	PW	LC	LC	-	-	/	-	-	-	/
25	นกกระจิบหญ้าสีเรียบ	*Prinia inornate*	Cisticolidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	/	/
26	นกกระติ๊ดขี้หมู	*Lonchura punctulata*	Estrildidae	Passeriformes	R	PW	LC	LC	-	/	/	-	/	-	-
27	นกกระติ๊ดตะโพกขาว	*Lonchura striata*	Estrildidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	-
28	นกกระติ๊ดสีอิฐ	*Lonchura atricapilla*	Estrildidae	Passeriformes	R	PW	LC	LC	-	-	-	-	-	-	/
29	นกกระทาทุ่ง	*Francolinus pintadeanus*	Phasianidae	Galliformes	R	PW	LC	LC	-	-	-	-	-	/	
30	นกกวัก	*Amaurornis phoenicurus*	Rallidae	Gruiformes	R/WV	PW	LC	LC	-	-	-	-	-	-	/
31	นกกะเต็นน้อยธรรมดา	*Alcedo atthis*	Alcedinidae	Coraciiformes	R/WV	PW	LC	LC	-	-	-	/	-	-	/
32	นกกะเต็นหัวดำ	*Halcyon pileate*	Alcedinidae	Coraciiformes	WV	PW	LC	VU	-	/	-	-	-	-	-
33	นกกะเต็นอกขาว	*Halcyon smyrnensis*	Alcedinidae	Coraciiformes	R	PW	LC	LC	-	/	/	-	-	-	/
34	นกกะปูดใหญ่	*Centropus bengalensis*	Cuculidae	Cuculiformes	R	PW	LC	LC	-	/	/	-	-	/	/
35	นกกาเหว่า	*Eudynamys scolopaceus*	Cuculidae	Cuculiformes	R	PW	LC	LC	-	/	/	-	/	/	/
36	นกกางเขนบ้าน	*Copsychus saularis*	Muscicapidae	Passeriformes	R	PW	LC	LC	-	/	-	-	/	-	-
37	นกกาน้ำเล็ก	*Microcarbo niger*	Phalacrocoracidae	Suliformes	R	-	LC	LC	-	/	/	-	-	/	/
38	นกกาบบัว	*Mycteria leucocephala*	Ciconiidae	Ciconiiformes	R/WV	PW	LC	NT	-	-	/	-	-	-	-
39	นกกิ้งโครงคอดำ	*Gracupica nigricollis*	Sturnidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	-
40	นกกินปลีอกเหลือง	*Cinnyris jugularis*	Nectariniidae	Passeriformes	R	PW	LC	LC	-	/	-	-	/	-	/
41	นกหมื่นน้อยธรรมดา	*Aegithina tiphia*	Aegithinidae	Passeriformes	R	PW	LC	LC	-	-	/	-	-	-	-
42	นกจับแมลงคอแดง	*Ficedula albicilla*	Muscicapidae	Passeriformes	WV	PW	LC	LC	-	/	-	-	-	-	-
43	นกจับแมลงสีน้ำตาล	*Muscicapa dauurica*	Muscicapidae	Passeriformes	R/WV	PW	LC	LC	-	-	-	-	/	-	-
44	นกจาบคาเล็ก	*Merops orientalis*	Meropidae	Coraciiformes	R	PW	LC	LC	-	/	/	-	/	/	/
45	นกจาบคาหัวเขียว	*Merops philippinus*	Meropidae	Coraciiformes	R/WV	PW	LC	LC	-	/	-	-	-	-	-
46	นกจาบฝนปีกแดง	*Mirafra erythrocephala*	Alaudidae	Passeriformes	R	PW	LC	LC	-	/	/	-	-	/	/
47	นกตะขาบทุ่ง	*Coracias benghalensis*	Coraciidae	Coraciiformes	R	PW	LC	LC	-	/	/	-	-	-	/
48	นกตีทอง	*Psilopogon haemacephalus*	Megalaimidae	Piciformes	R	PW	LC	LC	-	-	-	-	/	-	-
49	นกนางแอ่นบ้าน	*Hirundo rustica*	Hirundinidae	Passeriformes	R/WV	PW	LC	LC	-	/	/	-	-	/	/
50	นกปรอดคอลาย	*Pycnonotus finlaysoni*	Pycnonotidae	Passeriformes	R	PW	LC	LC	-	-	-	-	/	-	-
51	นกปรอดสวน	*Pycnonotus blanfordi*	Pycnonotidae	Passeriformes	R	PW	LC	LC	-	/	/	-	/	-	-
52	นกปรอดหน้านวล	*Pycnonotus goiavier*	Pycnonotidae	Passeriformes	R	PW	LC	LC	-	-	-	-	/	-	-

Table 3.2.1.2-12
List of Names, Abundance and Status of Birds in the Study Area

No.	Thai Name	Scientific Name	Family	Order	Seasonal Status	Wildlife Preservation Act 1/	IUCN 2023 2/	ONEP 3/	CITES 4/	Study area				Project area	
										Transmission lines	agricultural	Water source	community	agricultural	Puddle of water
53	นกปรอดหัวสีเขม่า	*Pycnonotus aurigaster*	Pycnonotidae	Passeriformes	R	PW	LC	LC	-	/	/	-	-	/	-
54	นกปากห่าง	*Anastomus oscitans*	Ciconiidae	Ciconiiformes	R	-	LC	LC	-	-	/	-	-	-	/
55	นกพงใหญ่พันธุ์ญี่ปุ่น	*Acrocephalus orientalis*	Acrocephalidae	Passeriformes	WV	PW	LC	LC	-	-	/	-	-	-	-
56	นกพงกิ้วดำ	*Acrocephalus bistrigiceps*	Acrocephalidae	Passeriformes	WV	PW	LC	LC	-	-	/	-	-	/	/
57	นกพริก	*Metopidius indicus*	Jacanidae	Charadriiformes	R	PW	LC	LC	-	-	-	/	-	-	-
58	นกพิราบป่า	*Columba livia*	Columbidae	Columbiformes	R	-	-	LC	-	/	/	-	/	/	/
59	นกยอดข้าวหางแพนลาย	*Cisticola juncidis*	Cisticolidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	/	
60	นกยอดหญ้าหลังดำ	*Saxicola jerdoni*	Muscicapidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	/
61	นกยอดหญ้าหัวดำ	*Saxicola stejnegeri*	Muscicapidae	Passeriformes	WV	PW	LC	LC	-	-	-	-	-	/	/
62	นกยางเปีย	*Egretta garzetta*	Ardeidae	Pelecaniformes	WV/R	PW	LC	LC	-	/	/	-	-	-	-
63	นกยางโทนใหญ่	*Ardea alba*	Ardeidae	Pelecaniformes	R/WV	PW	LC	LC	-	/	/	-	-	/	/
64	นกยางโทนน้อย	*Ardea intermedia*	Ardeidae	Pelecaniformes	R/WV	PW	LC	LC	-	/	/	-	-	/	/
65	นกยางกรอกพันธุ์ชวา	*Ardeola speciosa*	Ardeidae	Pelecaniformes	R	PW	LC	LC	-	/	/	-	-	/	-
66	นกยางควาย	*Bubulcus coromandus*	Ardeidae	Pelecaniformes	WV/R	PW	LC	LC	-	/	/	-	-	/	-
67	นกสีชมพูสวน	*Dicaeum cruentatum*	Dicaeidae	Passeriformes	R	PW	LC	LC	-	/	/	-	/	-	-
68	*นกอ้ายงั่ว*	*Anhinga melanogaster*	*Anhingidae*	*Suliformes*	R	PW	NT	NT	-	-	-	-	-	-	/
69	นกอีเสือสีน้ำตาล	*Lanius cristatus*	Laniidae	Passeriformes	WV	PW	LC	LC	-	/	/	-	-	/	/
70	นกอีเสือหลังแดง	*Lanius collurioides*	Laniidae	Passeriformes	R/WV	PW	LC	LC	-	/	-	-	-	-	-
71	นกอีแพรดแถบอกดำ	*Rhipidura javanica*	Rhipiduridae	Passeriformes	R	PW	LC	LC	-	/	-	-	/	-	-
72	นกอีล้ำ	*Gallinula chloropus*	Rallidae	Gruiformes	R/WV	PW	LC	LC	-	-	-	/	-	-	-
73	นกอีวาบคิ้วแดง	*Cacomantis merulinus*	Cuculidae	Cuculiformes	R	PW	LC	LC	-	-	-	-	/	-	-
74	อีกา	*Corvus macrorhynchos*	Corvidae	Passeriformes	R	PW	LC	LC	-	/	-	-	-	-	-
Total					**53 R, 6 WV, 14 R/WV, 1 R/WV/PM**	**68 PW**	**72 LC, 1 NT**	**71 LC, 2 NT, 1 VU**	**3 II**	**43**	**31**	**4**	**23**	**30**	**33**

Remark: Seasonal Status; R = Resident, WV = Winter visitor, PM = Passage migrant

1/ Wildlife Preservation Act B.E. 2562 (2019)
- PW refers to Protected wildlife according to the Wildlife Preservation Act B.E. 2562 (2019)
- \- refers to not protected wildlife

2/ International Union Conservation of Nature; IUCN (2022)
- VU = Vulnerable
- NT = Near Threatened,
- LC = Least Concern

3/ Thailand's Biological Resource Management Policy, as of B.E. 2560 (2017)
- VU = Vulnerable,
- NT = Near Threatened,
- LC = Least Concern

4/ The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- II refers to Appendix II, includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.



นกกะเต็นน้อยธรรมดา (*Alcedo atthis*)



เหยี่ยวผึ้ง (*Pernis ptilorhynchus*)



นกเป็ดผีเล็ก (*Tachybaptus ruficollis*)



นกเขาชวา (*Geopelia striata*)



นกกาบบัว (*Mycteria leucocephala*)



นกตีทอง (*Psilopogon haemacephalus*)



นกปากห่าง (*Anastomus oscitans*)



นกกะเต็นอกขาว (*Halcyon smyrnensis*)



นกจาบคาหัวสีส้ม (*Merops leschenaulti*)



นกกินปลีอกเหลือง (*Cinnyris jugularis*)

	
เหยี่ยวปีกแดง (*Butastur liventer*)	นกกระแตแต้แว้ด (*Vanellus indicus*)
	
นกจาบฝนปีกแดง (*Mirafra erythrocephala*)	นกกระจิบหญ้าสีเรียบ (*Prinia inornata*)
	
นกเอี้ยงด่าง (*Gracupica contra*)	นกยางปีย (*Egretta garzetta*)
	
นกกระติ๊ดขี้หมู (*Lonchura punctulata*)	เหยี่ยวขาว (*Elanus caeruleus*)
	
นกแอ่นพง (*Artamus fuscus*)	นกกะปูดใหญ่ (*Centropus bengalensis*)

Figure 3.2.1.2-12 Birds Found During the Survey in Project Area

2.4 Potential Impacts

Loss of Habitat:

In the Project area, the majority of land utilization is agricultural area. Wildlife inhabiting this area, either for feeding or living, can adapt to the land utilization. Within the 3-kilometer radius from the Project's boundary, there is also a significant amount of agricultural land, providing wildlife with opportunities for sustenance and reproduction. However, during the survey in this area, some species were identified with a conservation status of Near Threatened (NT) and Vulnerable (VU). An example is the *Anhinga melanogaster*, a non-breeding visitor or winter visitor that is not commonly observed. It requires water sources for foraging, displaying a preference for small-sized fish primarily found in shallow waters. After catching prey, it perches on dry branches or trees near the water surface, drying its wings. The *Anhinga melanogaster*, being dependent on water bodies and trees along the water, necessitates suitable habitats for its survival (Mongkol, B.E. 2546 (2003)). With construction and operation of the Project, the *Anhinga melanogaster* could still find foraging opportunities in the surrounding areas, as the environment remains agriculturally influenced and maintains accessible water sources.

Collision with Transmission Line:

From the survey conducted in the area, six migratory bird species were identified, *Halcyon pileata*, *Ficedula albicilla*, *Acrocephalus orientalis*, *Acrocephalus bistrigiceps*, *Saxicola stejnegeri*, and *Lanius cristatus*. Additionally, predatory birds were also observed, such as *Elanus caeruleus*, *Butastur liventer*, and *Pernis ptilorhynchus*, in the area.

In addition, from questioning the people residing along the Project's transmission line those who living near existing transmission lines, it was found that commonly encountered bird species include the Little Egret and Asian Openbill. These are typically found in areas where land is utilized for rice cultivation. Small-sized birds like the Common Tailorbird and Zebra Dove are often seen perching on power lines.

2.5 Existence of Concerned Wildlife Species

According to the proximity report generated from IBAT, there were 5 endangered species within 50 kilometers of the Project site, namely Asian Elephant (Elephas maximus), Greater Adjutant (Leptoptilos dubius), Green Peafowl (Pavo muticus), Southeast Asian Box Turtle (Cuora amboinensis), and Steppe Eagle (Aquila nipalensis). Based on the expert judgement, the project's location which is a modified habitat that

dedicated to agricultural area for a long time, COT decided to study all above 5 endangered species plus Milky Stork (Mycteria cinerea).

Document review of the habitats of six wildlife species, including *Elephas maximus*, *Cuora amboinensis*, *Aquila nipalensis*, *Pavo muticus*, *Leptoptilos dubius*, and *Mycteria cinerea* were conducted. The results of the review are as follows:

1) The Asian Elephant (*Elephas maximus)*

The Asian Elephant is a large, milk-feeding mammal classified as Endangered (EN) according to the Office of Natural Resources and Environmental Policy and Planning (B.E. 2560 (2017)). It has a foraging and living range of 184-407 square kilometers. The gestation period for elephants is 22 months, and they give birth to one calf at a time, with each calving occurring every four years. Harmful factors to the calf population include death after birth, predation by natural predators, and aggression by male elephants outside the herd. These serve as natural control mechanisms for the elephant population. Asian Elephants inhabit various ecosystems, including grasslands, mixed deciduous forests, dry evergreen forests, and human agricultural areas. They are predominantly found in the wild rather than in community areas (WCS Thailand, 2007; Pratumthong & Khlaipet, 2022).

From the survey, no elephants were found in the project area. However, the Asian elephant still has populations dispersed in various national parks and wildlife sanctuaries across Thailand. The location where elephants are most commonly observed near the Project area is in Kanchanaburi Province (Srinakarin Dam National Park), approximately 190 kilometers. Additionally, elephants have been sighted in the adjacent area in Phetchaburi Province (Kaeng Krachan National Park), approximately 224 kilometers. The specific locations where Asian elephants were spotted are illustrated in **Figure 3.2.1.2-13** (Thbif, B.E. 2566 (2023)).

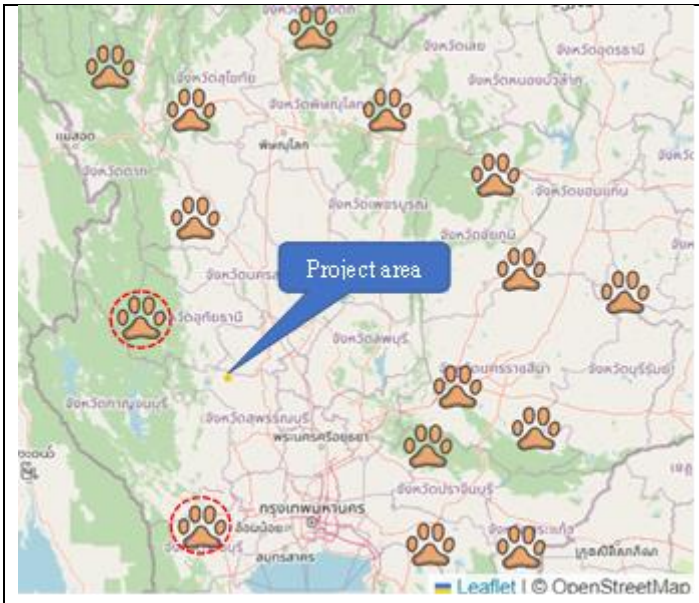


Figure 3.2.1.2-13 Location of Sighting Asian Elephants in Thailand
Source: https://thbif.onep.go.th/

2) The SEA Box Turtle (*Cuora amboinensis*)

The SEA Box Turtle is classified as Near Threatened (NT) according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017), and it is also categorized as Near Threatened (EN) according to the IUCN. The population has decreased, and one of the causes is hunting for food (IUCN, 2022). In Thailand, it is commonly found in the central and southern regions, particularly near water bodies in lowland areas, such as ponds, rice fields, canals, rivers, and sometimes even in mountain streams. However, based on the surveys and inquiries conducted in the project area and study area, the SEA Box Turtle has not been observed.

However, sightings of the SEA Box Turtle are still reported in Thailand. The highest number of sightings near the Project area is in Kanchanaburi Province (Srinakarin Dam National Park), approximately 190 kilometers. Additionally, sightings have been recorded in the adjacent area in Nakhon Sawan Province (rice fields in Wat Sai Sub-district, Mueang Nakhon Sawan District), approximately 95 kilometers. Specific locations where the Southeast Asian box turtle was observed are illustrated in **Figure 3.2.1.2-14** (Thbif, B.E. 2566 (2023)).



Figure 3.2.1.2-14 Location of Sighting the SEA Box Turtle in Thailand
Source: https://thbif.onep.go.th/

3) The Steppe Eagle (*Aquila nipalensis*)

The Steppe Eagle is a winter visitor or a wandering bird that is difficult to find (Jarujin et al., 2022). It is classified as Near Threatened (NT) according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017), and it is also categorized as Endangered (EN) according to the IUCN. This eagle searches for food in open areas, fields, or agricultural areas. From the foraging habitat characteristics of the Steppe Eagle and the features of its hunting flight, the Project area and its vicinity exhibit an open landscape, including fields, or agricultural areas that are suitable for foraging.

In Thailand, there have been reports of sightings of the Steppe Eagle, with the highest number of sightings near the Project area being in Chai Nat Province (Khao Khayai Mountain), approximately 50 kilometers. Additionally, sightings have been recorded in the adjacent area in Lopburi Province (Wat Kroen Ka Thin), approximately 75 kilometers. Specific locations where the Steppe Eagle was observed are illustrated in **Figure 3.2.1.2-15** (eBird, 2023).

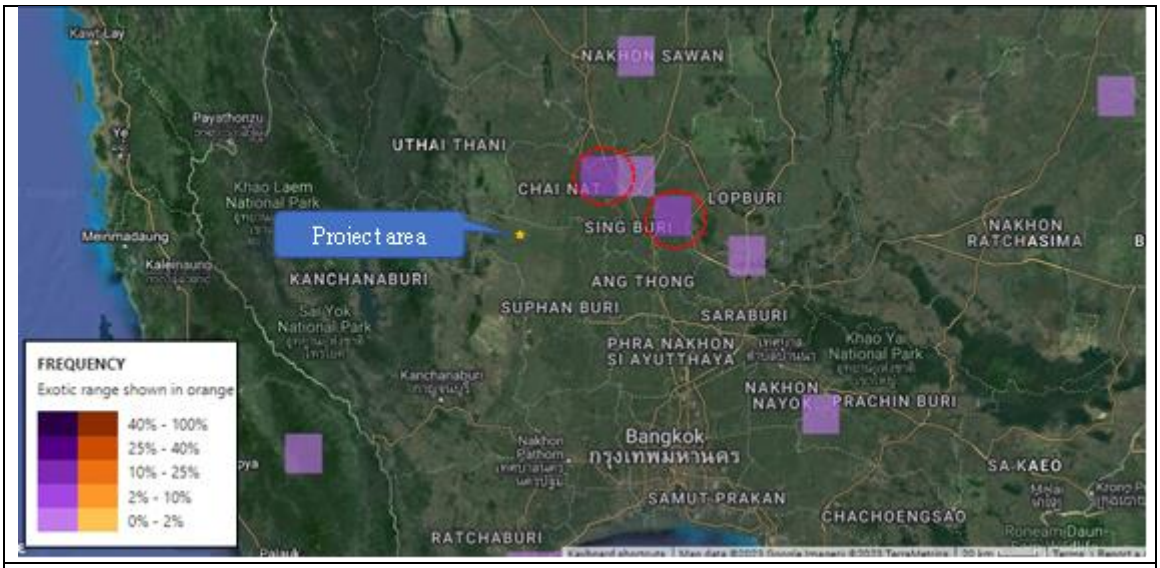


Figure 3.2.1.2-15 Location of Sighting the Steppe Eagle in Thailand
Source: https://ebird.org/home

4) The Green Peafowl (*Pavo muticus*)

The Green Peafowl is classified as Endangered (EN) according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017). It inhabits Deciduous forests and Mixed deciduous forests, often found near sandy beaches or open areas close to water sources for mating. It is a resident bird, challenging to find, and is occasionally observed in specific areas (Jarujin et al., B.E. 2561 (2022)). The Green Peafowl will be limited in an area where ecosystem suitable for living and breeding. It can only be seen in protected forests or national parks. Therefore, the Green Peafowl cannot be easily found.

However, there have also been sightings of the green peafowl scattered throughout Thailand. The most frequent sightings near the project area are in Uthai Thani Province (Huai Kha Khaeng Wildlife Sanctuary), approximately 95 kilometers and Kanchanaburi Province (Erawan National Park), approximately 95 kilometers. The sightings area is illustrated in **Figure 3.2.1.2-16** (ebird, 2023).



Figure 3.2.1.2-16 Location of Sighting the Green Peafowl in Thailand
Source: https://ebird.org/home

(5) The Greater Adjutant (*Leptoptilos dubius*)

The Greater Adjutant is an extremely rare and critically endangered species according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017). The main cause of its critical status is the loss of nesting areas due to urban expansion, leading to the felling of large trees. Additionally, the greater adjutant has a negative perception among local people as it is considered a dirty bird. This perception arises from its scavenging behavior for carcasses and food scraps in garbage dumps. When building nests on large trees near homes, the stork emits a foul odor, and its droppings can dirty the surroundings, leading locals to discourage the presence of Greater Adjutant near their homes (The Cornell Lab, 2021).

Nevertheless, there have also been sightings of the Greater Adjutant distributed in Thailand. The most frequent sightings near the project area are in Lopburi Province, approximately 117 kilometers, and Phra Nakhon Si Ayutthaya Province, approximately 101 kilometers. The Greater Adjutant sightings are depicted in **Figure 3.2.1.2-17** (ebird, 2023).

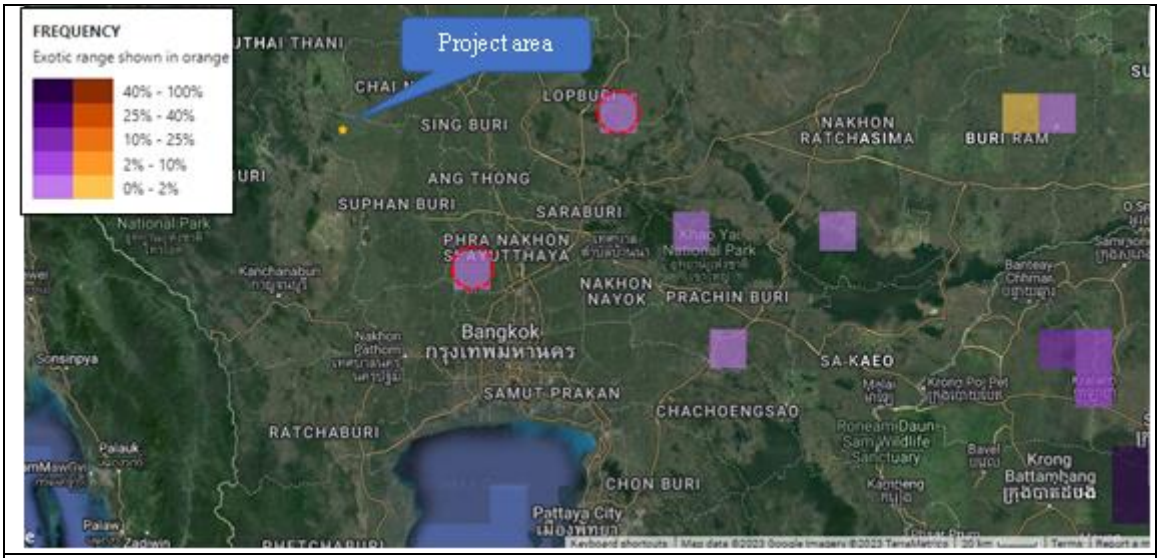


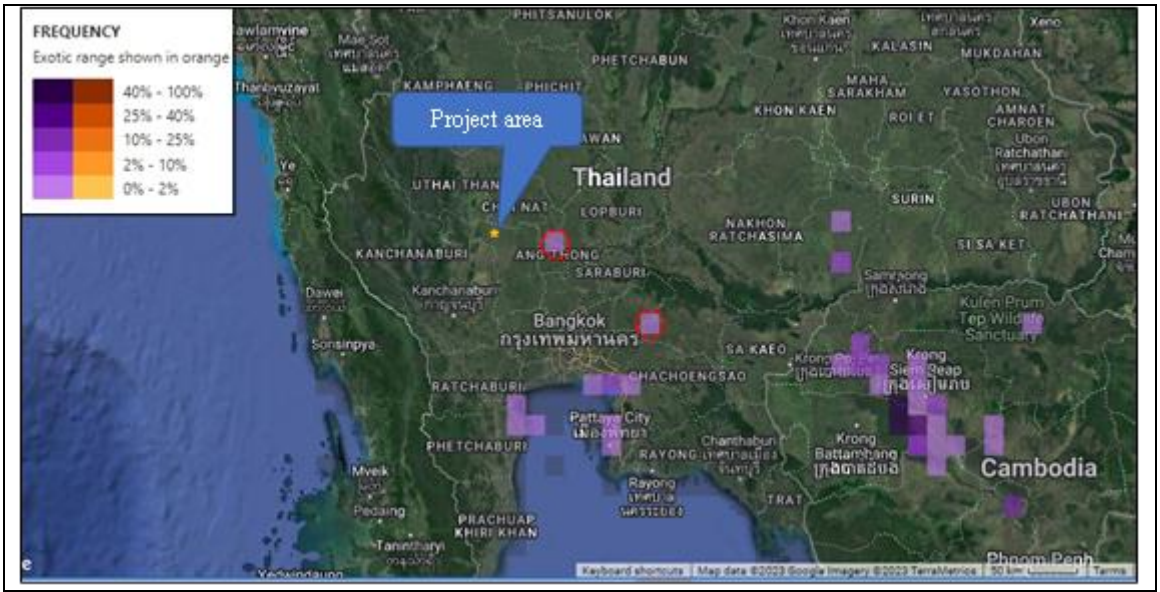
Figure 3.2.1.2-17 Location of Sighting the Greater Adjutant in Thailand
Source: https://ebird.org/home

(6) The Milky Stork (*Mycteria cinerea*)

The Milky Stork is a species that is critically endangered (CR) with a very small population in Thailand, estimated to be around 15 individuals. They are found in limited numbers in the southern region, and Samut Prakan Province. Their habitat includes wetland areas such as marshes, ponds, and reservoirs in the western Gulf of Thailand and wetland areas in the northeastern region.

In Thailand, there have been no documented instances of Milky Storks laying eggs. However, in Java, Indonesia, they have been observed nesting alongside other birds such as *Microcarbo niger* and *Anhinga melanogaster*. They lay 2-4 eggs per clutch. Threats to their population include encroachment for agricultural purposes, the expansion of human settlements, resulting in the loss of nesting areas, and illegal hunting and trading (Wildlife Research Group, B.E. 2559 (2016)).

Nevertheless, there have also been sightings of the Milky Stork dispersed in Thailand. The most frequent sightings near the Project area are in Sing Buri Province, approximately 55 kilometers, and Nakhon Nayok Province, approximately 171 kilometers. The Milky Stork sightings are depicted in **Figure 3.2.1.2-18** (ebird, 2023).



<u>Figure 3.2.1.2-18</u> Location of Sighting the Milk Stork in Thailand
Source: https://ebird.org/home

From the survey conducted in the Project area and the study area, which is predominantly agricultural land consisting of rice fields, sugarcane plantations, cassava plantations, and human residential areas, the identified area is not suitable for the survival of the six wildlife species. This is due to various factors such as the land not being forested, sandy areas near water sources, inadequate territory size for sustaining life, insufficient food sources, human disturbances, loss of nesting areas, and a high risk of predation resulting in a complete absence of these animals in the area of Doem Bang Nang Buat District, Suphanburi Province.

3.2.2 Aquatic Ecology

The nearest surface water source of the Project is Huai Hin. It is located approximately 100 meters away from the Project area. The water flows from the west to the east of the Project area. A survey conducted on May 5th, B.E. 2566 (2013) revealed that Huai Hin is a seasonal water source, and it remains dry throughout the year, especially during the dry season. There are only a few spots with slightly deeper areas compared to other parts where water is stagnant (**Figure 3.1.6-2**). Sampling methods of phytoplankton, zooplankton and benthos. Details are as follows:

(1) Sampling Methods

1) Phytoplankton

Phytoplankton samples were collected from 20-liter water from the water surface (about 0-30 cm. depth) and poured into 20-micron-mesh-plankton nets. The samples were placed in a sampling bottle and maintained by adding neutralizing formaldehyde solution. The concentration of formaldehyde in the samples was 5% by volume. After that, the samples were analyzed and counted at the laboratory.

2) Zooplankton

Zooplankton samples were collected by 70-micron-mash and 45-mm-diameter-mouth zooplankton nets. The samples were dragged vertically from the designated depth to the water surface. The samples were placed in a sampling bottle and maintained by adding neutralizing formaldehyde solution. The concentration of formaldehyde in the sample was equal to 5% by volume. After that, the samples were analyzed and counted at the laboratory.

The density of phytoplankton is in units/m^3. Zooplankton is in units/ m^3. The analysis of document type is based on Ladda (1999), Smith (1950), Mizuno (1969), Carr and Whitton (1973), and Bold and Wynne (1978).

After analyzing the species and plankton density of each station, the species diversity index was estimated from the following formula:

$$H' = -\sum_{i=1}^{s} (n_i / n) \ln (n_i / n) \quad (Shannon and\ Weaver, 1963)$$

Where, H' = Diversity Index
s = Number of plankton species
n = Total number of plankton species
n_i = Number of each plankton species

Species diversity indicates water quality according to the following standards (Wilhm and Dorris, 1968).

$H' < 1.0$ Low water quality – Organisms cannot live.

$H' = 1.0\text{-}3.0$ Fair water quality – Organisms can live.

$H' > 3.0$ Good to Very good water quality – It is appropriate for organisms.

3) Benthos

Sample collection of benthos used a 15*15 centimeter Ekman Dredge. Sediment samples were collected at a 13-centimeter depth of the soil surface. Samples were collected 3 times per station (total area 0.75 sq. ft.). Unwanted scrap materials were separated by a 1.0 and 0.5mm mesh sieve. The benthos remaining on the sieve were collected in a sampling bottle and maintained by adding neutralizing formaldehyde. The concentration of formaldehyde in the sample was 5% by volume. After that, the samples were analyzed and counted at the laboratory.

Analysis of benthic species is based on the documents of Prachuap (1982), Supavadee (1982), Saowapa (1985), Brinkhurst (1971), Brandt (1974), Merritt and Cummins (1984), and Williams and Felmate (1992).

(2) Results and Discussion

Aquatic ecology was conducted on October 30th, B.E.2566 (2023). The result of sampling can be shown in **Table 3.1.6.1** to **Table 3.1.6-3**.

1) SW1 Huai Hin (from the Project to the west)

Phytoplankton: A total of 18 phytoplankton species are found. The species diversity shows that the diversity index is 2.10, and the density is 5,322 cells/m^2 means that this is good to very good water quality that appropriate for organisms.

Zooplankton: A total of 5 zooplankton species are found. The species diversity shows that the diversity index is 1.23, and the density is 72 individual/m^2 means that this is good to very good water quality that appropriate for organisms.

Benthos: A total of 4 benthos species are found. The species diversity shows that the diversity index is 1.39, and the density is 60 individuals/m^2.

2) SW2 Huai Hin (from the Project to the south)

Phytoplankton: A total of 21 phytoplankton species are found. The species diversity shows that the diversity index is 2.62, and the density is 1,734 cells/m^3 means that this is good to very good water quality that appropriate for organisms.

Zooplankton: A total of 3 zooplankton species are found. The species diversity shows that the diversity index is 0.58, and the density is 102 individuals/m^3 means that this is good to very good water quality that appropriate for organisms.

Benthos: A total of 3 benthos species are found. The species diversity shows that the diversity index is 1.04, and the density is 60 individuals/m^2.

3) SW3 Huai Hin (from the Project to the east)

Phytoplankton: A total of 9 phytoplankton species are found. With a total density of 1,032 unit/liter. The species diversity shows that the diversity index is 1.94, and the density is 1,032 cells/m^3 means that this is good to very good water quality that appropriate for organisms.

Zooplankton: A total of 3 zooplankton species are found. The species diversity shows that the diversity index is 0.66, and the density is 84 individuals/m^3 means that this is good to very good water quality that appropriate for organisms.

Benthos: A total of 1 benthos species are found. The species diversity shows that the diversity index is 0.00 and the density is 15 individuals/m^2.

Table 3.1.6-1

Phytoplankton

Parameter	Unit	Sampling Point		
		SW.1	SW.2	SW.3
Phylum Cyanophyta				
Class Cyanophyceae (สาหร่ายสีเขียวแกมน้ำเงิน)				
Order Oscillatoriales				
Family Oscillatoriaceae				
Oscillatoria sp.	cells/m^3	42	48	0
Order Nostocales				
Family Nostocaceae				
Anabaena sp.	cells/m^3	6	0	0
Phylum Chlorophyta				
Class Chlorophyceae (สาหร่ายสีเขียว)				
Order Chlamydomonadales				
Family Volvocaceae				
Pandorina morum (Muller) Bory	cells/m^3	90	18	0
Volvox sp.	cells/m^3	0	72	0
Order Sphaeropleales				
Family Hydrodictyaceae				
Pediastrum tetras (Ehrenberg) Ralfs	cells/m^3	0	6	0
Class Trebouxiophyceae				
Order Chlorellales				
Family Oocystaceae				
Oocystis sp.	cells/m^3	42	0	0
Phylum Charophyta				
Class Zygnematophyceae				
Order Zygnematales				
Family Zygnemataceae				
Spirogyra sp.	cells/m^3	0	30	0

Parameter	Unit	Sampling Point		
		SW.1	SW.2	SW.3
Phylum Euglenophyta				
Class Euglenophyceae (ยูกลีนอยด์)				
Order Euglenales				
Family Euglenaceae				
Euglena acus Ehrenberg	cells/m^3	810	150	84
Euglena oxyuris Schmarda	cells/m^3	18	48	0
Euglena sp.	cells/m^3	372	66	90
Strombomonas gibberosa (Playfair) Deflandre	cells/m^3	30	60	72
Strombomonas praeliaris (Palmer) Deflandre	cells/m^3	0	24	0
Trachelomonas hispida (Perty) Stein	cells/m^3	984	66	78
Lepocinclis fusiformis (Carter) Lemmermann	cells/m^3	66	132	0
Lepocinclis ovum (Ehrenberg) Lemmermann	cells/m^3	1,146	390	168
Lepocinclis salina Fritsch	cells/m^3	42	0	12
Phacus acuminatus Strokes	cells/m^3	30	36	0
Phacus hamatus Pochmann	cells/m^3	1,104	84	54
Phacus helikoides Pochmann	cells/m^3	228	222	324
Phacus longicauda (Ehrenberg) Dujardin	cells/m^3	42	48	0
Phacus ranula Pochmann	cells/m^3	0	18	0
Phacus tortus (Lemmermann) Skvortzov	cells/m^3	12	48	0
Phylum Bacillariophyta				
Class Bacillariophyceae (ไดอะตอม)				
Order Bacillariales				
Family Naviculaceae				
Navicula sp.	cells/m^3	0	12	0
Phylum Dinophyta				
Class Dinophyceae (ไดโนแฟลเจลเลต)				
Order Peridiniales				
Family Peridiniaceae				
Peridinium sp.	cells/m^3	258	156	150
Density (Unit/L)		**5,322**	**1,734**	**1,032**
Number (species)		**18**	**21**	**9**
Diversity Index (H′)		**2.10**	**2.62**	**1.94**

Table 3.1.6-2

Zooplankton

Parameter	Unit	Sampling Point		
		SW.1	SW.2	SW.3
Phylum Rotifera (โรติเฟอร์)				
Class Monogononta				
Order Ploima				
Family Lepadellidae				
Colurella sp.	Ind/m^3	0	0	6
Lepadella sp.	Ind/m^3	6	0	0
Family Lecanidae				
Lecane bulla (Gosse)	Ind/m^3	42	0	0
Lecane luna (O.F. Mueller)	Ind/m^3	6	0	0
Lecane papuana (Murray)	Ind/m^3	6	0	0
Lecane sp.	Ind/m^3	0	0	12
Family Trichocercidae				
Trichocerca sp.	Ind/m^3	0	6	0
Family Synchaetidae				
Polyarthra sp.	Ind/m^3	0	84	66
Order Floscullariacea				
Family Testudinellidae				
Testudinella patina (Hermann)	Ind/m^3	12	0	0
Phylum Arthropoda				
Subphylum Crustacea				
Class Maxillopoda				
Subclass Copepoda (โคพีพอด)				
Copepod nauplius	Ind/m^3	0	12	0
Density (Ind/:)		**72**	**102**	**84**
Number (Species)		**5**	**3**	**3**
Diversity Index (H′)		**1.23**	**0.58**	**0.66**

Table 3.1.6-3

Benthos

Parameter	Unit	Sampling Point		
		SW.1	SW.2	SW.3
Phylum Arthropoda				
Class Insecta				
Odonata				
Family Macromiidae				
Marcromia sp.	Ind/m^2	15	0	0
Order Hemiptera				
Family Belosomatidae				
Diplonychus sp.	Ind/m^2	0	0	15
Phylum Mollusca				
Class Gastropoda				
Order Hygrophila				
Family Lymnaeidae				
Lymnaea auricularis swinhoei	Ind/m^2	0	30	0
Family Planobidae				
Indoplanorbis exutus	Ind/m^2	0	15	0
Order Mesogastrpoda				
Family Viviparidae				
Filopaludina martensi martensi	Ind/m^2	15	0	0
Filopaludina filosa	Ind/m^2	15	15	0
Filopaludina sp.	Ind/m^2	15	0	0
Density (Ind./m^2)		**60**	**60**	**15**
Number (Species)		**4**	**3**	**1**
Diversity Index (H′)		**1.39**	**1.04**	**0.00**

3.3 QUALITY OF LIFE VALUES

3.3.1 Social Information

The Project is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. The comprehensive study of the socio-economic landscape will be carried out at the sub-district levels. The data were collected from relevant government agencies, specifically focusing on local administrative agencies within the study area, particularly the local government organizations. The intention was to provide a comprehensive examination of the socio-economic information of the study area from various perspectives.

The study area covers a radius of 3 kilometers from the Project location, as depicted in **Figure 3.3.1-1**. It encompasses the jurisdictional regions of Nong Krathum Sub-district Municipality, Bo Kru Sub-district Administrative Organization, Doem Bang Nang Buat District, and Nong Makhamong Sub-district Administrative Organization, Dan Chang District, Suphanburi Province. The details are as follows:

(1) Provincial-Level Social and Economic Conditions

Suphanburi Province is divided into 10 districts and 110 sub-districts. The local administration includes 1 Provincial Administrative Organization, 2 Municipalities, 44 Sub-district Municipalities, and 80 Sub-district Administrative Organizations, totaling 127 organizations. As of the year B.E. 2565 (2022), the population of Suphanburi Province was 606,593 people, consisting of 312,999 females and 293,594 males. (**Table 3.3.1-1**)

Table 3.3.1-1

Number of Population by the District of Suphanburi Province

District	Male	Female	Total
Mueang Suphanburi	50,608	56,183	106,791
Doem Bang Nang Buat	19,719	21,195	40,914
Dan Chang	30,278	31,076	61,354
Bang Pla Ma	28,090	29,649	57,739
Si Prachan	18,966	20,786	39,752
Don Chedi	19,463	20,842	40,305
Song Phi Nong	53,693	55,902	109,595
Sam Chuk	18,845	20,417	39,262
U Thong	31,405	33,233	64,638
Nong Ya Sai	22,527	23,716	46,243
Total	**293,594**	**312,999**	**606,593**

Source: Registration Administration Office, Department of Provincial Administration, Ministry of Interior (August 2023)

According to the summarized provincial report of Suphanburi in the year B.E. 2566 (2023), the gross domestic product of the province was valued at 890,628 million Baht in the year B.E. 2563 (2020), a decrease from the 2,417 million Baht in the year B.E. 2562 (2019). In the agricultural sector, the value was 24,309 million Baht, and in non-agricultural sectors, the value was 65,319 million Baht.

1) Agriculture

The majority of the population in Suphanburi Province is engaged in agriculture. Rice is cultivated in the following areas: Bang Pla Ma District with 196,780 rai, Mueang Suphanburi District with 173,792 rai, and Doem Bang Nang Buat District with 160,400 rai. For field crops, the highest cultivation is found in Dan Chang District, and for fruit trees, it is most prominent in Mueang Suphanburi District. The significant economic crops include rice, animal feed corn, cassava, and rubber.

2) Employment

The Provincial Labour Office of Suphanburi has conducted a survey on the employment situation of the population, categorized by employment status. According to the labor situation in Suphanburi Province, there are 724,880 people within the working age group of 15 years and above. Among them, 447,815 people are employed, 4,990 people are unemployed, and 6,261 people are seasonally unemployed. On the other hand, 265,814 people are not part of the labor force. As for foreign workers in the province who are permitted to work, there are a total of 10,974 individuals. They consist of 9,353 Myanmar nationals, 506 Lao nationals, and 1,115 Cambodian nationals.

3) Education

Suphanburi Province has a total of 768 educational institutions, with a student population of 138,735 individuals. The number of classrooms is 6,141, and the number of teachers is 9,759.

4) Religion and Culture

The majority of the population in Suphanburi Province adheres to Buddhism, with 597 temples (including branch monasteries) and 201 main monasteries. There are 583 Mahanikaya monasteries, 13 Dhammayut monasteries, and 1 Anam Nikaya monastery.

(2) District-Level Social and Economic Conditions

The study area of the Project is located within the administrative jurisdiction of Doem Bang Nang Buat District. The total area of Doem Bang Nang Buat District is 552.3 square kilometers. The general social and economic characteristics of Doem Bang Nang Buat District can be summarized as follows:

1) Governance

Doem Bang Nang Buat District is divided into 2 parts: central administration and local administration, as described below:

- Central Administration: The central administrative area is divided into 14 sub-districts and 121 communities as follows:

(1) Khao Phra Sub-district, 11 communities
(2) Nang Buat Sub-district, 10 communities
(3) Doem Bang Sub-district, 11 communities
(4) Pak Nam Sub-district, 7 communities
(5) Khok Chang Sub-district, 10 communities
(6) Thung Khli Sub-district, 8 communities
(7) Khao Din Sub-district, 12 communities
(8) Yang Non Sub-district, 7 communities
(9) Hua Khao Sub-district, 12 communities
(10) Hua Na Sub-district, 7 communities
(11) Pa Sakae Sub-district, 6 communities
(12) Wang Si Rach Sub-district, 4 communities
(13) Bo Kru Sub-district, 7 communities
(14) Nong Krathum Sub-district, 9 communities

- Local Administration: Local administration consists of 16 entities, including 8 Municipalities and 8 Sub-district Administrative Organizations, as follows:

(1) Khao Phra Municipality
(2) Nang Buat Municipality
(3) Bo Kru Municipality
(4) Khao Din Municipality
(5) Pak Nam Municipality
(6) Doem Bang Municipality

(7) Nong Krathum Municipality
(8) Thung Khli Municipality
(9) Khao Phra Sub-district Administrative Organization
(10) Nang Buat Sub-district Administrative Organization
(11) Khok Chang Sub-district Administrative Organization
(12) Hua Khao Sub-district Administrative Organization
(13) Hua Na Sub-district Administrative Organization
(14) Bo Kru Sub-district Administrative Organization
(15) Pa Sakaea Sub-district Administrative Organization
(16) Yang Non Sub-district Administrative Organization

2) Population

Doem Bang Nang Buat District has a total population of 40,914 individuals, consisting of 19,719 males and 21,195 females (**Table 3.3.1-2**). The number of households is 15,642, with a population density of 74.08 individuals per square kilometer.

Table 3.3.1-2
Number of Population by the Sub-district of Doem Bang Nang Buat District

Sub-district	Population			Households
	Male	Female	Total	
Khao Phra	1,345	1,458	2,803	1,352
Nang Buat	1,490	1,597	3,087	1,146
Thung Khli	2,479	2,709	5,188	1,986
Khok Chang	2,164	2,408	4,572	1,640
Hua Khao	3,141	3,442	6,583	2,521
Hua Na	2,025	2,131	4,156	1,534
Bo Kru	993	1,012	2,005	741
Wang Si Rat	296	300	596	219
Pa Sakae	1,154	1,279	2,433	934
Yang Non	2,325	2,492	4,817	1,740
Nong Krathum	2,307	2,367	4,674	1,829
Total	**19,719**	**21,195**	**40,914**	**15,642**

Source: Registration Administration Office, Department of Provincial Administration, Ministry of Interior (August 2023)

3) Occupations

The majority of the population is engaged in agricultural activities, while others work as industrial laborers, in establishments, shops, and various governmental and private sector institutions within the area.

4) Industry and Commerce

Within Doem Bang Nang Buat District, there are 19 licensed medium and large-sized industrial factories, and a total of 4 banks.

5) Education

There are 50 educational institutions in Doem Bang Nang Buat District, consisting of 42 primary schools, 4 secondary schools, and 4 private educational institutions.

6) Religion

The majority of the population practices Buddhism. Within Doem Bang Nang Buat District, there are 58 Buddhist temples, 2 Christian churches, and 4 monastic centers.

7) Healthcare Facilities

There is 1 hospital and 3 private clinics in Doem Bang Nang Buat District, along with 20 sub-district health promotion hospitals.

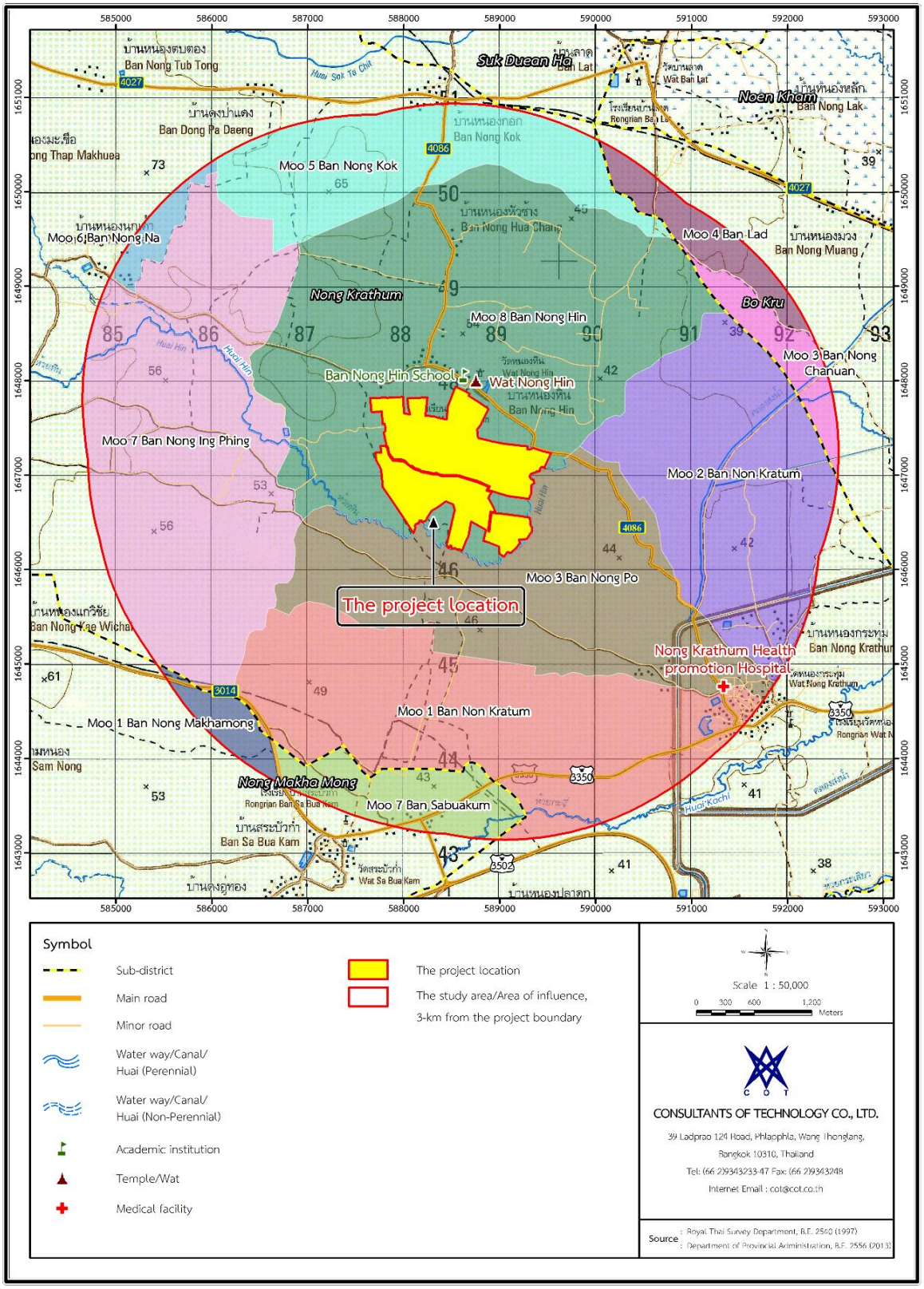


Figure 3.3.1-1 Communities in the Study Area

(3) Sub-district Level Social and Economic Conditions

1) Nong Krathum Sub-district

Nong Krathum Sub-district is under the jurisdiction of Nong Krathum Sub-district Municipality. It is situated within the administrative boundaries of Doem Bang Nang Buat District, Suphanburi Province. It is approximately 35 kilometers from the Doem Bang Nang Buat District Office and around 76 kilometers from the provincial capital of Suphanburi. The administrative division comprises 9 communities, enumerated as follows:

Moo 1 Ban Nong Krathum
Moo 2 Ban Nong Krathum
Moo 3 Ban Nong Po
Moo 4 Ban Nong Pladook
Moo 5 Ban Nong Kok
Moo 6 Ban Nong Na
Moo 7 Ban Nong Ing Ping
Moo 8 Ban Nong Hin
Moo 9 Ban Sok Hai

(a) Population

Nong Krathum Sub-district has a total population of 4,674 individuals, comprising 2,307 males and 2,367 females (**Table 3.3.1-3**). The number of households is 1,829, with an average population density of approximately 64.10 individuals per square kilometer.

Table 3.3.1-3

Number of Population by the Community of Nong Krathum Sub-district

Community	Population			Households
	Male	Female	Total	
Moo 1 Ban Nong Krathum	500	502	1,002	427
Moo 2 Ban Nong Krathum	353	369	722	275
Moo 3 Ban Nong Po	193	216	409	163
Moo 4 Ban Nong Pladook	62	71	133	53
Moo 5 Ban Nong Kok	185	215	400	138
Moo 6 Ban Nong Na	280	276	556	202
Moo 7 Ban Nong Ing Ping	343	333	676	276
Moo 8 Ban Nong Hin	255	254	509	192
Moo 9 Ban Sok Hai	136	131	267	103
Total	**2,307**	**2,367**	**4,674**	**1,829**

Source: Registration Administration Office, Department of Provincial Administration, Ministry of Interior (August 2023)

(b) Agriculture

The agricultural area of the sub-district spans 34,812 rai with 844 agricultural households. Prominent agricultural products include rice, sugarcane, cassava, and taro. The primary source of irrigation water is from natural water sources such as streams and newly constructed reservoirs.

(c) Education

Nong Krathum Sub-district encompasses 1 pre-primary school and 4 primary schools.

(d) Healthcare

Public healthcare services in the sub-district consist of 2 Sub-district health promoting hospitals.

(e) Religion and Culture

The majority of the population in Nong Krathum Sub-district are of Thai nationality and adhere to Buddhism. The region has four religious' institutions, including Wat Nong Krathum, Wat Nong Na, Wat Nong Hin, and the Monastic Community Center in Ban Nong Ing Ping.

2) Bo Kru Sub-district

Bo Kru Sub-district is in the jurisdiction of Bo Kru Sub-district Administrative Organization and Bo Kru Sub-district Municipality. The Project's study area falls under the jurisdiction of Bo Kru Sub-district Administrative Organization and is situated within the administrative boundaries of Bang Nang Buat District, Suphanburi Province. It is approximately 23 kilometers from the Doem Bang Nang Buat District Office. Bo Kru Sub-district is divided into two administrative zones:

Bo Kru Sub-district Municipality Zone: 3 communities.
Moo 1 Ban Bo Kru
Moo 7 Ban Thung Kathin
Moo 6 Ban Nong Pa Saeng (with 18 households)

Bo Kru Sub-district Administrative Organization Zone: 5 communities.
Moo 2 Ban Don Kao
Moo 3 Ban Nong Chanwon

Moo 4 Ban Lad

Moo 5 Ban Nong Lad

Moo 6 Ban Nong Pa Saeng

(a) Population

Bo Kru Sub-district has a total population of 2,005 individuals, comprising 993 males and 1,012 females (**Table 3.3.1-4**). The number of households is 741, with an average population density of approximately 37.93 individuals per square kilometer.

Table 3.3.1-4

Number of Population by the Community of Bo Kru Sub-district

Community	Population			Households
	Male	Female	Total	
Moo 2 Ban Don Kao	198	189	387	148
Moo 3 Ban Nong Chanwon	259	266	525	186
Moo 4 Ban Lad	285	301	586	231
Moo 5 Ban Nong Lad	95	89	184	62
Moo 6 Ban Nong Pa Saeng	156	167	323	114
Total	**993**	**1,012**	**2,005**	**741**

Source: Registration Administration Office, Department of Provincial Administration, Ministry of Interior (August 2023)

(b) Agriculture

Approximately 80% of the population derives its income from agriculture. Key agricultural products include rice, sugarcane, cassava, and red beans.

(c) Education

Bo Kru Sub-district encompasses 1 pre-primary school and 1 primary school.

(d) Healthcare

Public healthcare services in the sub-district consist of 1 Sub-district health promoting hospital.

(e) Religion and Culture

The entire population in Bo Kru Sub-district adheres to Buddhism. The region has two religious' institutions, including Wat Don Kao and Wat Ban Lad.

3) Nong Makhamong Sub-district

Nong Makhamong Sub-district in under the jurisdiction of Nong Makhamong Sub-district Administrative Organization. It is located in Dan Chang District, Suphanburi Province. It is approximately 4 kilometers from the Dan Chang District Office. The sub-district covers an area of approximately 127.21 square kilometers or around 79,506.25 rai. The administrative jurisdiction of Nong Makhamong Sub-district is divided into 20 communities as follows:

Moo 1 Ban Nong Makhamong
Moo 2 Ban Phu Khoy
Moo 3 Ban Nong Ulok
Moo 4 Ban Nong Kha Sam Nong
Moo 6 Ban Kilo Paet
Moo 7 Ban Sa Bua Kam
Moo 8 Ban Phu Khro
Moo 9 Ban Khao Nang Ngam
Moo 10 Ban Wang Nam Chon
Moo 11 Ban Don Yae
Moo 12 Ban Pa Sak
Moo 13 Ban Nong Khaen Pok
Moo 14 Ban Pak Chat
Moo 15 Ban Dong Uthong
Moo 16 Ban Pong Kham
Moo 17 Ban Bo Yang
Moo 18 Ban Khan Song Phatthana (partly)
Moo 19 Ban Kilo Song Phatthana (partly)
Moo 20 Ban Don Bo
Moo 21 Ban Khao Nam Daeng
(Note: Moo 5 Ban Kilo Song, is within the administrative jurisdiction of Dan Chang Sub-district Municipality)

(a) Population

Nong Makhamong Sub-district has a total population of 13,617 individuals, comprising 6,616 males and 7,001 females (**Table 3.3.1-5**). The number of households is 6,283, with an average population density of approximately 107.04 individuals per square kilometer.

Table 3.3.1-5

Number of Population by the Community of Nong Makhamong Sub-district

Community	Population			Households
	Male	Female	Total	
Moo 1 Ban Nong Makhamong	359	380	739	333
Moo 2 Ban Phu Khoy	232	231	463	173
Moo 3 Ban Nong Ulok	433	471	904	348
Moo 4 Ban Nong Kha Sam Nong	472	498	970	688
Moo 6 Ban Kilo Paet	375	381	756	365
Moo 7 Ban Sa Bua Kam	544	526	1,070	430
Moo 8 Ban Phu Khro	328	352	680	234
Moo 9 Ban Khao Nang Ngam	224	245	469	188
Moo 10 Ban Wang Nam Chon	273	265	538	522
Moo 11 Ban Don Yae	249	312	561	221
Moo 12 Ban Pa Sak	333	354	687	331
Moo 13 Ban Nong Khaen Pok	307	334	641	229
Moo 14 Ban Pak Chat	396	418	814	278
Moo 15 Ban Dong Uthong	319	326	645	240
Moo 16 Ban Pong Kham	278	296	574	205
Moo 17 Ban Bo Yang	269	259	528	218
Moo 18 Ban Khan Song Phatthana	419	447	866	413
Moo 19 Ban Kilo Song Phatthana	79	88	167	101
Moo 20 Ban Don Bo	197	230	427	144
Moo 21 Ban Khao Nam Daeng	530	588	1,118	622
Total	**6,616**	**7,001**	**13,617**	**6,283**

Source: Registration Administration Office, Department of Provincial Administration, Ministry of Interior (August 2023)

(b) Agriculture

Main agricultural products include sugarcane, maize, and cassava, along with various vegetable crops. In terms of cultivated area, the sub-district has approximately 51,572 rai of sugarcane, 4,504 rai of cassava, and 1,700 rai of maize for animal feed. The areas dedicated to rice cultivation are in Moo 7, 10, 13, and 15, totaling about 2,000 rai.

(c) Education

A substantial portion of the population in Nong Makhamong Sub-district has completed compulsory education, with some individuals pursuing higher levels of education. Educational institutions in the area include 3 government-affiliated schools: 2 pre-primary and primary level schools and 1 early childhood development center.

(d) Public Health

Public health services provided by the government consist of 2 Sub-district health-promotion hospitals.

(e) Religion and Culture

The majority of the population in Nong Makhamong Sub-district adheres to Buddhism. The area is home to various Buddhist temples and monastic organizations, contributing to the cultural and religious landscape.

(4) Vulnerable Group

Summary of the Social Situation Report for the year B.E. 2564 (2021) by the Office of Social Development and Human Security in Suphanburi Province reveals key findings related to vulnerable groups. There are a total of 75,935 vulnerable households, comprising 208,201 individuals, accounting for 24.83% of the total population. Among them, 8,518 households, with 14,169 individuals, face extreme poverty, representing 1.69% of the total population. These households encounter challenges primarily in income, education, health, living conditions, and access to government services, in that order.

Regarding the elderly population unable to care for themselves, experiencing income insufficiency, lacking caregivers, being homebound, and bedridden, there were 3,753 individuals in B.E. 2564 (2021), constituting 2.13% of the total elderly population. Notably, the bedridden group witnessed a significant increase in the first half of the year compared to the past four years.

Concerning persons with disabilities holding identification cards, the province recorded 1,008 individuals in B.E. 2564 (2021), accounting for 0.12% of the total population. This number showed a decreasing trend over the past four years. In terms of individuals with substance abuse issues, the year B.E. 2564 (2021) showed a total of 703 individuals, representing 0.08% of the total population. Predominantly, the majority were males, constituting 89.62% (630 individuals), while females accounted for 10.38% (73 individuals). Notably, there was a 34.24% reduction compared to the year 2020.

From the population data provided by the National Statistical Office as of December 30, B.E. 2564 (2021), it is evident that Suphanburi Province has a population of 835,360 people. Among them, there are 181,982 individuals aged 60 and above, constituting 21.78% of the total population, indicating a complete demographic of elderly

individuals. Another concerning aspect for the residents of the province is the escalating average household debt. In B.E. 2563 (2020), the average debt per household was 45,860.04 Baht. By B.E. 2565 (2022), this figure increased to 60,153.24 Baht, reflecting a 31.17% rise. Furthermore, in 2024, the average household debt surged to 101,884.29 Baht, representing a substantial 69.37% increase from 2022. This upward trend in household debt may significantly impact the livelihoods of each household in the province. (Source: Social Situation Report for the year B.E. 2565 (2022) by the Office of Social Development and Human Security in Suphanburi Province)

(5) Gender Equality

From the Global Gender Gap Report 2023, reports that in the year 2023, Thailand is ranked 74th out of 146 countries assessed in the index (**Figure 3.3.1-2**). The Global Gender Gap Index annually benchmarks the current state and evolution of gender parity across four key dimensions (Economic Participation and Opportunity, Educational Attainment, Health and Survival, and Political Empowerment).

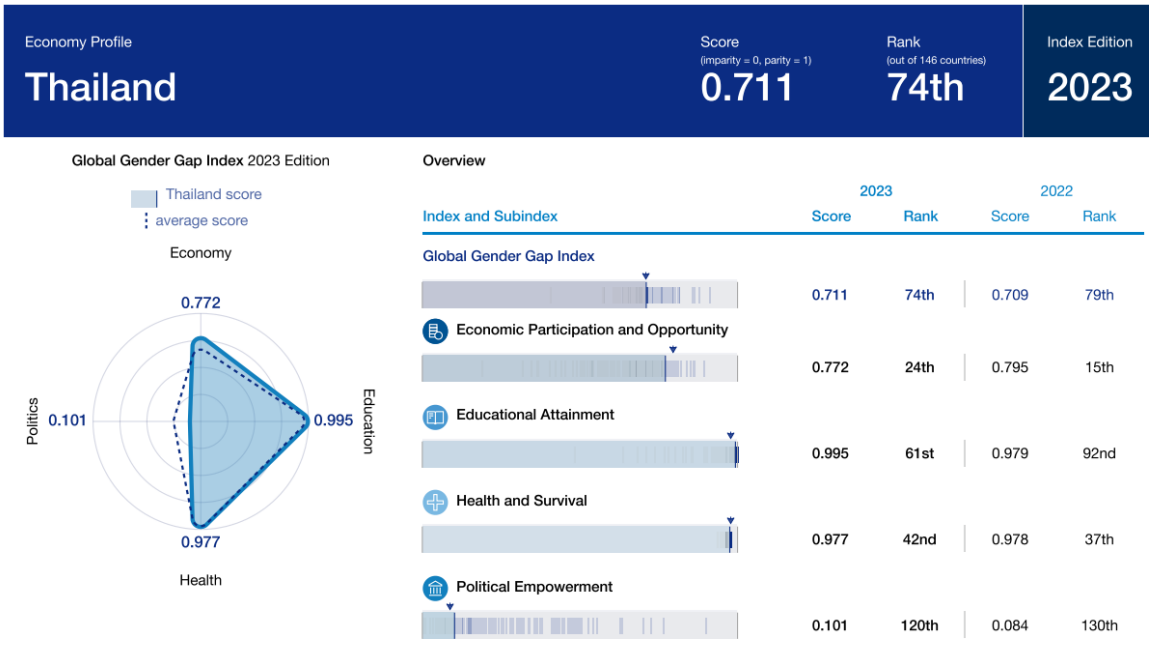


Figure 3.3.1-2 Thailand's Global Gender Gap Index

3.3.2 Economic Information

(1) Agriculture

1) General Agricultural Information at the Provincial Level

Suphanburi Province has a total agricultural area of 2,315,004 rai, accounting for 69.13% of the total area. Key agricultural products include rice, cassava, corn, and rubber. Data from years B.E. 2561-2565 (2018-2022) presented in **Table 3.3.2-1** revealed that paddy rice has consistently been the highest yielding agricultural product.

Table 3.3.2-1
Agricultural Production Statistics in Suphanburi Province

Crops	Production volume (tons/year)				
	2018	2019	2020	2021	2022
1. In-season rice	1,238,409	1,198,652	1,209,062	1,157,093	1,238,917
2. Off-season rice	906,036	832,353	592,802	724,260	820,804
3. Cassava	31,643	34,446	61,908	107,846	110,995
4. Corn	45,450	52,142	49,279	58,164	57,865
5. Rubber	7,081	7,447	7,354	6,888	6,586

Source: Suphanburi Provincial Agriculture Office, B.E. 2566 (2023)

2) General Agricultural Information in the Study Area

In Doem Bang Nang Buat District, the total agricultural area is approximately 199,537 rai. Key agricultural products include rice, cassava, corn, and rubber. Data from the years BE 2561-2565 (2018-2022), as shown in **Table 3.3.2-2**, revealed that rice has consistently been the highest yielding agricultural product, aligning with the overall trend at the provincial level.

Table 3.3.2-2
Agricultural Production Statistics in Doem Bang Nang Buat District

Crops	Production volume (tons/year)				
	2018	2019	2020	2021	2022
1. In-season rice	175,308	165,977	189,050	150,461	180,980
2. Off-season rice	142,807	114,187	51,940	97,835	108,000
3. Cassava	6,166	7,533	12,032	18,600	19,138
4. Corn	236	100	23	90	150
5. Rubber	330	266	218	196	196

Source: Suphanburi Provincial Agriculture Office, B.E. 2566 (2023)

The main factors affecting agricultural production quantities are the fluctuating prices of agricultural products in each year, leading farmers to adjust their cultivation types according to market prices. Additionally, factors such as weather variability and drought may also impact production quantities, resulting in the agricultural production trend not remaining constant.

3) General Livestock Information at the Provincial Level

Regarding livestock, Suphanburi Province's major livestock includes chickens, ducks, and birds. Historical data on the number of livestock for each type in B.E. 2561-2565 (2018-2022), as presented in **Table 3.3.2-3**, indicated changing trends for livestock farming in the province. These changes are influenced by local consumption demands based on the increasing population each year, as well as factors related to the prices of livestock products and the capacity to produce and export to foreign markets, which vary annually.

Table 3.3.2-3
Livestock Statistics in Suphanburi Province

Economic Livestock	Production volume (head/year)				
	2018	2019	2020	2021	2022
1. Beef Cattle	146,598	152,496	189,120	208,037	213,385
2. Dairy Cattle	1,293	941	1,506	1,400	1,396
3. Buffalo	2,803	3,920	4,604	5,260	5,350
4. Pigs	413,491	494,462	596,926	481,395	470,676
5. Chickens	16,535,530	15,755,495	16,156,587	16,956,226	17,565,317
6. Ducks	3,333,925	3,389,139	2,151,329	2,023,389	1,966,731
7. Goats	20,478	34,259	43,132	53,826	55,064
8. Sheep	1,581	3,974	5,425	6,049	6,228
9. Swans	1,663,901	1,739,258	1,833,550	1,782,050	1,739,050
10. Other Animals	-	59,663	9,101	10,269	10,507

Remark: - Denotes no reported data for that year Source: Provincial Livestock Office of Suphanburi, accessed on May, B.E. 2566 (2023)

(2) Aquaculture

In Suphanburi Province, there are 44,694 households engaged in freshwater aquaculture (**Table 3.3.2-4**). Key freshwater species include white shrimp, Nile tilapia, catfish, giant freshwater prawn, and snakehead fish. However, there is no information indicating that any households in the study area of the Project are engaged in aquaculture activities.

Table 3.3.2-4
Aquaculture Production Quantities in Suphanburi Province

Aquatic animal species	Cultivated area (rai)	Productivity (kg/year)	Value (Baht)
White shrimp	6,993	17,832,192	2,139,862,988
Giant freshwater prawn	11,361	2,840,228	511,241,000
Nile tilapia	22,137	10,404,297	468,193,383
Catfish	1,853	3,428,604	126,858,358
Snakehead fish	150	480,000	40,800,000
Siriped Catfish	875	455,259	12,747,247
Thai Carp	528	132,052	5,282,060
Seven-Stripped Carp	152	98,800	2,964,000
Red Tilapia Fish	140	490,438	39,235,000
Snake Skin Gourami	130	13,687	479,046
Giant Gourami	134	469,875	28,192,500
Featherback	210	304,863	22,864,688
Frog	29	105,521	5,276,070
Total	**44,694**	**37,055,815**	**3,403,996,339**

Source: Suphanburi Provincial Fisheries Office, B.E. 2566 (2023)

(3) Industrial Information

1) General Provincial Industrial Information

According to the industrial data search for Suphanburi Province in the year B.E. 2565 (2022), there were a total of 724 industrial factories in the province, with a capital investment of 54.23 billion baht and a total workforce of 19,668 people (**Table 3.3.2-5**).

Table 3.3.2-5
Industrial Establishments in Suphanburi Province

Details	2018	2019	2020	2021	2022
Number of factories	1,145	681	694	712	724
Investment (million Baht)	55,831	48,539	39,242	52,295	54,230
Workforce (persons)	22,198	15,998	15,857	16,114	19,668

Source: National Statistical Office, B.E. 2566 (2023)

2) General Industrial Information in the Study Area

In the year B.E. 2565 (2022), there were 56 industrial factories in Doem Bang Nang Buat District, all of which were small-sized industries. The total capital investment amounted to 4.653 billion baht, and there were 804 employees (**Table 3.3.2-6**). Analyzing the statistics on the number of industrial factories in Doem Bang Nang Buat District during the period of BE 2560-2564 (2017-2021), it can be observed that there was a significant increase in the number of factory closures in the years BE 2563-2564 (2020-2021).

Table 3.3.2-6
Industrial Establishments in Doem Bang Nang Buat District

Details	2018	2019	2020	2021	2022
Number of factories	90	90	87	53	56
Investment (million Baht)	4,312	4,320	3,990	4,588	4,653
Workforce (persons)	717	988	1,010	787	804

Source: National Statistical Office, B.E. 2566 (2023)

Socio-economic Survey

Data for socio-economic information was conducted from interviews with households within a 300-meter radius of the project boundaries on 9^{th} – 10^{th} December B.E. 2566 (2023) by COT (**Figure 3.3.2-1**).



Figure 3.3.2-1 Socio-economic Survey by COT

(1) Methodology

The survey was conducted in the Nong Krathum Sub-district in the Doem Bang Nang Buat District of Suphanburi Province. The procedure for obtaining information from the key informants consisted of five sequential steps:

1) Utilizing the Google Maps program to precisely indicate every residence within a 300-meter radius of the project site (a total of 27 places were found).

2) The sample for data collection consisted of 27 dwellings, with three being excluded: two due to their disappearance during the study, and one due to being classified as an abandoned house. Ultimately, a total of 24 houses, accounting for 88.89% of the population, were selected as the representative samples for the survey.

3) Building a connection to ensure their suitability for interviews. The survey objectives were clearly elucidated, and informed consent (consent given by action) was adhered to.

4) Door-to-door interviews, employing both closed and open-ended questionnaires, served as an important method for gaining access and conducting interviews. The dates were December 9th and 10th, 2030. The majority of the important informants were the heads of their own families.

5) The information was analyzed using the Excel program and shown as percentages. Open-ended responses were aggregated and also presented as percentages.

(2) Demographic Analysis of a Sample Population

Demographic analysis plays a crucial role in understanding the characteristics of a population. In this report, we will analyze the population characteristics of a sample size of 24 households. The analysis will focus on various aspects such as age distribution, education level, religious affiliation, main occupation, supplemental occupation, annual income, ethnicity, and domicile. By examining this information, we can gain insights into the diverse composition of the population and identify key patterns and trends. The details are in **Table 3.3.2-7.**

Table 3.3.2-7

Population Characteristics

Population Characteristics (N=24)	Percentage
Age	
31-40 years	8.33
41-50 years	16.67
51-60 years	41.67
60 years and above	33.33
Education Level	
Unschooled	12.50

Elementary school (6 years)	83.33
secondary school (9 years)	4.17
Religious	
Buddhist	100.00
Main occupation	
Agriculture	25.00
Merchandize / Self-employed	8.33
General employee	50.00
Housekeeper	16.67
Supplement occupation	
No	91.67
Yes	8.33
- Agriculture	50.00
- Merchandize/ Self-employed	50.00
Annual income (Mean Average)	19,685
Lower than 100,000 Baht	58.33
Higer than 100,000 Baht	37.50
No income	4.17
Ethnicity	
Thai	100.00
Domicile	
Nong Kratum originally	95.83
in-migration	4.17
Emigration	
Yes	0.00
NO	100.00

1) Age Distribution: The sample population is diverse in terms of age. The majority of individuals fall within the age range of 51-60 years (41.67%), followed by those aged 60 years and above (33.33%). Individuals between the ages of 41-50 years represent 16.67% of the population, while those aged 31-40 years make up 8.33%.

2) Education Level: The education level of the population is predominantly elementary school education (83.33%). 12.50% of the sample is unschooled. A smaller percentage of individuals (4.17%) have completed secondary education of 9 years.

3) Religious Affiliation: The entire sample population is Buddhist, indicating a homogeneous religious composition. This reflects the predominant religious and practices in Thailand.

4) Main Occupation: The population consists of individuals engaged in diverse occupations. The largest proportion (50.00%) is engaged in general employment, followed by those involved in agriculture (25.00%). Self-employment/merchandising represents 8.33% of the population, while housekeepers constitute 16.67%.

5) Supplemental Occupation: A substantial majority (91.67%) of the population does not have a supplemental occupation. However, a small portion (8.33%) does engage in supplemental activities such as agriculture or self-employment/merchandising.

6) Annual Income: The mean average monthly income of the population is 19,685 Baht (Approximately 563 US Dollars). For annual income, interestingly, a significant proportion (58.33%) earns less than 100,000 Baht. Conversely, 37.50% of individuals have an annual income higher than 100,000 Baht, while only 4.17% report having no income.

7) Ethnicity: The sample population is entirely Thai, indicating a homogenous ethnic composition. It reflects the dominant ethnic group in the area under study.

8) Domicile: The majority (95.83%) of individuals are originally from Nong Kratum, while a small percentage (4.17%) are in-migrants. The comprehensive representation of the original population suggests a relatively stable local community.

9) Emigration: Surprisingly, there are no recorded cases of emigration in the sample population, indicating a preference for residing within their native community.

(3) Family Context

The provided **Table 3.3.2-8** presents an insightful overview of the community situation, focusing on aspects like family and economic security, family relationship, and family arrangement. The details are as follows.

Table 3.3.2-8

Family Context of the Respondents

Family Context (N=24)	Percentage
Family & economic security	
Income	
- Family incomes exceed family expenditures	4.17
- Family incomes are insufficient to cover family expenditures.	66.67
- Family incomes are equivalent to family expenditures.	29.17
Saving money	
Yes	8.33
No	91.67
Debt	
Yes	37.50
No	62.50
Family Relationship	
Good	4.17
Moderate	50.00
Poor	4.17
Unidentified (living alone)	41.66
Family arrangement	
Living alone	41.66
2 family members	25.00
3 family members	16.67
4 family members	12.50
6 family members	4.17

1) Family & Economic Security: In terms of income, the data reveals that only 4.17% of families have incomes that exceed their expenditures. This indicates a small percentage of families enjoy financial stability and have the ability to save for the future. On the other hand, a majority of 66.67% face financial challenges, with their incomes being insufficient to cover their expenditures. Additionally, almost one-third (29.17%) of families have incomes equivalent to their expenditures, implying they are able to meet their basic needs without much surplus.

2) Saving: Saving Money: The data reveals that a mere 8.33% of the respondents reported saving money. This suggests that a majority of families within the community face barriers that prevent them from building up financial reserves. The lack of savings can contribute to financial vulnerability during unforeseen emergencies or future financial planning.

3) Debt: Approximately 37.50% of the respondents reported being in debt. This indicates that a significant portion of the community is burdened with financial liabilities. High levels of debt can restrict families from improving their financial situation and hinder their ability to invest in education, housing, or other essential needs.

4) Family Relationship: The data demonstrates that 4.17% of families report having a good family relationship. This suggests that a small but notable portion of the community enjoys a harmonious and supportive family environment, which likely contributes to their overall well-being and resilience. A larger proportion, 50.00% of families, report having a moderate family relationship. While this designation may indicate no acute issues within these families, it also suggests that there is room for improvement and enhancement of family dynamics and communication. Surprisingly, 4.17% of families consider their family relationships to be poor. This finding signals the presence of strained or dysfunctional family relationships within the community, which can have profound socio-emotional and psychological impacts on individuals. Addressing this issue may require targeted interventions, such as family counseling or support programs. It is worth noting that a significant portion, 41.66%, of the community is categorized as "unidentified" and living alone. This could indicate individuals who are not part of traditional family structures or who are living independently for various reasons. Further exploration of this group may provide additional insights into the community's demographics and social dynamics.

5) Family Arrangement: The data indicates a range of family arrangements within the community. The most prevalent arrangement is living alone (41.66%), followed by households with 2 family members (25.00%). The distribution gradually decreases as the number of family members increases, with 3, 4, and 6 family

members comprising 16.67%, 12.50%, and 4.17% of the respondents, respectively. These findings reveal the diversity in family structures and sizes existing within the community.

(4) Community Context

The concept of community context and empowerment plays a crucial role in addressing various social issues and improving the overall well-being of a society. This part aims to explore the community context as evidenced by the percentages of different risk factors present in a given community, as well as the empowerment initiatives undertaken to support vulnerable groups. By examining these factors, we can gain valuable insights into the challenges faced by the community and the efforts made to empower its members, as illustrate in **Table 3.3.2-9**.

Table 3.3.2-9

Community Context, Risk, and Empowerment

Community Context (N=24)	Percentage
Community risk	
Drug abuse	37.50
Gambling	37.50
Alcohol consumption	33.33
Game café & snooker club	4.17
Community Quarrel	0.00
Community Empowerment	
Empowerment of Child Youth and Woman	8.33
Empowerment of elderly people	16.67
Empowerment of Persons with Disabilities	4.17
Empowerment of domestic violences	8.33
Empowerment of family relationship	8.33

1) Community Risk Factors: The first aspect of community context that can be observed from the provided data is the prevalence of specific risk factors. Among the surveyed community members, drug abuse and gambling emerge as the most common risks, both accounting for 37.50% of the community context. This alarming statistic highlights the need for implementing effective strategies to combat substance abuse and gambling addiction. In addition to these risks, alcohol consumption also appears as a significant concern, affecting approximately 33.33% of the community. This finding underscores the importance of promoting responsible drinking habits and implementing awareness campaigns on the potential consequences of excessive alcohol consumption.

Interestingly, the data also indicates the presence of a game café and snooker club as contributing to the community context, albeit to a lesser extent (4.17%). While this may not seem as significant as the other risk factors, it still warrants attention to prevent potential negative consequences associated with gambling and excessive gaming.

2) Community Empowerment Initiatives: Addressing the community context also requires empowering various vulnerable groups. The data indicates that efforts have been made in this regard, with a focus on several key areas. The empowerment of child youth and women is given priority, accounting for 8.33% of the overall community empowerment initiatives. This suggests recognition of the need to provide equal opportunities and support for these groups, enabling them to thrive and contribute to the community's development. Furthermore, the empowerment of elderly people holds significant importance, representing 16.67% of the community empowerment initiatives. This recognition of the unique challenges faced by the elderly population demonstrates the community's commitment to ensuring their well-being and inclusion. Empowerment of persons with disabilities and victims of domestic violence comprises 4.17% and 8.33% of the initiatives, respectively. These figures highlight the community's efforts to address the specific needs and rights of marginalized groups, ensuring their empowerment and protection from abuse or discrimination.

(5) Environmental Context

This part provides an overview of the environmental conditions provided by 24 key informants, focusing on various aspects such as electricity, water availability and quality, road conditions, waste management, and wastewater management. The details are as follows (**Table 3.3.2-10**).

Table 3.3.2-10

Environmental Context

Environmental Context	Acceptability (percentage)	Impact and concern
Electricity	100	Electricity is covered in every household, and 95.8% utilize PEA. Moreover, solar cells, as an alternative electric resource, are found in 4.2%. There are no complaints regarding electricity use from this survey.
Drinking water availability	100	The primary sources of drinking water include bottled water (60%), village waterworks (24%), rainwater (8%), and PWA (8%). All respondents confirmed that drinking water availability is satisfactory and affordable.
Drinking water quality	100	All responders confirmed that drinking water quality is satisfactory and deemed acceptable.

Used water availability	95.8	There is only one household where a pond is located within a dwelling and used for domestic purposes. at the same time, the remaining individuals utilize PWA water (88%). He expressed concern with the water supply during the summer season, citing the unpredictable and consistently decreasing annual precipitation.
Used water quality	100	All responders confirmed that the water quality used was satisfactory and deemed acceptable.
Agricultural water availability	85.7	The irrigation system plays a crucial role as a valuable natural resource for agricultural activity in this region. The survey revealed a persistent insufficiency of water for agricultural uses. Installing a water pump for irrigation purposes is a method to address the issue.
Agricultural water quality	100	All responders confirmed that agricultural water quality is satisfactory and deemed acceptable.
Road	91.3	Although the majority (88.9%) of this village is made up of paved roads, other areas have dirt roads (7.4%) and asphalt roads (3.7%) that have been built and are in use. Several individuals have raised concerns about the road condition in this village, noting that it consistently suffers from deterioration, contains potholes, and can be challenging to navigate during wet weather conditions.
Domestic waste management	87.5	Despite being classified as a transition community, Nhong Kratum continues to engage in backyard or open burning, which is currently widespread, with a prevalence rate of 95.8%. approximately 12.5% of respondents are apprehensive about the negative impact on their physical and psychological well-being caused by the emission of ash, smoke, carbon, or other pollutants from garbage burning.
Wastewater management	100	The respondents stated satisfaction with their approaches to managing wastewater. 82.8% of the participants support allowing water to flow openly in a space, explicitly allowing it to run along the surface. Concurrently, 17.2% employed wastewater or recycled water for gardening.

1) Electricity: The survey reveals that every household in the village is covered, with 95.8% of households utilizing the Public Electricity Authority (PEA). Additionally, 4.2% of households have adopted solar cells as an alternative electric resource. Encouragingly, no complaints regarding electricity use were reported by the survey participants.

2) Water Availability and Quality: The primary drinking water sources in the village include bottled water, village waterworks, rainwater, and the Provincial Waterworks Authority (PWA). Most respondents (60%) rely on bottled water, followed by

24% who use village waterworks. Rainwater and PWA water account for 8% each. All respondents confirmed that drinking water availability and quality are satisfactory, affordable, and acceptable. Regarding used water availability, 88% of households utilize PWA water, while only one household relies on a pond within the dwelling. Respondents expressed concern about water supply during the summer season due to unpredictable and consistently decreasing annual precipitation. Nevertheless, all responders confirmed that the water quality was satisfactory and acceptable. Finally, the irrigation system is crucial in supporting agricultural activities in the village. However, the survey revealed a persistent insufficiency of water for agricultural purposes. One potential solution identified by the respondents is the installation of water pumps for irrigation. Despite the challenges, all responders confirmed that agricultural water quality is satisfactory and acceptable.

3) Road Conditions: The majority (88.9%) of the village is comprised of paved roads, while dirt roads (7.4%) and asphalt roads (3.7%) are also present. Several individuals raised concerns about the deteriorating condition of roads, including potholes that make navigation challenging during wet weather conditions.

4) Waste Management: Although Nong Kratum is classified as a transition community, the survey indicates that backyard or open waste burning is prevalent, with a prevalence rate of 95.8%. Approximately 12.5% of respondents express apprehension about the negative impact of emissions from garbage burning on their physical and psychological well-being. This highlights the need for proper waste management practices and awareness campaigns.

5) Wastewater Management: The respondents expressed satisfaction with their cultural approaches to managing wastewater. Most (82.8%) support allowing water to flow openly in a space, while 17.2% employ wastewater or recycled water for gardening. This indicates a positive attitude towards sustainable wastewater management practices, but the effects on underground water and human health should be mentioned and monitored.

(6) Environmental Impacts on Families

The Environmental Impacts on Families table presents data on various factors affecting families. The percentages provided in the table shed light on the prevalence of different environmental impacts experienced by these families, see **Table 3.3.2-11**. Ador emission, caused by neighboring livestock farming, is the biggest issue, with 45.80% of families noting its impact. This shows how prevalent air pollution is and how it may affect families. This finding highlights the pervasive nature of air pollution and its potential consequences on the well-being of families.

Table 3.3.2-11
Environmental Impacts of Families

Environmental impacts on families (N=24)	Percentage
Ador emission	45.80
Dust pollution	4.17
Noise	0.00
Vibration	0.00
Domestic waste	0.00
Wastewater	0.00
Transport accident	0.00
Flooding and drainage system	0.00

1) Dust pollution, the last factor, exhibits comparatively lower percentages (4.17%), resulting from road traffic and transportation passing in front of their homes, particularly during the summer seasons. This is particularly relevant for people who live near the dirt roads.

2) Noise, vibration, and domestic waste do not appear to have a significant impact, as indicated by 0.00%. Similarly, there is no reported impact from wastewater, transport accidents, flooding, or drainage systems.

This data underscores the urgent need to address air pollution from livestock farming, which can harm individuals' and families' health and quality of life, especially psychological well-being. It emphasizes the importance of implementing measures to mitigate air pollution and safeguard the well-being of communities. Such measures can include stricter regulations on emissions, promoting cleaner and sustainable energy sources, and raising awareness about the importance of reducing pollution.

(7) Healthcare Service Preference

Healthcare service preference is vital in ensuring individual well-being and is influenced by various factors, including accessibility, quality, and availability of healthcare services. Understanding these behaviors and identifying barriers to healthcare can benefit project plans and operations (**Table 3.3.2-12**).

Table 3.3.2-12
Healthcare Service Preference and Barriers to Healthcare

Healthcare service preference and barriers to healthcare (N=24)	Percentage
Health behavior	
Government hospital	75.86
Private hospital	6.90
Sub-district health promoting hospital / primary care unit	17.24
Barriers to healthcare services	
No problem	69.23
Time spent in healthcare services/long queue	23.07
Insufficient medical health personnel	3.85
Lack of medical technology	3.85

1) Healthcare Service Preference: Based on the table, the majority of respondents (75.86%) sought healthcare services from government hospitals. This indicates that government hospitals play a prominent role in the healthcare sector, possibly because they are affordable, have extensive healthcare coverage programs, are trusted, and are easily accessible. Private hospitals ranked as the second preference, with 6.90% of participants preferring them. Only 17.24% of individuals seek healthcare from sub-district health promotion hospitals or primary care units, even those located closest to the village, making them the least preferred option.

2) Barriers to Healthcare Services: The data also highlights several barriers that impede individuals from accessing healthcare services effectively. Three significant barriers identified are time spent in healthcare services/long queues (23.07%), insufficient medical health personnel (3.85%), and lack of medical technology (3.85%).

(8) Vulnerable Population in the Community Context

The **Table 3.3.2-13** illustrates the vulnerable population in the community context, focusing on various factors such as economic vulnerability, physical health vulnerability, and vulnerability in household management. This information provides essential insights into the percentages and impact of different vulnerable groups within the community.

Table 3.3.2-13
Vulnerable Population in the Community Context

Vulnerable population in the community context	Percentage
Economic Vulnerability (An annual income below 100,000 Baht, equivalent to approximately 2857 US Dollars)	
Lower	42.31
Higher	30.77
No income (supported by children, students, unemployed)	26.92
Physical Vulnerability	
Infancy (0-5 years)	1.92
Elderly (60 years or above)	25.00
Disability group	1.92
No vulnerable group	71.16
Vulnerability and household management	
Unsophisticated	80.00
Sophisticated	20.00

1) Economic vulnerability: Starting with economic vulnerability, the table highlights that 42.31% of the population falls under this category, indicating an annual income below 100,000 Baht (approximately 2,857 US Dollars). These individuals face financial hardships and struggles, significantly impacting their daily lives and overall well-being. Furthermore, 30.77% of the respondents fall under the higher economic vulnerability category, indicating they face even greater economic challenges.

2) Physical Vulnerability: The table also addresses physical and health vulnerability, focusing on different age groups. Infants from 0 to 5 years comprise 1.92% of the vulnerable population. This group requires extra care and attention due to their delicate stage of development. On the other hand, older adults, individuals aged 60 years or above, account for 25% of the vulnerable population. Aging comes with various health complications, making this group more susceptible to illnesses and limitations in mobility. Additionally, the disability group, comprising 1.92% of the vulnerable population, faces unique challenges that require special assistance to ensure their well-being.

3) Vulnerability and household management: The vulnerability in household management is classified into two categories: unsophisticated and sophisticated, as indicated by the table. 80% of the vulnerable population comprises the unsophisticated group, while the remaining 20% comprises the sophisticated group. The respondents attribute their economic insecurity to factors often challenging their ability to manage well. Hence, exerting more effort and maximizing savings are the essential factors in tackling this situation.

(9) Project Information

1) Receiving the project information and details: In terms of communicating project information, the table detailed the interaction between the project, the community, and the villagers. 87.50% of respondents have received the project's information and particulars, according to the data. This indicates that the project's specifications are known and that the majority of project participants have access to the required information. However, 12.50% of the participants have not received the project information. This implies a potential gap in communication or information distribution, which must be addressed promptly. Ensuring that all project stakeholders have access to the necessary information is crucial to foster understanding, alignment, and collaboration.

2) Communication channel: Moving on to the communication channels used in the project, the data shows that only 41.67% of participants actively communicate. We can observe that 4.17% participate in community meetings, whereas 16.66% communicate with project staff. Additionally, 7.50% of participants rely on community leaders for communication. While it is positive that some individuals are actively involved

in the communication process, the relatively low percentages suggest a need for improvement. Strengthening communication channels to facilitate timely and effective information exchange is essential. This would enable better collaboration and ensure that all project stakeholders are well-informed about any updates, changes, or concerns regarding the project. Finally, the table hints at a potential concern regarding communication with neighbors. The percentage of participants relying on neighbors for communication is not specified, suggesting a potential gap in communication between project stakeholders and neighboring individuals or communities. This highlights the need to establish effective communication channels with neighbors to foster understanding, address concerns, and promote a collaborative environment for the successful execution of the project.

In conclusion, the data in the **Table 3.3.2-14** highlights the importance of project information dissemination, active communication, and the need to address potential gaps in communication channels. By ensuring that project information is accessible to all stakeholders and improving communication channels, we can enhance collaboration, mitigate concerns, and positively impact the overall project outcomes.

Table 3.3.2-14

Project Information

Project information	Percentage
Receiving the project information and details	
Received	87.50
Not received	12.50
Communication channel	
Participate in the community meeting	41.67
Project staff	4.17
Community leader	16.66
Neighbor	7.50

(10) Community Concerns and impacts of the project

Community concerns play a crucial role in shaping the development and implementation of the projects. Understanding these concerns is vital to ensuring the project's success while minimizing negative impacts on the community. This part examines the community concerns and the possible impacts during a specific project's construction and operation phases (**Table 3.3.2-15**).

Table 3.3.2-15

Community Concerns and Impacts of the Project

Community concerns and impact	Percentage
Community concerns during the project construction	
Yes	29.2
No	70.83
Pattern of concerns	
- Airborne particulate matter pollution	26.67
- Disruption caused by building activities	33.33
- Congestion/volume of trucks going through the community	26.67
- Unintentional incidents resulting from the transit of materials	13.33
Community concerns during the project operation	
Yes	45.83
No	54.17
Pattern of concerns (N=11)	
- *The impact of the solar panels' reflection on the residents' daily lives.*	9.09
- *The increase in the ambient temperature of the community caused by solar panels*	90.91
Positive impacts/ advantages of the project	
Yes	66.67
No	33.33
The pattern of positive impact (N=16)	
- *The power plant fund provides employment opportunities for the youth residing in the village.*	75.00
- *It contributes to the prosperity of the community.*	18.75
- *The annual budget serves as a valuable resource in strengthening community development.*	6.23
Negative impacts/ disadvantages of the project	
Yes	0.00
No	100.00

1) Community Concerns during Construction: The table presents the percentage of community concerns raised during the project's construction phase. The most significant concern, with 70.83%, was airborne particulate matter pollution. This indicates that community members were worried about the potential disruption caused by building activities, which could lead to air pollution and affect their health. Additionally, 33.33% expressed concern about the congestion and volume of trucks passing through the community during construction. These concerns highlight the need for effective mitigation measures and community engagement to address air pollution and transportation issues.

2) Community Concerns during Operation: Community concerns shifted during the project's operation. The table shows that 54.17% of respondents did not express

concerns, indicating a positive response. However, 9.09% had concerns regarding the impact of solar panels' reflection on residents' daily lives. This suggests that the community was worried about glare or other related issues. Furthermore, 90.91% were concerned about the increase in ambient temperature caused by the solar panels. These concerns reflect the need for appropriate design considerations and mitigation strategies to minimize discomfort and ensure the community's well-being.

3) Positive Impacts of the Project: Despite the concerns raised, the construction project also brought several positive impacts, as indicated by the table. Most respondents (75%) acknowledged that the power plant fund provided employment opportunities for the youth residing in the village. This shows that the project had potential economic benefits and contributed to local job creation. 18.75% believed the contributes to the prosperity of the community. Finally, 6.23% recognized the annual budget provided by the project as a valuable resource for community development. This indicates that the project had a direct positive impact on the prosperity and growth of the community. Finally,

4) Negative Impacts of the Project: It is important to note that 100% had no negative concerns. This suggests that the project generally had a positive perception among the community. However, the specific negative concerns were not detailed in the provided information, and further examination would be required to understand the nature and extent of these concerns.

Moreover, during the biodiversity field study, some local residents residing in the vicinity of the Project area have expressed concerns about the reflection of light and heat from solar panels, potential health risks, increased temperatures, irregular rainfall patterns, and the overall impact of the Project. These issues could likely be addressed with accurate and transparent information provided to the affected communities by the Project owner.

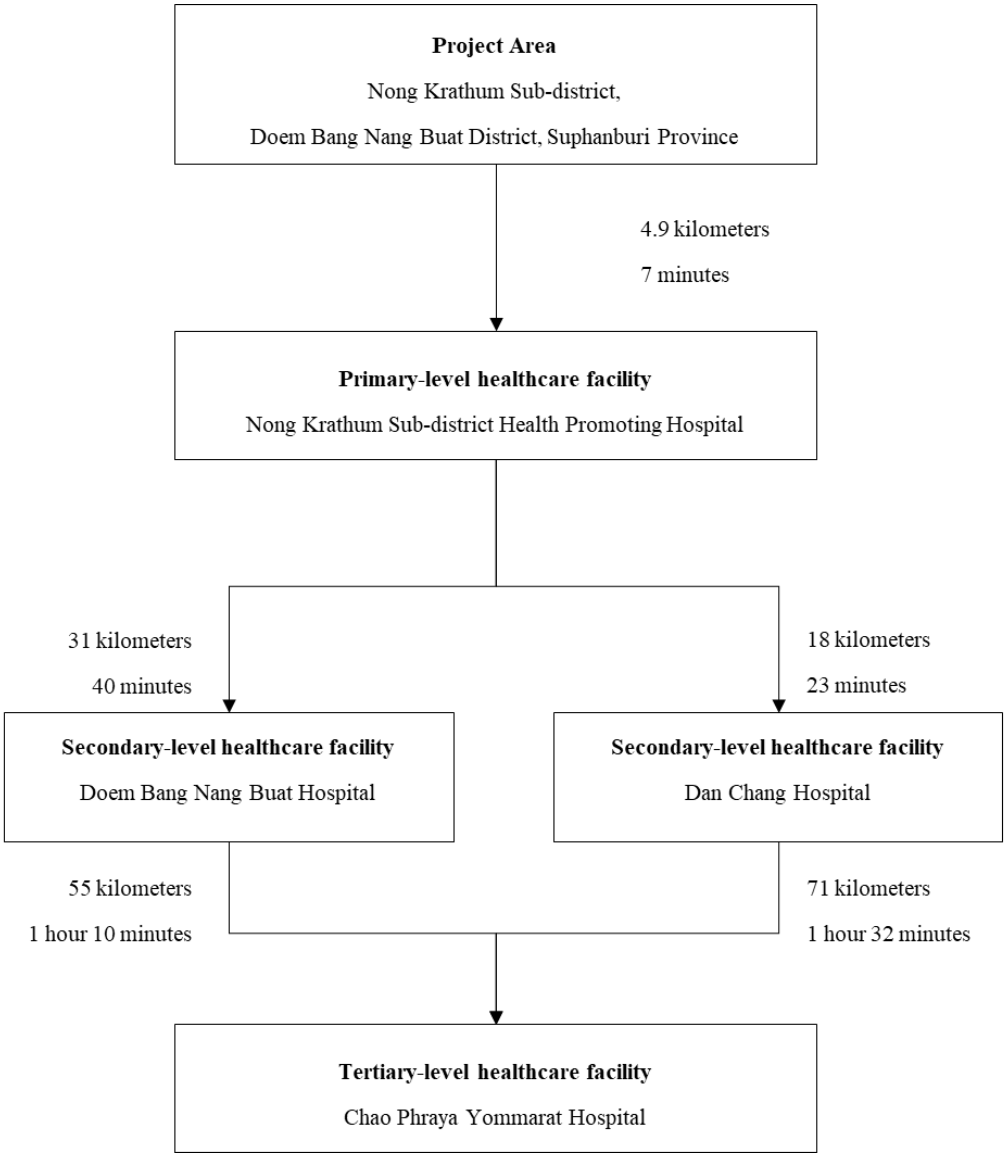
3.3.3 Public Health

(1) Healthcare Facility

Suphanburi Province has various public healthcare facilities provided by the state sector, including a central hospital with a capacity of 680 beds, a general hospital with 262 beds, a community hospital with 150 beds, eight community hospitals ranging in size from 60 to 120 beds, and 174 sub-district health promoting hospitals. Regarding the study area, Nong Krathum Sub-district has the relevant healthcare facility on several levels consisting of;

1) Primary-level healthcare facility
   - Nong Krathum Sub-district Health Promoting Hospital: located in Moo 3, Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. Responsible for all areas in Nong Krathum Sub-district. The distance is approximately 4.9 kilometers from the project location.
2) Secondary-level healthcare facility
   - Doem Bang Nang Buat Hospital: located in Doem Bang Sub-district, Doem Bang Nang Buat District, Suphanburi Province. Currently, it is a hospital with a capacity of 108 beds, The distance is approximately 31 kilometers from Nong Krathum Sub-district Health Promoting Hospital.
   - Dan Chang Hospital: located in Dan Chang Sub-district, Dan Chang District, Suphanburi Province. Currently, it is a hospital with a capacity of 110 beds, The distance is approximately 18 kilometers from Nong Krathum Sub-district Health Promoting Hospital.
3) Tertiary-level healthcare facility
   - Chao Phraya Yommarat Hospital: located in Tha Phi Liang Sub-district, Mueang Suphanburi District, Suphanburi Province. Currently, it is a hospital with a capacity of 680 beds, The distance is approximately 55 kilometers from Doem Bang Nang Buat Hospital and 71 kilometers from Dan Chang Hospital.

In the event of an emergency within the project area. The patient will be sent to Nong Krathum Sub-district Health Promoting Hospital, which is the nearest healthcare facility. It takes approximately 7 minutes to transfer the patient. However, if the injury exceeds the capacity of Nong Krathum Sub-district Health Promoting Hospital, the project has arranged a plan to refer the patient to the secondary-level and tertiary-level healthcare facility in nearby areas for further treatment. (**Figure 3.3.3-1**)



Remark: Primary-level healthcare facility - Providing basic treatment services at the outpatient level.
Secondary-level healthcare facility - Providing treatment services for general diseases up to inpatient level by receiving patient referral from primary level.
Tertiary-level healthcare facility - Providing treatment services at the inpatient level which requires the specialists by receiving patient referral from secondary level.

Figure 3.3.3-1 The Referring Emergency Patients Procedures of the Project

(2) Medical and Public Health Personnel

Based on the geographic information system of medical personnel allocation from the Ministry of Public Health, the personnel composition of the medical workforce includes physicians, dentists, registered nurses, public health officers, public health experts, and dental officers, as detailed in **Table 3.3.3-1**.

According to the statistical data provided by the Bureau of Policy and Strategy, Ministry of Public Health, the ratio of healthcare personnel to population in Suphanburi Province is generally higher compared to the Health Service Area 5 and the national average. Health Service Area 5 encompasses the provinces of Kanchanaburi, Nakhon Pathom, Prachuap Khiri Khan, Phetchaburi, Ratchaburi, Samut Songkhram, Samut Sakhon, and Suphanburi. In Suphanburi Province, the physician-to-population ratio is 1:2,513, the dentist-to-population ratio is 1:8,024, the pharmacist-to-population ratio is 1:5,183, and the registered nurse-to-population ratio is 1:422, as illustrated in **Table 3.3.3-2**.

Table 3.3.3-2
The Ratio of Healthcare Personnel to Population in Suphanburi Province

Personnel	The ratio of healthcare personnel to population		
	Suphanburi Province	Health Service Area 5	Thailand
Physicians	1 : 2,513	1 : 1,869	1 : 1,680
Dentists	1 : 8,024	1 : 8,208	1 : 8,057
Pharmacists	1 : 5,183	1 : 4,577	1 : 4,053
Registered Nurse	1 : 422	1 : 392	1 : 353

(3) Epidemiological Health Status Data of the Population in Suphanburi Province

The health status data of the population was collected from the summarized provincial report of Suphanburi Province for B.E. 2565 (2022). The analysis revealed the predominant illnesses affecting the residents of the province, with the top five significant diseases being outlined in **Table 3.3.3-3**.

Table 3.3.3-1

Number of Medical and Public Health Personnel in Suphanburi Province

Hospital	Physician	Dentist	Registered Nurse	Public Health Officer	Public Health Expert	Dental officer
Chao Phraya Yommarat Hospital	677	19	520	29	95	35
The 17th Somdej Phrasangkaraj Hospital	168	28	372	73	80	29
Doem Bang Nang Buat Hospital	48	13	81	22	41	16
Dan Chang Hospital	64	12	125	21	21	13
Bang Pla Ma Hospital	38	8	110	37	42	18
Sri Prachan Hospital	31	8	115	24	34	19
Don Chedi Hospital	15	5	85	24	10	11
Sam Chuk Hospital	29	8	98	16	24	12
U Thong Hospital	195	9	244	34	61	17
Nong Ya Sai Hospital	24	4	75	18	19	14
Total	**1,289**	**114**	**1,825**	**298**	**427**	**184**

Source: GIS Health, Bureau of Policy and Strategy, Ministry of Public Health, May B.E. 2566 (2023)

Table 3.3.3-3
Number of Outpatient Cases and Disease Incidence Rates, Segregated by Underlying Causes in Suphanburi Province, B.E. 2565 (2022)

Disease	Number of Case (Capita)	Incident Rate (Per 100,000 capita)
Hypertension	364,159	43,122
Diabetes	241,056	28,545
Abnormal tissue	169,443	20,065
Various abnormalities of teeth and structure	132,369	15,675
Other acute upper respiratory tract infections	103,932	12,307

In the context of epidemiological diseases, the majority of the population experiences the highest incidence of illness attributed to diarrhea. Subsequent in frequency are cases of unknown fever etiology, pneumonia, and influenza, in descending order as depicted in **Table 3.3.3-4**.

Table 3.3.3-4
Illustration of Patient Count and Incidence Rates Pertaining to Top 10 Epidemiological Surveillance Diseases in Suphanburi Province, B.E. 2565 (2022)

Disease	Number of Patient	Incident Rate (Per 100,000 population)
Diarrhea	8,201	969.12
Fever of unknown cause	2,920	345.06
Pneumonia	1,878	221.93
Influenza	1,525	180.21
Dengue fever	797	94.18
New cases of pulmonary tuberculosis	578	68.30
Food poisoning	424	50.10
Sexually transmitted disease	367	43.37
Conjunctivitis	350	41.36
Chickenpox	241	28.48

(4) Epidemiological Health Status Data of the Study Area

The collation of epidemiological health status data of the population within the study area encompassed data on the causes of illnesses for outpatients seeking services from public healthcare facilities within the study area and its nearby locales. The data as a representation of the health conditions of the population within the study area. The particulars of this endeavor are outlined as illustrated in **Table 3.3.3-5** for Doem Bang Nang Buat Hospital and **Table 3.3.3-6** for Nong Krathum Sub-district Health Promoting Hospital.

Table 3.2.3-5
Outpatient Data classified by Causes of Illness from Doem Bang Nang Buat Hospital, during B.E. 2561-2565 (2018-2022)

Cause of Illness	2018		2019		2020		2021		2022	
	Number (instance)	Rate (per 100,000 pop.)	Number (instance)	Rate (per 100,000 pop.)	Number (instance)	Rate (per 100,000 pop.)	Number (instance)	Rate (per 100,000 pop.)	Number (instance)	Rate (per 100,000 pop.)
1. Diabetes	27,254	36,168.91	25,361	35,167.44	22,354	30,997.71	24,886	34,776.41	23,167	32,730.54
2. High blood pressure without cause	24,643	32,703.84	24,630	34,153.78	23,986	33,260.76	26,781	37,424.54	26,072	36,834.74
3. Cavities	11,840	15,712.92	11,829	16,402.97	11,318	15,694.38	8,237	10,113.19	8,380	11,839.34
4. Abnormal tissue	10,906	14,473.40	11,381	15,781.74	10,639	14,752.83	8,844	12,358.86	7,496	10,590.41
5. Other abnormalities of teeth and structure	10,493	13,925.61	10,495	14,553.14	7,304	10,128.27	5,166	7,219.12	8,076	11,409.84
6. Other back pathologies	8,542	11,375.94	8,999	12,478.68	5,947	8,246.55	4,440	6,204.58	4,775	6,746.16
7. Other acute upper respiratory tract infections	9,471	12,569.01	8,726	12,100.12	7,197	9,979.89	4,345	6,071.83	5,521	7,800.12
8. Other plants of the esophagus stomach and duodenum	7,264	9,640.09	6,344	8,797.06	6,134	8,505.86	4,636	6,478.48	4,621	6,613.36
9. Acute strep throat and acute tonsillitis	3,873	5,139.88	0	0.00	0	0.00	0	0.00	5,930	8,377.95
10. Other specified, unspecified and multiple body injuries	5,034	6,680.65	6,377	6,069.47	3,855	5,345.63	3,344	4,673.00	3,478	4,913.75
11. Other diseases of the skin and subcutaneous tissue	3,850	5,109.35	3,782	5,396.94	3,507	4,863.07	0	000	2,666	3,766.55
12. Endocrine disorders, other nutrition and metabolic	0	0.00	0	0.00	0	0.00	3,053	4,266.35	2,834	4,003.90
13. Cataracts and other lens abnormalities	0	0.00	0	0.00	0	0.00	0	0.00	3,977	5,618.74

Table 3.2.3-6

Outpatient Data Classified by 21 Disease Groups from Nong Krathum Sub-district Health Promoting Hospital, during B.E. 2561-2565 (2018-2022)

Cause of Illness	2018		2019		2020		2021		2022	
	Number (instance)	%	Number (instance)	%	Number (instance)	%	Number (instance)	%	Number (instance)	%
1. Certain infectious and parasitic diseases	46	1.22	45	1.29	45	1.13	24	0.95	28	1.66
2. Neoplasms	0	0.00	0	0.00	1	0.03	1	0.04	0	0.00
3. Diseases of the blood and blood forming organs	66	1.75	93	2.67	41	1.03	24	0.95	11	0.65
4. Endocrine, nutritional and metabolic diseases	421	11.15	300	8.61	279	7.02	243	9.64	167	9.88
5. Mental and behavioral disorders	35	0.93	1	0.03	874	21.99	3	0.12	6	0.35
6. Diseases of the nervous system	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7. Diseases of the eye and adnexa	74	1.96	60	1.72	41	1.03	35	1.38	26	1.54
8. Diseases of the ear and mastoid process	2	0.05	4	0.12	4	0.10	3	0.12	2	0.12
9. Diseases of the circulatory system	768	20.33	487	13.99	499	12.56	476	18.89	327	19.35
10. Diseases of the respiratory system	305	8.08	254	7.29	268	6.74	168	6.67	158	9.35
11. Diseases of the digestive system	696	18.43	801	23.00	570	14.34	300	11.90	22	1.30
12. Diseases of the skin and subcutaneous tissue	35	0.93	20	0.57	13	0.33	15	0.60	18	1.07
13. Diseases of the musculoskeletal system and connective tissue	236	6.25	208	5.97	254	6.39	253	10.03	169	10.00
14. Diseases of the genitourinary system	15	0.40	18	0.52	12	0.30	4	0.16	7	0.41
15. Compilation of pregnancy, childbirth and the puerperium	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
16. Certain conditions originating in the perinatal period	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
17. Congenital malformations, deformations and chromosomal abnormalities	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18. Symptoms, sign and abnormality clinical and laboratory findings, not elsewhere classified	1,077	28.52	1,192	34.22	1,071	26.95	971	38.53	749	44.32
19. Food poisoning, toxic effect, and their sequelae	0	0.00	0	0.00	1	0.03	0	0.00	0	0.00
20. Transport accidents and their sequelae	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21. Other external causes of morbidity and fatality	0	0.00	0	0.00	1	0.03	0	0.00	0	0.00
Total	**3,776**	**100**	**3,483**	**100**	**3,974**	**100**	**2,520**	**100**	**1,690**	**100**

3.3.4 Indigenous People

From the ethnic group database of the Princess Maha Chakri Sirindhorn Anthropology Centre (Public Organization), it was found that Suphanburi Province has a total of 26 indigenous communities. These consist of 10 communities of the Tai Dam ethnic group, 6 communities of the Pakakayo ethnic group, 4 communities of the Thai Phuan ethnic group, 3 communities of the Gong ethnic group, 1 community of the Kuay ethnic group, 1 community of the Pwo ethnic group, and 1 community of the Lao Wiang ethnic group. However, it was not reported that any indigenous ethnic group communities were established in the area of Doem Bang Nang Buat District. (Source: https://ethnicity.sac.or.th/database-ethnic).

Through several site visit, meetings with community leaders, pre-engagement meeting, and public hearing conducted so far, it has been observed that people in Suphanburi Province, where the Project is located, primarily communicate in standard Thai language. They share cultural practices and a way of life similar to the general population in central Thailand, with no distinctive characteristics found. Therefore, it is not meet the criteria under ADB Safeguard Requirement 3[1].

3.3.5 Physical and Cultural Heritage

Suphanburi Province is regarded as an ancient province rich in historical significance, archaeological, and antiquities. It holds a prominent status as an ancient city, yielding archaeological evidence dating back no less than 3,500 to 3,800 years. The discovered artifacts span various epochs including the Neolithic, Bronze Age, Iron Age, and a continuous cultural heritage from the Sukhothai period. In addition to its archaeological value, Suphanburi also holds a significant place in Thai literary history as the birthplace of the epic tale "Khun Chang Khun Phaen," giving rise to numerous pivotal locations portrayed within the narrative of this literary work.

One important archaeological site in the province is The Nong Ratchawat Archaeological Site is situated in Nong Ratchawat Sub-district, Nong Yai Sai District. Originally covering approximately 15 rai, this site, elevated around 2 meters above its surrounding area, was initially characterized by rice paddies and sugarcane fields. The

[1] (i) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others; (ii) collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories; (iii) customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and (iv) a distinct language, often different from the official language of the country or region.

initial excavation revealed significant archaeological evidence including four human skeletons, animal bones, fragments of tripod pottery, stone hand-milling tools, flint arrowheads, earthen pellets, and clay figurines. These artifacts signify that the area had been inhabited by people of the Neolithic era around 3,000-4,000 years ago.

However, within a radius of 3 kilometers from the Project boundary, there are no registered archaeological sites or historical sites as stipulated by relevant legislation, pertaining to archaeological sites, antiquities, cultural artifacts, and national heritage sites.

3.4 HUMAN USE VALUES

3.4.1 Land Use

(1) Principal City Plan and Regulation

From the examination of the principal city plan data of Suphanburi, according to the Ministry's regulations on enforcing the Principal City Plan of Suphanburi, B.E. 2560 (2017), land use has been designated into 7 categories, including:

1) Pink: Community land
2) Purple: Industrial and warehouse land
3) Green: Rural and agricultural land
4) Green with brown border and diagonal brown line: Land for land reform purposes for agriculture
5) Light green: Open land for recreational and environmental conservation purposes
6) Light green with white diagonal line: Forest conservation land
7) Blue: Open land for environmental conservation purposes

The Project site is located within the green zone (**Figure 3.4.1-1**), which is classified as rural and agricultural land. This type of land allows for business activities in buildings that are not tall or large-sized. However, if there are agreements for purchase or lease involving regional electricity utilities, it is considered a public utility and can be conducted. In any case, the Project does not fall under the category or type of factory that is prohibited from conducting operations in this area. Therefore, the implementation of the Project does not conflict with the Principal City Plan for Land Use of Suphanburi, B.E. 2560 (2017), and is thus eligible for conducting business activities within the mentioned area.

(2) Land Use within the Study Area

The research of land use within the study area encompasses a radius of 3 kilometers from the Project boundaries using the Geographic Information System (GIS) along with the 1:50,000 scale base map from the Department of Land Development (B.E. 2562 (2019)) and modifies satellite imagery from Google Earth, as well as additional field survey data. The predominant land use within the study area is agriculture. Regarding land use in the study area, it can be categorized into five types (**Figure 3.4.1-2**). The Project site is not located within protected areas, pollution control areas, or collision-prone areas. The details are as follows:

1) Agricultural Area

The most predominant land use within the study area is agriculture, which is widely distributed across all communities. It covers a total area of 43.79 square kilometers, representing 90.61% of the entire study area

2) Water Area

The water area covers a total area of 1.50 square kilometers, representing 3.10% of the entire study area.

3) Community Area and Infrastructures

The utilization of land for community and infrastructure purposes covers a total area of 1.27 square kilometers, representing 2.63% of the entire study area.

4) Other Areas

Other areas refer to land areas that are not utilized for any specific purpose. It covers a total area of 0.96 square kilometers, representing 1.99% of the entire study area.

5) Industrial Area

Industrial land use covers a total area of 0.81 square kilometers, representing 1.67% of the entire study area.

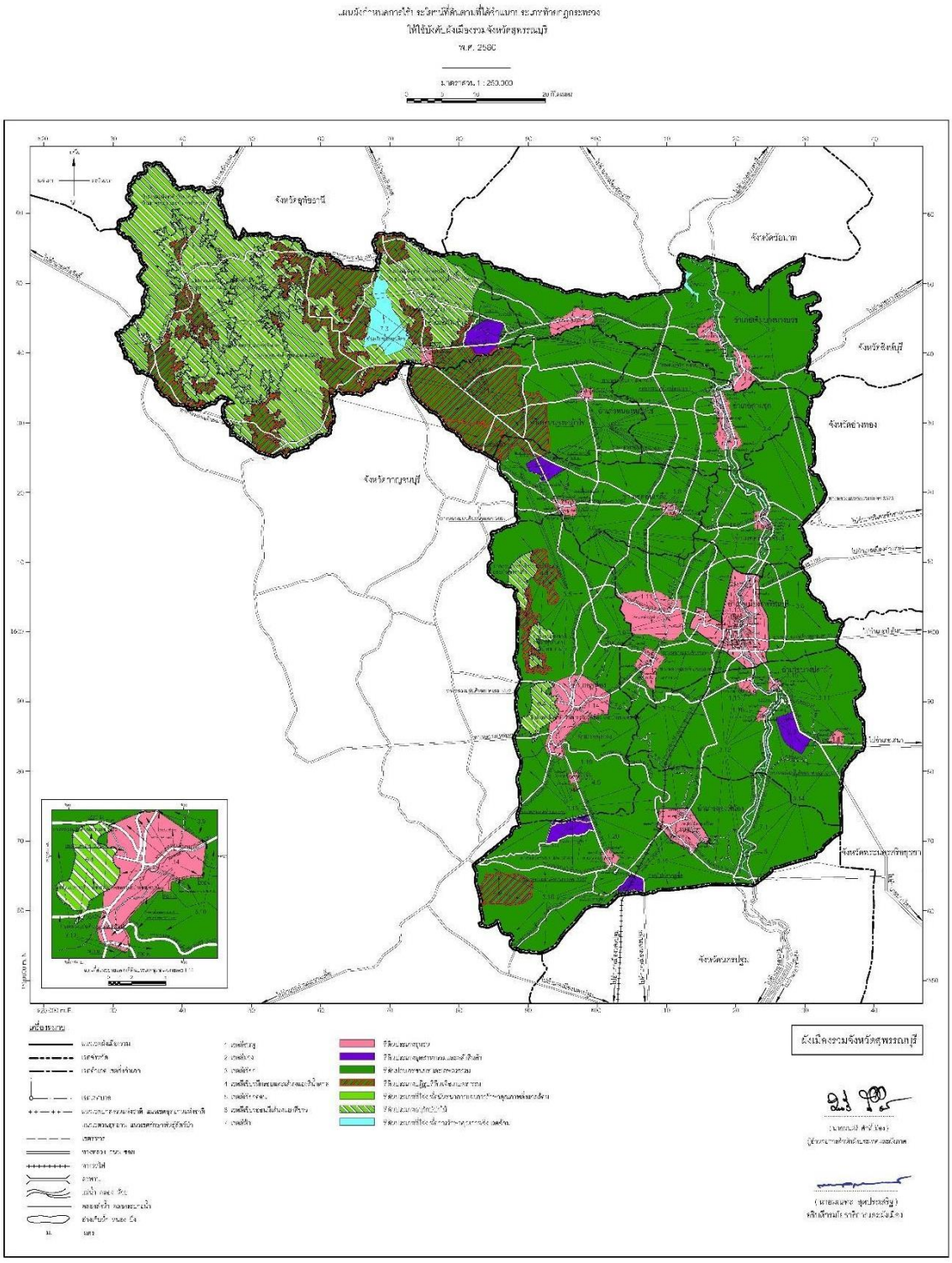
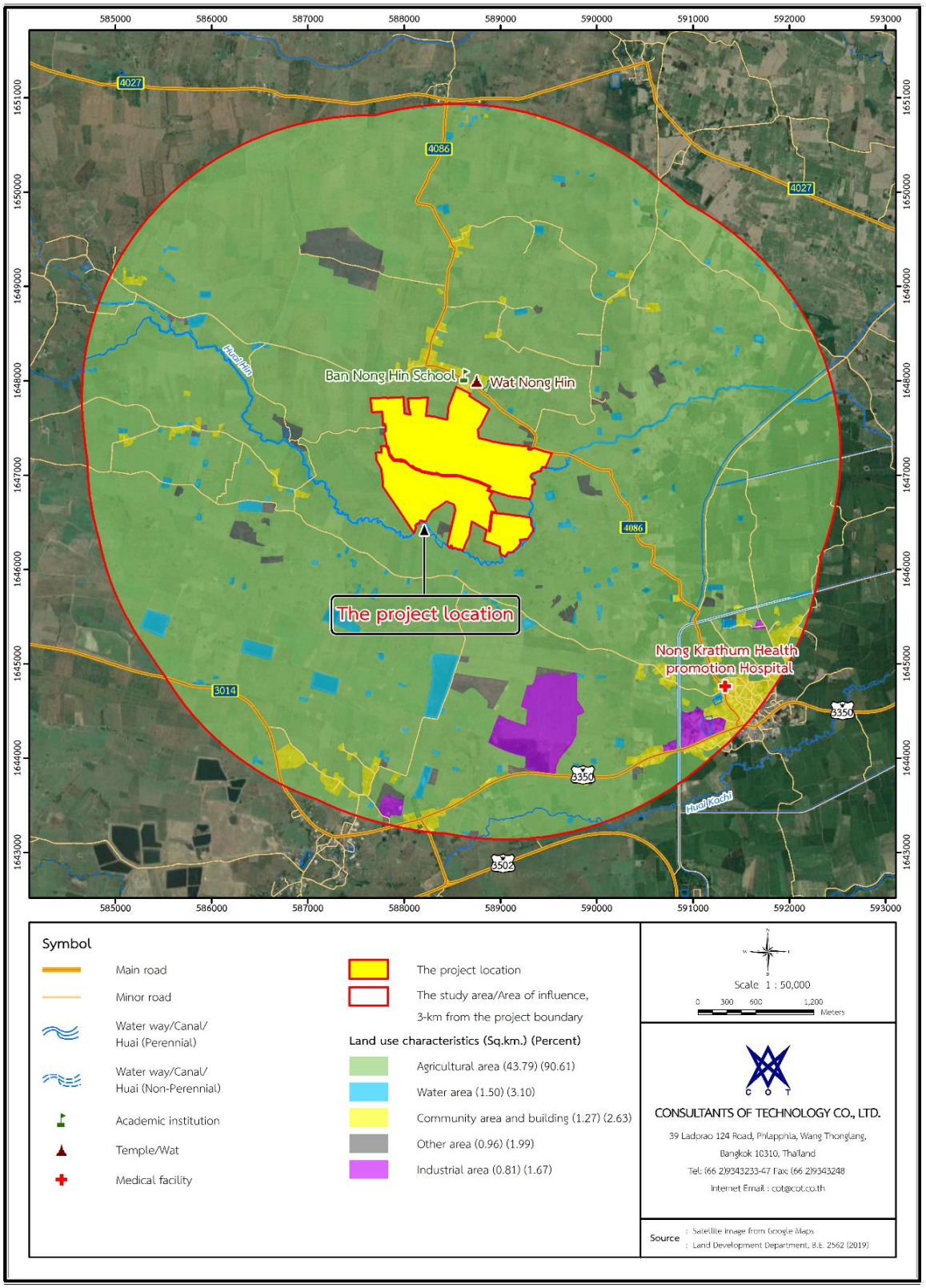


Figure 3.4.1-1 Project Location and Principal City Plan of Suphanburi, B.E. 2560 (2017)



Source: Satellite image from Google Maps and data from the Department of Land Development, B.E. 2561 (2018)

Figure 3.4.1-2 Type of Land Use in the Study Area

(3) Land Use within 100-meter Radius from the Transmission Line

The research of land use within 100-meter from transmission line route using the Geographic Information System (GIS) base map from the Department of Land Development (B.E. 2562 (2019)) and modifies satellite imagery from Google Earth. The predominant land use within the study area is agriculture (**Figure 3.4.1-3**). Regarding land use in the study area, agricultural area occupied 82.64% of the total area (**Table 3.4.1-1**). The Project site is not located within protected areas, pollution control areas, or collision-prone areas.

Table 3.4.1-1

Percentage of Land Use in the Study Area of Transmission Line

Land Use Characteristic	Area (sq.m.)	Percentage
Agricultural Area		
Sugarcane	1.44	50.00
Paddy Field	0.92	31.94
Corn	0.01	0.35
Mango	0.01	0.35
Sub-total	**2.38**	**82.64**
Non-agricultural Area		
Community	0.13	4.51
Factory	0.12	4.17
Irrigation Canal	0.10	3.47
Shrubland	0.07	2.43
River, Canal	0.03	1.04
Farm Pond	0.03	1.04
Road	0.01	0.35
Cemetery	0.01	0.35
Sub-total	**0.50**	**17.36**
Total	**2.88**	**100**

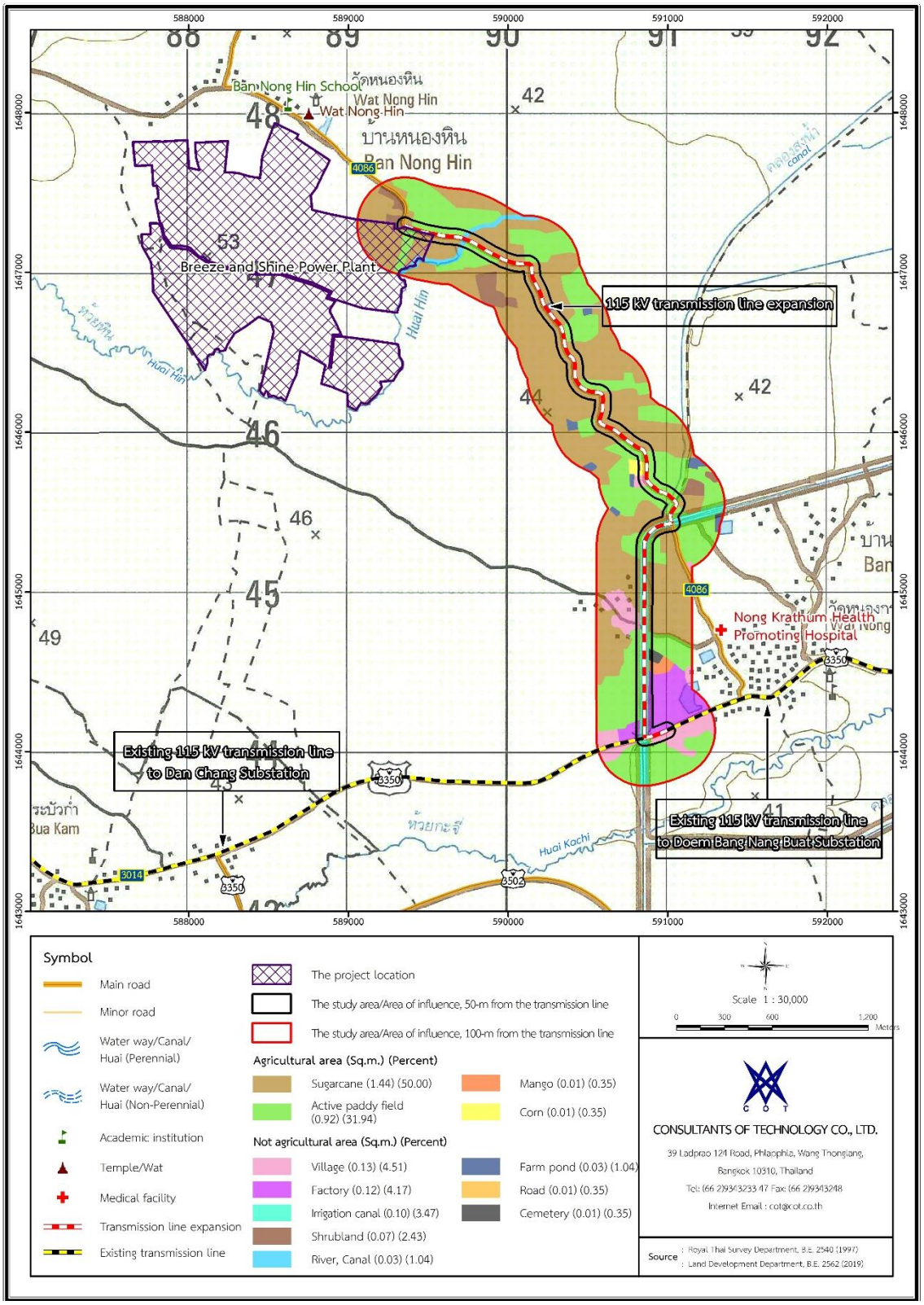


Figure 3.4.1-3 Land Use Characteristic in the Study Area of Transmission Line

In addition, survey of land use characteristic along transmission route line was carried out on October 19th, B.E. 2566 (2023). The objective of the survey is to collect baseline information of land use in the Right of Way (RoW) and nearby structure to predict initial impacts that may occur during the construction.

Based on the survey results illustrated in **Figure 3.4.1-4** and **Table 3.4.1-2** by COT, it can be observed that there was farming activity along the Right of Way (RoW). Nevertheless, the exact locations of the poles are not finalized in this stage of the study. Therefore, the total area of crops to be managed is not specified. However, due to the size of the pole (0.9 x 2.2 x 3.0 meters - width x length x depth), it requires a relatively small area in comparison with the total farming area. So, it can be estimated that the damage to crops/infrastructures in the RoW will be minimal. In summary, the 115 kV transmission line, will be constructed, operated, and maintained by PEA using the Right of Way (RoW) of public roads. Therefore, land acquisition is naturally not expected. In the event of informal settlers and crops exist, this will be managed by PEA's contractor.



Figure 3.4.1-4 Reference Observation Points

Table 3.4.1-2

Current Environment Condition Along the Project's Transmission Lines

Observation Point	Current Land Use Characteristic	Picture
L1	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
R1	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
L2	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	
R2	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	
L3	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	

Observation Point	Current Land Use Characteristic	Picture
L4	☑ Infrastructure (Hut) ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
R3	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Cassava farm)	
L5	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
L6	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Cassava farm)	
R4	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Cassava farm)	

Observation Point	Current Land Use Characteristic	Picture
L7	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	
R5	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	
R6	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	
R7	☑ Infrastructure (Hut) ☐ Informal Business ☐ Business ☐ Agricultural Area	
L8	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm, Eucalyptus plantation)	

Observation Point	Current Land Use Characteristic	Picture
L9	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Cassava farm)	
L10	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
R8	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	
L11	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	
L12	☑ Infrastructure (Hut) ☐ Informal Business ☐ Business ☐ Agricultural Area	

Observation Point	Current Land Use Characteristic	Picture
L13	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Sugarcane farm)	
R9	☐ Infrastructure ☐ Residential area ☑ Agricultural Area (Sugarcane farm)	
L14	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
R10	☑ Infrastructure (Local restaurant) ☐ Informal Business ☐ Business ☐ Agricultural Area	
R11	☑ Infrastructure (Animal stall, Concrete house with zinc roof) ☐ Informal Business ☐ Business ☐ Agricultural Area	

Observation Point	Current Land Use Characteristic	Picture
L15	☑ Infrastructure (Water pump) ☐ Informal Business ☐ Business ☐ Agricultural Area	
R12	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
L16	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
R13	☑ Infrastructure (Concrete house with zinc roof) ☐ Informal Business ☐ Business ☐ Agricultural Area	
R14	☑ Infrastructure (Hut) ☐ Informal Business ☐ Business ☐ Agricultural Area	

Observation Point	Current Land Use Characteristic	Picture
R15	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Cassava farm)	
L17	☐ Infrastructure ☐ Informal Business ☐ Business ☑ Agricultural Area (Paddy field)	
R17	☐ Infrastructure ☐ Informal Business ☐ Business ☐ Agricultural Area	
R18	☑ Infrastructure (Hut) ☐ Informal Business ☐ Business ☐ Agricultural Area	
R19	☑ Infrastructure (Hut) ☐ Informal Business ☐ Business ☐ Agricultural Area	

Observation Point	Current Land Use Characteristic	Picture
L18	☑ Infrastructure ☐ Informal Business ☐ Business ☐ Agricultural Area	
L19	☑ Infrastructure ☐ Informal Business ☐ Business ☐ Agricultural Area	
L20 (Connect with exist 115-kV transmission line)	☑ Infrastructure (Retail store) ☐ Informal Business ☐ Business ☐ Agricultural Area	 

3.4.2 Land Transportation

(1) Transportation Network in Suphanburi Province

Suphanburi Province is located approximately 107 kilometers away from Bangkok via Highway 340, a concrete road with 6 lanes (3 lanes each way). This road provides a direct connection between the northern and southern regions without having to pass through Bangkok. The transportation network within the province and between provinces is highly convenient and efficient due to continuous road improvements. Currently, the transportation infrastructure, including road and railway networks, is well-developed. The province boasts a comprehensive and efficient transportation system, including various types of passenger vehicles operating around the clock. Additionally, there is a railway route originating from Bangkok and passing through Nakhon Pathom Province before entering Suphanburi Province. The railway journey extends approximately 142 kilometers and currently offers daily services. These details are outlined in the Provincial Development Plan for Suphanburi (2023-2027) by the Suphanburi Provincial Office.

Regarding the transportation system that extends beyond the provincial boundaries, there are several major highways connecting to various provinces. These include Highway 340 (Suphanburi-Phranakhon Si Ayutthaya-Bangkok), Highway 3195 (Suphanburi-Ang Thong), Highway 321 (Suphanburi-Nakhon Pathom), and Highway 324 (Suphanburi-Kanchanaburi), among others.

For the Project located in the area of Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province, there are transportation routes passing through the area, including Highway 4086 (traffic counting point), Highway 304, and Highway 3350 (**Figure 3.4.2-1**).

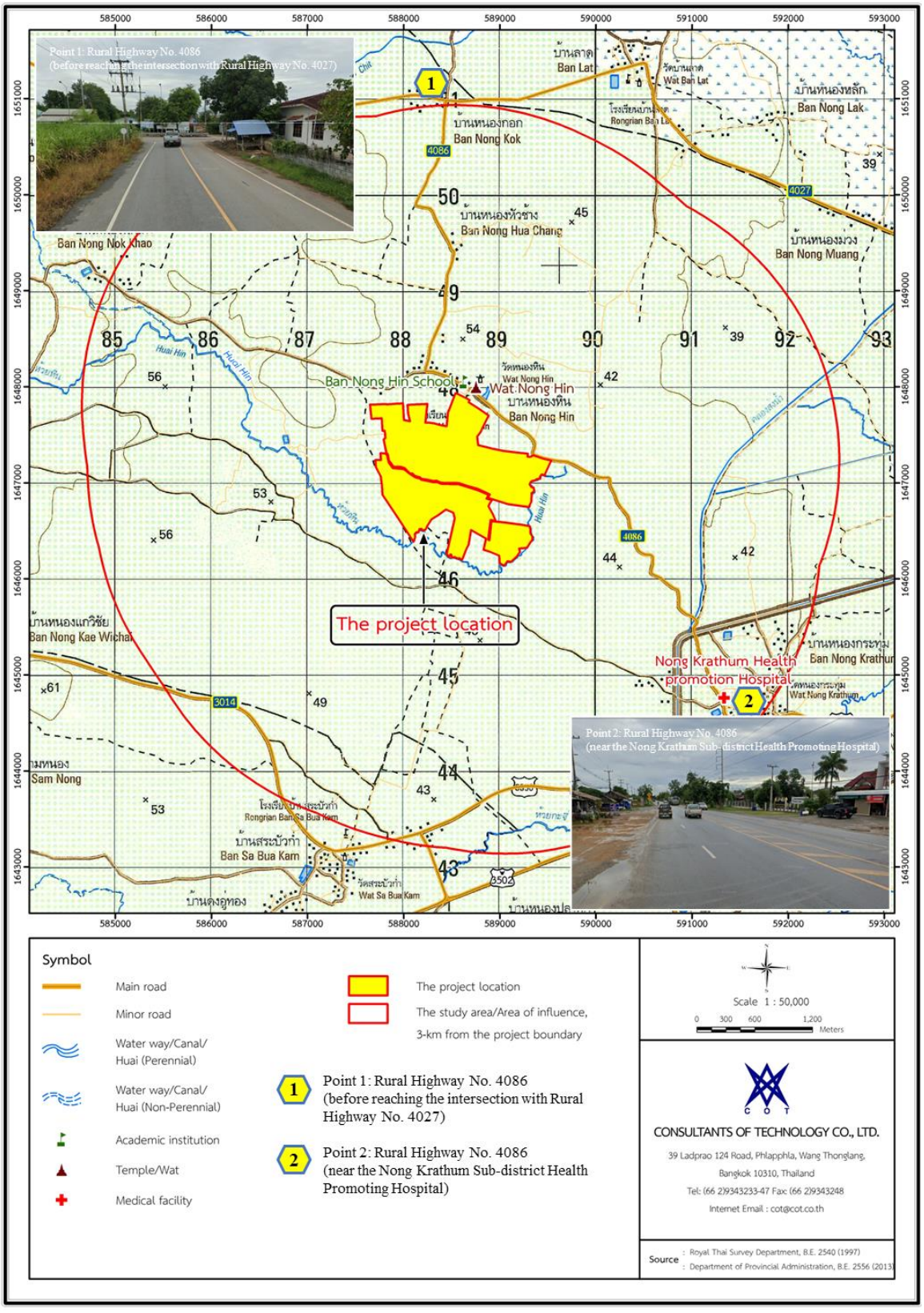


Figure 3.4.2-1 Transportation Route in the Study Area

(2) Traffic Volume from Secondary Data

The study has collected statistical traffic volume data on a daily average basis from the Bureau of Highway Safety, Department of Highway for the past three years (B.E. 2563-2565 (2020-2022)) on Highway 3350, which is a transportation route within the Project study area. They selected a traffic measurement station located at kilometer mark 3+000, which is the closest station to the Project area. The findings showed that the average daily traffic volume from B.E. 2563 (2020) to B.E. 2565 (2022) was 6,848 5,438 and 6,188 vehicles per day, respectively, as shown in **Table 3.4.2-1**. The traffic volume trends fluctuated without a consistent pattern. The vehicle type with the highest volume was cars with a seating capacity of no more than 7 people.

Table 3.4.2-1

Traffic Volume on National Highway No. 3350 (Tha Chang - Sra Bua Kam) at the 3+000 Kilometer Mark (during B.E. 2563-2565 (2020-2022))

Vehicle Types	2020		2021		2022	
	Volume	%	Volume	%	Volume	%
Motorcycle	1,544	22.55	1,002	18.42	1,615	26.09
Passenger car, less than 7 persons	1,978	28.89	1,411	25.95	1,506	24.35
Passenger car, more than 7 persons	1,827	26.68	1,097	20.16	909	14.69
Light bus	9	0.13	13	0.24	2	0.03
Medium bus	1	0.01	6	0.11	5	0.08
Heavy bus	15	0.22	17	0.31	1	0.02
Light truck (4 wheels)	687	10.03	1,404	25.82	1,696	27.41
Medium truck (6 wheels)	210	3.07	189	3.48	148	2.39
Heavy truck (10 wheels)	161	2.35	133	2.45	80	1.29
Full trailer	164	2.39	95	1.75	160	2.59
Semi-trailer	252	3.68	71	1.31	66	0.97
Total	**6,848**	**100**	**5,438**	**100**	**6,188**	**100**

(3) Traffic Volume Survey

The traffic volume on Rural Highway No. 4086 (the road leading to the project) was surveyed by conducting a traffic count for 2 days, once, covering both regular and weekend days, specifically on Friday, June 9, B.E. 2566 (2023), and Saturday, June 10, B.E. 2566 (2023). Two points of traffic volume survey are;

Point 1: Rural Highway No. 4086 before reaching the intersection with Rural Highway No. 4027, and

Point 2: Rural Highway No. 4086 near the Nong Krathum Sub-district Health Promoting Hospital

(4) Analysis of Traffic Data in the Study Area

Traffic data analysis is assessed by the traffic density on various routes and flexibility in travel. The focus is the capacity of the road network. For traffic volume calculation, the unit of each type of vehicle will be converted to a single unit equivalent to a passenger car (Passenger Car Unit: PCU Factor) according to the regulations of the Department of Highways. The details of the calibration and the summary of the car quantity calibration (cars per day) to be the same unit (PCU) are as follows.

Car types are defined into 12 categories. Each type has a multiplier of Passenger Car Equivalents (PCE) to convert it into passenger car unit (PCU), as shown in **Table 3.4.2-2**.

Table 3.4.2-2

Weight of Each Type of Vehicle

Type of vehicle	Value of Passenger Car Equivalents Factor (PCE)
Passenger cars no more than 7 passengers	1.00
Passenger cars more than 7 passengers	1.00
Light bus	1.50
Medium bus	1.50
Heavy bus	2.10
Light truck (4 wheels)	1.00
Medium truck (6 wheels)	2.10
Heavy truck (10 wheels)	2.50
Full trailer	2.50
Semi-trailer	2.50
Bicycle and tricycle	0.33
Motorcycle and motor-tricycle	0.33

Source: Bureau of Safety, Department of Highways, 2019-2023

Let V be the traffic volume (from maximum PCU units per hour) to calculate the V/C Ratio in calibration with the standard value of the Traffic Engineering Division set at a maximum of less than 0.8 (80%). The highway capacity is shown in **Table 3.4.2-3**.

Table 3.4.2-3

Highways Capacity

Types of highways	Capacity (PCU/hr)
Multi-lane roads	2,000 (per 1 lane)
2-lane roads, 2directions	2,000 (both 2 directions)
3-lane road, 2directions	4,000 (both 2 directions)

Source: Phaophong Nillachanphansri, 1997

Calculation of V/C Ratio follows this formula.

$$\text{V/C Ratio} = \frac{\text{Traffic volume increased by the project + Original traffic volume}}{\text{The highways capacity}}$$

Value V/C Ratio used to calibrate the standard value for classifying traffic conditions in the future, as shown in **Table 3.4.4-4**.

Table 3.4.4-4

The Standard Value for Classifying Traffic Conditions in The Future

Level of service	Volume Capacity Ratio (V/C Ratio)	Meaning
A	0.00-0.60	- Free-Flow Conditions are not disturbed by other factors, and the driver has high freedom in controlling the vehicle.
B	0.61-0.70	- Traffic conditions are disturbed by other factors, and the driver has less freedom in controlling the vehicle.
C	0.71-0.80	- Static traffic conditions, the driver has more difficulty control of the vehicle, making changing lanes difficult.
D	0.81-0.90	- Traffic conditions become unstable. There is a slight increase in the traffic volume, causing vehicle movement to be delayed.
E	0.91-1.00	- Traffic conditions become unstable. There is an increase in traffic, causing vehicle movement to be highly delayed.
F	> 1.00	- Traffic jam

Details of the traffic volume from the survey are as shown in **Table 3.4.2-5** (Point 1) and **Table 3.4.2-6** (Point 2). It is found that the level of service at both points are at level A - Free-Flow Conditions are not disturbed by other factors, and the driver has high freedom in controlling the vehicle.

Table 3.4.2-5
Number of Vehicles at Point 1 (Rural Highway No. 4086 before reaching the intersection with Rural Highway No. 4027)

Vehicle - Type	PCU Factor	Morning Rush Hour (7 a.m. – 8 a.m.)			Off-peak hours (9 a.m. – 10 a.m.)			Evening Rush Hour (5 p.m. – 6 p.m.)		
		Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane
Friday, June 9th, B.E. 2566 (2023)										
Passenger Car, less than 7 persons	1	6	6	3.00	1	1	0.50	7	7	3.50
Passenger Car, more than 7 persons	1	0	0	0.00	0	0	0.00	0	0	0.00
Light Bus	1.5	0	0	0.00	0	0	0.00	0	0	0.00
Medium Bus	1.5	0	0	0.00	0	0	0.00	0	0	0.00
Heavy Bus	2.1	0	0	0.00	0	0	0.00	0	0	0.00
Light Truck (4 wheels)	1	19	19	9.50	10	10	5.00	14	14	7.00
Medium Truck (6 wheels)	2.1	0	0	0.00	0	0	0.00	0	0	0.00
Heavy Truck (10 wheels)	2.5	0	0	0.00	0	0	0.00	0	0	0.00
Full Trailer	2.5	0	0	0.00	0	0	0.00	0	0	0.00
Semi-Trailer	2.5	1	3	1.25	1	3	1.25	0	0	0.00
Motorcycles	0.333	14	5	2.33	5	2	0.83	9	3	1.50
Total		**40**	**40**	**32.16**	**16.08**	**17**	**15.17**	**7.58**	**30**	**24.00**
V/C ratio		**0.02**			**0.01**			**0.02**		
Level of service		**A**			**A**			**A**		
Saturday, June 10th, B.E. 2566 (2023)										
Passenger Car, less than 7 persons	1	1	1.00	3.00	1	1	0.50	7	7	3.50
Passenger Car, more than 7 persons	1	0	0.00	0.00	0	0	0.00	0	0	0.00
Light Bus	1.5	0	0.00	0.00	0	0	0.00	0	0	0.00
Medium Bus	1.5	0	0.00	0.00	0	0	0.00	0	0	0.00
Heavy Bus	2.1	0	0.00	0.00	0	0	0.00	0	0	0.00
Light Truck (4 wheels)	1	11	11.00	9.50	10	10	5.00	14	14	7.00
Medium Truck (6 wheels)	2.1	0	0.00	0.00	0	0	0.00	0	0	0.00
Heavy Truck (10 wheels)	2.5	0	0.00	0.00	0	0	0.00	0	0	0.00
Full Trailer	2.5	0	0.00	0.00	0	0	0.00	0	0	0.00
Semi-Trailer	2.5	0	0.00	1.25	1	3	1.25	0	0	0.00
Motorcycles	0.333	17	5.66	2.33	5	2	0.83	9	3	1.50
Total		**40**	**29**	**17.66**	**17**	**15.17**	**7.58**	**30**	**24.00**	**12.00**
V/C ratio		**0.02**			**0.01**			**0.02**		
Level of service		**A**			**A**			**A**		

Table 3.4.2-6
Number of Vehicles at Point 2 (Rural Highway No. 4086 near the Nong Krathum Sub-district Health Promoting Hospital)

Vehicle - Type	PCU Factor	Morning Rush Hour (7 a.m. – 8 a.m.)			Off-peak hours (9 a.m. – 10 a.m.)			Evening Rush Hour (5 p.m. – 6 p.m.)		
		Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane
Friday, June 9th, B.E. 2566 (2023)										
Passenger Car, less than 7 persons	1	61	61	30.50	30	30	15.00	13	13	6.50
Passenger Car, more than 7 persons	1	0	0	0.00	0	0	0.00	0	0	0.00
Light Bus	1.5	0	0	0.00	0	0	0.00	0	0	0.00
Medium Bus	1.5	0	0	0.00	0	0	0.00	0	0	0.00
Heavy Bus	2.1	0	0	0.00	0	0	0.00	0	0	0.00
Light Truck (4 wheels)	1	23	23	11.50	11	11	5.50	25	25	12.50
Medium Truck (6 wheels)	2.1	3	6	3.15	2	4	2.10	1	2	1.05
Heavy Truck (10 wheels)	2.5	1	3	1.25	1	3	1.25	0	0	0.00
Full Trailer	2.5	1	3	1.25	0	0	0.00	0	0	0.00
Semi-Trailer	2.5	1	3	1.25	0	0	0.00	0	0	0.00
Motorcycles	0.333	129	43	21.48	50	17	8.33	84	28	13.99
Total		**219**	**140.76**	**70.38**	**94**	**64.35**	**32.18**	**123**	**68.07**	**34.04**
V/C ratio		**0.10**			**0.06**			**0.10**		
Level of service		**A**			**A**			**A**		
Saturday, June 10th, B.E. 2566 (2023)										
Passenger Car, less than 7 persons	1	3	3.00	1.50	7	7.00	3.50	4	4	2.00
Passenger Car, more than 7 persons	1	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Light Bus	1.5	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Medium Bus	1.5	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Heavy Bus	2.1	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Light Truck (4 wheels)	1	22	22.00	11.00	28	28.00	14.00	24	24	12.00
Medium Truck (6 wheels)	2.1	2	4.20	2.10	5	10.50	5.25	0	0	0.00
Heavy Truck (10 wheels)	2.5	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Full Trailer	2.5	0	0.00	0.00	0	0.00	0.00	1	3	1.25
Semi-Trailer	2.5	0	0.00	0.00	0	0.00	0.00	1	3	1.25
Motorcycles	0.333	48	15.98	7.99	45	14.99	7.49	43	14	7.16
Total		**75**	**45.18**	**22.59**	**85**	**60.49**	**30.24**	**73**	**48.00**	**23.66**
V/C ratio		**0.03**			**0.06**			**0.07**		
Level of service		**A**			**A**			**A**		

3.4.3 Water Use

The study of water demand in Suphanburi Province (Source: Master Plan Report, Department of Irrigation, B.E. 2561 (2018)) can be categorized into 4 types. These include: water demand for domestic and consumptive purposes, water demand for environmental conservation, water demand for agriculture, and water demand for industrial purposes. The details are as follows:

(1) Domestic and Consumptive Water Use in Households

The demand for water usage for domestic consumption is assessed based on the population and usage rate. The assessment of future demand is conducted for 5 years, 10 years, and 20 years. An analysis of population trends reveals that the current demand for water usage for domestic consumption is 46.65 million cubic meters per year and is projected to increase to 47.02, 47.39, and 48.15 million cubic meters per year over the next 5 years, 10 years, and 20 years, respectively.

(2) The Demand for Watershed Ecosystem Maintenance

The demand for water usage to maintain the watershed ecosystem is assessed through a comparison of the water requirement for maintaining the watershed ecosystem of the main river basin. This assessment is based on the report of the Data Warehouse Development Project for 25 river basins and the Flood and Drought Hydrological Analysis conducted by the Water Resources and Agricultural Resource Information Institute (WARIA) in 2012. By comparing the area of Suphanburi Province with the watershed area that covers Suphanburi, the results of the assessment indicate that the demand for water usage to maintain the watershed ecosystem in Suphanburi Province is 90.50 million cubic meters per year.

(3) Agricultural Water Demand

The water demand for agricultural purposes is assessed based on the area of agricultural land during both the rainy and dry seasons, both within and outside the irrigation area, along with the water usage rate for cultivation per rai. The water demand for agriculture within the irrigation area is evaluated from the current irrigated areas and future plans for irrigation development. For the rainy season, cultivation covers the entire irrigation area, while during the dry season, cultivation covers 50% of the irrigation area. The water demand for agriculture outside the irrigation area is assessed from the current cultivated areas outside the irrigation zone and is anticipated to remain relatively constant. The results of the assessment indicate that the water usage requirement for agricultural purposes is 3,062.31 million cubic meters per year and is projected to increase to 3,202.01, 3,228.83, and 3,274.06 million cubic meters per year over the course of 5, 10, and 20 years, respectively.

(4) Industrial Water Demand

The Department of Industrial Works and Industrial Estates has conducted an assessment of water usage requirements for industrial purposes on a provincial basis. This assessment is based on the number of registered industrial factories with the Department of Industrial Works and their water usage rates, categorized by production capacity (horsepower). The evaluation of future water demand was conducted for 5, 10, and 20-year periods, analyzing the industrial growth trends. The results indicate that the water demand for industrial purposes in the province of Suphanburi is 20.19 million cubic meters per year and is projected to increase to 21.12, 22.13, and 24.14 million cubic meters per year over the course of 5, 10, and 20 years, respectively, following the sequence.

Moreover, the Project area is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. This falls within the jurisdictional responsibility for water supply and distribution of the regional water authority, Doem Bang Nang Buat Branch. When considering the current water consumption data for domestic and household use within the community in the study area, it is found that there are a total of 11,439 water users. The raw water source for producing tap water will be drawn from Tha Chin River, with a production capacity of 11,226 cubic meters per day. The monthly water production volume is 336,783 cubic meters, the volume of produced water supplied is 331,908 cubic meters per month, and the volume of water distributed is 218,805 cubic meters per month (Regional Water Authority, Doem Bang Nang Buat Branch, data as of May B.E. 2566 (2023)). Currently, the water supply is still sufficient to adequately serve the community within the responsible area. For the project's water usage, the project received a certificate for supplying the water for use within the project from the Provincial Waterworks Authority, Dan Chang Branch (**Appendix 2-8**).

3.4.4 Electricity Use

The Provincial Electricity Authority (PEA), Doem Bang Nang Buat District, responsible for supplying electricity to the population in 14 sub-districts and 121 communities, covers an area of 561.77 square kilometers. The number of electricity users amounts to 16,000. There are two branch offices under the Doem Bang Nang Buat District, the Doem Bang Nang Buat branch and the Nong Yasai branch. Additionally, there are two power stations, namely the Doem Bang Nang Buat Power Station and the Dan Chang Power Station. These facilities sufficiently meet the electricity demands of the local population. (Source: Doem Bang Nang Buat District Provincial Electricity Authority, May B.E. 2566 (2023))

3.4.5 Solid Waste Management

Currently, Suphanburi Province has an approximate daily waste generation of 826.08 tons, with a recoverable waste amount of 357.13 tons per day. The accumulated backlog of waste is 57,431.5 tons. The 23 operational waste collection and disposal sites in Suphanburi Province including:

1) A waste collection and disposal site managed by the Municipality of Suphanburi, utilizing a sanitary landfill method for waste disposal.

2) Nineteen open-air centralized disposal sites and 2 incineration facilities for waste disposal.

3) A transportation station operated by Jedsadawannakij Ruangrueng Co., Ltd.

In addition, Suphanburi Province has a policy to support waste management through the conversion of waste into electricity. Currently, there is a project to produce electricity from converting organic waste in Suphanburi Province, with one facility operated by Uthong Plasmer Energy Co., Ltd. This facility is responsible for managing infectious organic waste within the province. Each district has designated collection points for infectious organic waste, and these waste materials are then transferred to the partnership of S. Ruangroj Saraburi Co., Ltd., for disposal. Currently, all infectious organic waste within the province is being effectively managed. For waste management information in the study area (Doem Bang Nang Buat District) is within the scope of responsibility of 5 local government organizations as shown in **Table 3.4.5-1**.

3.4.6 Disaster Prevention and Mitigation

There are 3 organizations responsible for disaster prevention and mitigation in the study area. Based on the study of disaster prevention and mitigation data from local administrative organizations in the area (**Table 3.4.6-1**), can be summarized as the following:

(1) Nong Krathum Sub-district Municipality is approximately 2.5 kilometers away from the Project area. Currently, there are 9 firefighting personnel and 50 volunteer community disaster prevention officers. They possess a firetruck with a water capacity of 6,000 cubic meters, totaling 1 vehicle.

(2) Bo Kru Sub-district Administrative Organization is approximately 10 kilometers away from the Project area. At present, there are 8 firefighting personnel and 24 volunteer community disaster prevention officers. Additionally, they have a firefighting pickup truck, totaling 1 vehicle.

(3) Nong Makhamong Sub-district Administrative Organization is approximately 12 kilometers away from the Project area. Currently, there are 5 firefighting personnel and 278 volunteer community disaster prevention officers. They own 2 firetruck vehicles and 1 patrol vehicle.

Table 3.4.5-1
Waste Management Information in Doem Bang Nang Buat District

Solid waste collection/disposal site	Management	Amount of solid waste imported (tons/day)	Amount of residual solid waste (tons)
Khao Phra Sub-district Municipality Office	Open dump	601.59	4,410
Nong Krathum Sub-district Municipality Office	Open dump	1.5	90
Bo Kru Sub-district Municipality Office	Open dump	1.5	60
Nang Buat Sub-district Municipality Office	Open dump	1.8	20
Khao Phra Sub-district Administrative Organization	Open dump	3	150

Table 3.4.6-1
Information on Equipment and Personnel of Disaster Prevention and Mitigation Units in the Study Area

Equipment/Personnel	Nong Krathum Sub-district Municipality	Bo Kru SAO	Nong Makhamong SAO
1. Distance from the Project area	2.5 km.	10 km.	12 km.
2. Firefighting Truck	-	1	-
3. Firefighting Water Tank Truck			
- Capacity: 14,000 liters	-	-	1
- Capacity: 12,000 liters	-	-	1
- Capacity: 8,000 liters	-	-	-
- Capacity: 7,000 liters	-	-	-
- Capacity: 6,000 liters	1	-	-
4. Patrol Vehicle	-	-	1
5. Emergency Response Vehicle	-	-	-
6. Other Firefighting Equipment	-	-	-
7. Fire Extinguisher Cylinder with Spray Nozzle	-	-	2
8. Three-Way Split Fire Hose Connection	-	-	1
9. Firefighting Gear	-	-	4
10. Firefighting Personnel	9	8	5
11. Volunteer Community Disaster Prevention Officers	50	24	278

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CHAPTER 4

ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACT AND RISKS

CHAPTER 4
ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACT AND RISKS

4.1 SCOPE OF IMPACT ASSESSMENT

All components located in the project area, and transmission line as associated facility, that define the range of environmental and social factors assessed in IEE. Furthermore, the following environmental resource/value impacts were analyzed for each step of project implementation:

(1) Construction Phase

During the construction phase, there will be land clearing, construction of utilities and offices. The construction of all project components will be done according to construction schedule that takes seasonal constraint into consideration. Major impact will be those associated with construction activities.

(2) Operation Phase

After construction works finish, all equipment will be installed and commissioning will be conducted, then, commercial operation of project starts.

4.1.1 Methodology for Impact Assessment and Evaluation

The approach used to assess environmental and social impacts of the project determines the intensity, extent, and duration of the anticipated potential positive or negative impact. These three qualifiers are grouped under one synthesis indicator, the significance of the impact.

The generic definitions which will be used for determination of impact significance are as follows;

- Insignificant: At this level, the activities or outcomes from the project development do not cause changes or effects, both directly and indirectly, on natural resources or environment and social. The environmental condition continues with normal function.

- Low: At this level, the activities or outcomes from the project development cause effects or benefits to the environment and social for a short time and the scope of the impacts are limited to only some areas of the project. The effect time is short and reversible naturally, or the changes are within the standard or naturally acceptable level. The impact

may cause psychological effects on people, such as disturbance. This level of environmental and social impact may be corrected with certain mitigation measures or require no measures at all.

- Moderate: At this level, the activities or outcomes from the project development cause moderate impacts or benefits to the environment compared to the standard. The affected area is relatively wide, but limited within the project area. The activities occur at several stages of the project and the effects take a long time, yet impermanently. Some activities affect natural resources, people's health, and social, but not at the life-threatening level. Certain mitigation measures can reduce the impact.

- High: At this level, the activities or outcomes from the project development cause impacts or benefits to the environment at a greater level than the standard or cause changes to natural resources, environment, and social severely or permanently. The effects are widespread to people outside at a life-threatening level. Mitigation measures cannot reduce the impact or make such affected natural resources to their original condition.

4.2 SOLAR POWER PLANT

4.2.1 Physical Conditions

4.2.1.1 Air Quality

(1) Construction Phase

The impact on air quality during the construction phase is primarily attributed to two types of activities: dust particles generated from construction activities and pollutants emitted by machinery used in construction activities. Most of the dust particles generated can easily settle within the construction area, limiting their distribution to that area. This directly affects the construction workers. However, the project does not involve activities that would significantly disturb the soil surface. Instead, the activities mainly involve adjusting the terrain to achieve a consistent level. Furthermore, these activities have a relatively short duration.

According to U.S.EPA, AP-42, 1955, suspended particle generation in construction area depends on the activities. The Project only has an activity to level the land. Using soil formation information, soil moisture content, climate, and duration of the activity to plug the value in Box Model will give the estimated dust during different activities.

$C = Q / dwM$

Where C = Dust concentration (mg/m^3)

Q = Dust generation rate at the origin (mg/s)

d = Area width perpendicular to wind direction (m)

w = Yearly average wind speed (m/s) This project use 1.8 m/s or 0.93 m/s (source: 30-year average wind speed data from Suphanburi Meteorology Office from 1992 to 2021)

M = The mixing height, which is the height of the atmosphere where pollutants are mixed with the air (in meters), considering the lowest monthly average value near the project area, is the highest at the Bang Na Agrometeorological Station in BE 2564, with a value of 541.37 meters (**Table 4.2.1.1-1**)

Table 4.2.1.1-1

Mixing Height from Bang Na Agrometeorological in B.E. 2564, under the Thai Meteorological Department

Month	Mixing Height (meters)
January	681.79
February	598.72
March	780.98
April	657.54
May	732.82
June	743.61
July	830.48
August	883.50
September	694.97
October	702.39
November	659.30
December	**541.37**

Source: Analyzed by the Faculty of Environment, Kasetsart University, certified by the Ozone and Radiation Center, Thai Meteorological Department, in B.E. 2565 (2022).

U.S.EPA, AP-42, 1955 provides suspended particle generation rate in a construction area to be 1.2 ton/acre/month, equivalent to 9.88 g/m^2/day. Thus, the dust generation rate during the construction phase, working 8 hour/day equal to;

$$Q = \frac{9.88\ g/m^2/day \times 6{,}735\ m^2 \times 1000\ mg}{8\ hr/day \times 60\ second \times 60\ minute}$$

$$Q = 2{,}310.48\ mg/s$$

Plug the value Q = 2,310.48 mg/s into the Box Model, resulting in dust concentration of;

$$C = \frac{2{,}310.48\ mg/s}{40\ m \times 0.93\ m/s \times 541.37\ m}$$

$$C = 0.115\ mg/m^3$$

Therefore, the estimated Total Suspended Particulates (TSP) resulting from the project's site adjustment activities is approximately 0.115 milligrams per cubic meter. The maximum background concentration of TSP from the measurement value as illustrated in **Chapter 3** was 0.076 mg/m^3 at Ban Nong Hin School. After plugged in calculation value of 0.115 mg/m^3 with the background concentration, the total concentration of TSP is 0.191 mg/m^3. Based on the calculation, the quantity of dust particles generated from these activities which is within the standard limit, which is set at no more than 0.33 milligrams per cubic meter (National Environmental Committee Announcement No. 24, B.E. 2547 (2000)). There is no ambient air quality standard limit set for TSP in the IFC General EHS Guidelines.

During construction phase, most of the dust particles generated are coarse and can settle quickly to the ground, limiting their dispersion to the construction site area. The primary impact is on the construction workers working in that vicinity. However, the project has environmental impact prevention and mitigation measures in place, along with monitoring and follow-up procedures to ensure that environmental impacts remain at a low level.

(2) Operation Phase

During the operation phase, solar energy (solar intensity) will be used to generate electricity. There will be no sources of continuous air pollution from the project operations. No air pollution impact during operation phase is anticipated.

4.2.1.2 Noise

Assessment Methodology

(1) Impact from Noise Level

The impact from the noise level considers the Leq-24hr measurement value in the receptor area. The result of the noise level will be compared with the standards set by the National Environmental Board's Announcement No. 15 (B.E. 2540 (1997)), which specifies general noise level standards. The average 24-hour noise level should not exceed 70 dBA. There are three following steps to evaluate the noise level that the receptor receives from the construction activities;

1) Evaluating the noise level attenuated by distance at the observation point using **Equation (1)**.

$$Lp_2 = Lp_1 - 20\log R_2/R_1 \quad \textbf{(1)}$$

Where; Lp_2 = Noise level at distance from the noise source
Lp_1 = Reference noise level of the activity
R_1 = Distance measuring reference noise level
R_2 = Distance from noise source to the receptor

2) Assessing the noise level from project activities in conjunction with the currently measured noise level at the observation point using **Equation (2)**.

$$Lp_{total} = 10 \log (Lp1/10 + Lp2/10) \quad \textbf{(2)}$$

Where; Lp1 = Baseline noise level (Worst case)
Lp2 = Calculate noise from the activity

3) Assessing the noise level from project activities at the desired time interval using **Equation (3)**.

$$Leq_T = Lp + 10 \log t/T \quad \textbf{(3)}$$

Where; Leq_T = The noise level that occurs within the desired time interval, in dBA

Lp = The noise level generated from the source, in dBA

t = The duration of the noise generated from the source, in hours

T = The desired time interval for which the noise level needs to be known, in hours

(2) Annoyance Noise

The assessment of annoyance noise based on the guidelines provided by the Pollution Control Department's National Environmental Committee Announcement Re: Methods for measuring ambient noise levels, the noise level in the absence of annoyance, noise measurement and calculation, annoyance noise level calculation, and noise measurement recording forms in B.E. 2565 (2022). There are seven steps in the evaluating annoyance noise level as summarized in **Table 4.2.1.2-1**.

Table 4.2.1.2-1

Evaluation of Noise Annoyance Level

Step	Detail	Note
1	Gather of noise level data in the absence of annoyance at various observation points. The data used in this assessment includes equivalent noise level (Leq), background noise level (L90) by using 1-hr interval during day time and 5-minute interval during the night time.	Leq = A L90 = B
2	Evaluate the noise level at the receptor by calculating the noise levels from project-related noise sources, attenuated by the distance and obstruction/barrier, by using **Equation (1)**. **$Lp_2 = Lp_1 - 20 \log R_2/R_1$ (1)**	Lp_2 = C
3	Evaluate the total noise level during the construction activities at the receptor, by using **Equation (2)**. **$Lp_{total} = 10 \log (Lp1/10 + Lp2/10)$ (2)**	Lp_{total} = D
4	Calculate the noise level during annoyance by using **Equation (3)**. **$Leq,Tr = [10 \log (10^{0.1Leq,Ts} - 10^{0.1Leq,R})] + 10 \log (Ts/Tr)$ (3)** Where; Leq, Tr = Noise level during disturbances, in dBA Leq, Ts = Noise level when sound from noise sources occurs, in dBA Leq, R = Noise level in the absence of disturbances, in dBA Ts = Duration of the period when noise sources occur, in minutes Tr = Reference time used for calculating the noise level during disturbances, in minutes	Leq,Tr = E
5	Adjustments are made in various cases as follows; - +3 dBA for areas requiring quietness and during night time.	F = E+3 dBA G = E+5 dBA

Step	Detail	Note
	- +5 dBA for cases where the noise originates from sources with sharp echoes or vibrations.	
6	Evaluate the annoyance noise level using **Equation (4)**. **Annoyance noise level = Noise level in the presence of annoyance – Background noise level (L90)_____(4)** If the result exceeds 10 dBA, the noise level from the construction activities is considered annoyance noise level.	H = E-B < 10
7	If the result exceeds 10 dBA, additional measures should be considered to reduce noise levels from the source, and reevaluation should be conducted from steps 2 to 6 until the annoyance level is within acceptable limits.	-

Receptor (Sensitive Area)

Ban Nong Hin School is considered a noise receptor because it is a sensitive area and is located closest to the Project, approximately 20 meters away from the Project boundary. In addition, there are also households located to the north of the Project (**Figure 4.2.1.2-1**). The nearest one is approximately 140 meters from the Project boundary. However, the Project designs to locate the solar panels at a setback distance of 100 meters from the boundary. As a result, both receptors, Ban Nong Hin School and Farm Dwelling, are located approximately 120, and 240 meters away from the noise source.

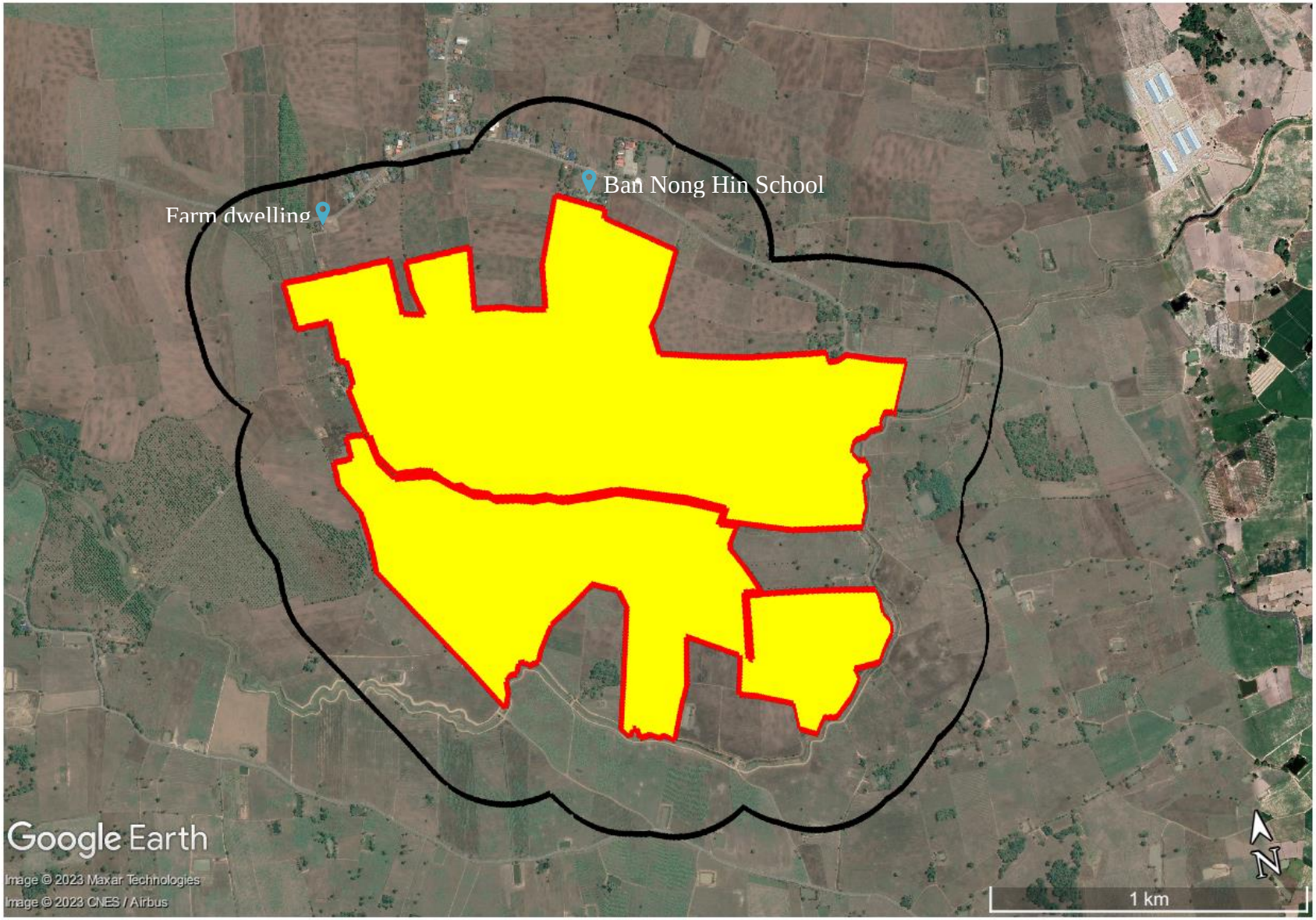


Figure 4.2.1.2-1 Noise Receptors

Assessment

(1) Construction Phase

1) Noise Sources

Activities during the construction phase that may generate disturbing noise to the lives and well-being of nearby residents in the Project area include the construction of structures for installing solar panels and building construction using percussion piling method. Construction processes can be generally divided into ground clearing, excavation, foundation, erection, and finishing. Each step involves different equipment, creating its own noise characteristics. Variations in noise levels occur at each step. A representative source level is determined for each phase based on reference data. **Table 4.2.1.2-2** presents a reference noise level at construction site at each step of construction process.

During the 8-hour construction period, not all machinery operates simultaneously. Therefore, Case II (minimum require equipment present at site) is used in the calculation. 83 dBA at a distance of 15 meters from the source is chose as a reference noise level in this assessment because it is the highest noise level generated from the construction of the Project (U.S. EPA 1971).

Table 4.2.1.2-2
Typical Ranges of Noise Levels at Construction Sites with a 50 dB(A) Ambient Typical of Suburban Residential Areas

Construction stages	Building/Construction type							
	Residential Building		Office, Hotel, School, and Utilities		Industrial factory, parking areas, mall, and service station		road, highway, and water drainage system	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundation	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

Remark: I = All pertinent equipment presents at site
II = Minimum require equipment present at site
Source: Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, U.S. EPA 1971

2) Evaluate Equivalent Noise Level

Then, evaluate the noise level that the receptors shall receive during construction following **Equation (1)** to **Equation (3)** and compare the result of evaluation with the national and international standards. The results can be shown in **Table 4.2.1.2-3**. The results show that during construction, difference noise levels that the receptors shall receive are 1.6 and 0.5 dBA, respectively compliance with the value prescribed in EHS guideline (not over 3 dBA).

Table 4.2.1.2-3

Noise Level Evaluation at the Receptors (without noise barrier equipped)

Receptor 1: Ban Nong Hin School	Receptor 2: Farm Dwelling
Noise Source = 83 dBA (at 15 m.) Distance = 120 m.	Noise Source = 83 dBA (at 15 m.) Distance = 240 m.
Evaluating Leq-1 hr. (Daytime) $Lp_2 = Lp_1 - 20 \log R_2/R_1$ $= 83 - 20 \log (120/15)$ $=$ **64.9 dBA** Highest Leq 1-hr (Daytime) baseline data = 68.5 dBA $Lp_{total} = 10 \log (10^{Lp1/10}+10^{Lp2/10})$ $= 10 \log (10^{64.9/10} + 10^{68.5/10})$ $=$ **70.1 dBA** Diff = 70.1 – 68.5 = 1.6 **dBA** **Compliance with EHS Guideline, difference noise level not over 3 dBA**	**Evaluating Leq-1 hr. (Daytime)** $Lp_2 = Lp_1 - 20 \log R_2/R_1$ $= 83 - 20 \log (240/15)$ $=$ **58.9 dBA** Highest Leq 1-hr (Daytime) baseline data = 68.5 dBA $Lp_{total} = 10 \log (10^{Lp1/10}+10^{Lp2/10})$ $= 10 \log (10^{58.9/10} + 10^{68.5/10})$ $=$ **69.0 dBA** Diff = 69.0 – 68.5 = 0.5 **dBA** **Compliance with EHS Guideline, difference noise level not over 3 dBA**
Evaluating Leq-24 hr. $Lp_2 = Lp_1 - 20 \log R_2/R_1$ $= 83 - 20 \log (120/15)$ $=$ **64.9 dBA** Highest Leq-24 hr baseline data = 59.0 dBA $Lp_{total} = 10 \log (10^{Lp1/10}+10^{Lp2/10})$ $= 10 \log (10^{64.9/10} + 10^{59.0/10})$ $=$ **65.9 dBA** **Compliance with national standard, <70.0 dBA**	**Evaluating Leq-24 hr.** $Lp_2 = Lp_1 - 20 \log R_2/R_1$ $= 83 - 20 \log (240/15)$ $=$ **58.9 dBA** Highest Leq-24 hr baseline data = 59.0 dBA $Lp_{total} = 10 \log (10^{Lp1/10}+10^{Lp2/10})$ $= 10 \log (10^{58.9/10} + 10^{59.0/10})$ $=$ **62.0 dBA** **Compliance with national standard, <70.0 dBA**

3) Evaluate Annoyance Noise

The calculated annoyance noise at the receptor during construction activities (**Table 4.2.1.2-4** and **Table 4.2.1.2-5**) falls within the range of 8.3-32.1 dBA at Ban Nong Hin School, and within the range of 2.3-25.9 dBA. When compared to the standards set by the National Environmental Board's Announcement No. 29 (B.E. 2550 (2007)) regarding annoyance noise levels, it is noted that most values do not meet the standard. The impact is considered moderate; therefore, it is recommended that the Project shall install noise barriers during construction activities.

Table 4.2.1.2-4

Annoyance Noise Levels from Construction Activities of the Project (Ban Nong Hins School)

Time		Measurement value		Noise level at the receptor			Adjusting the noise level	Annoyance level during construction 4/	Result
		(Leq 1 hr)	(L_{90})	Attenuated noise level from the project 1/	Total noise level during the construction activity 2/	Noise level in the presence of annoyance 3/	+ 5 dbA for noise originates from sources with sharp echoes or vibrations		
		A	B	C	D	E	F	H = F-B	
DAY 1	08:00-09:00	48.4	42.6	64.9	65.0	64.9	69.9	27.3	Failed
	09:00-10:00	49.9	43.8	64.9	65.0	64.9	69.9	26.1	Failed
	10:00-11:00	49.1	42.6	64.9	65.0	64.9	69.9	27.3	Failed
	11:00-12:00	49.7	43.5	64.9	65.0	64.9	69.9	26.4	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	50.3	42.4	64.9	65.0	64.9	69.9	27.5	Failed
	14:00-15:00	49.3	42.4	64.9	65.0	64.9	69.9	27.5	Failed
	15:00-16:00	48.9	38.3	64.9	65.0	64.9	69.9	31.6	Failed
	16:00-17:00	54.0	42.1	64.9	65.2	64.9	69.9	27.8	Failed
DAY 2	08:00-09:00	50.0	45.7	64.9	65.0	64.9	69.9	24.2	Failed
	09:00-10:00	51.8	46.3	64.9	65.1	64.9	69.9	23.6	Failed
	10:00-11:00	50.5	43.9	64.9	65.1	64.9	69.9	26.0	Failed
	11:00-12:00	50.2	44.0	64.9	65.0	64.9	69.9	25.9	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	47.4	39.8	64.9	65.0	64.9	69.9	30.1	Failed
	14:00-15:00	47.6	40.7	64.9	65.0	64.9	69.9	29.2	Failed
	15:00-16:00	51.6	43.7	64.9	65.1	64.9	69.9	26.2	Failed
	16:00-17:00	53.7	45.5	64.9	65.2	64.9	69.9	24.4	Failed
DAY 3	08:00-09:00	53.7	45.4	64.9	65.2	64.9	69.9	24.5	Failed
	09:00-10:00	49.8	42.5	64.9	65.0	64.9	69.9	27.4	Failed
	10:00-11:00	49.4	42.6	64.9	65.0	64.9	69.9	27.3	Failed
	11:00-12:00	49.6	41.3	64.9	65.0	64.9	69.9	28.6	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	46.9	40.3	64.9	65.0	64.9	69.9	29.6	Failed
	14:00-15:00	49.6	41.6	64.9	65.0	64.9	69.9	28.3	Failed
	15:00-16:00	50.8	44.8	64.9	65.1	64.9	69.9	25.1	Failed
	16:00-17:00	50.0	42.9	64.9	65.0	64.9	69.9	27.0	Failed
DAY 4	08:00-09:00	49.4	41.9	64.9	65.0	64.9	69.9	28.0	Failed
	09:00-10:00	50.3	40.3	64.9	65.0	64.9	69.9	29.6	Failed
	10:00-11:00	52.4	46.9	64.9	65.1	64.9	69.9	23.0	Failed
	11:00-12:00	48.1	39.1	64.9	65.0	64.9	69.9	30.8	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	46.2	38.7	64.9	65.0	64.9	69.9	31.2	Failed
	14:00-15:00	47.4	37.9	64.9	65.0	64.9	69.9	32.0	Failed
	15:00-16:00	51.5	45.3	64.9	65.1	64.9	69.9	24.6	Failed
	16:00-17:00	52.3	42.5	64.9	65.1	64.9	69.9	27.4	Failed
DAY 5	08:00-09:00	63.0	48.9	64.9	67.1	64.9	69.9	21.0	Failed
	09:00-10:00	50.7	43.0	64.9	65.1	64.9	69.9	26.9	Failed
	10:00-11:00	54.0	47.0	64.9	65.2	64.9	69.9	22.9	Failed
	11:00-12:00	48.8	40.5	64.9	65.0	64.9	69.9	29.4	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	46.8	39.0	64.9	65.0	64.9	69.9	30.9	Failed
	14:00-15:00	49.7	40.1	64.9	65.0	64.9	69.9	29.8	Failed
	15:00-16:00	47.6	38.4	64.9	65.0	64.9	69.9	31.5	Failed
	16:00-17:00	49.5	38.0	64.9	65.0	64.9	69.9	31.9	Failed
DAY 6	08:00-09:00	53.3	46.8	64.9	65.2	64.9	69.9	23.1	Failed
	09:00-10:00	52.5	41.0	64.9	65.1	64.9	69.9	28.9	Failed
	10:00-11:00	50.1	40.3	64.9	65.0	64.9	69.9	29.6	Failed
	11:00-12:00	50.0	37.8	64.9	65.0	64.9	69.9	32.1	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	63.7	59.0	64.9	67.4	64.9	69.9	10.9	Failed
	14:00-15:00	60.1	53.5	64.9	66.1	64.9	69.9	16.4	Failed
	15:00-16:00	49.0	40.6	64.9	65.0	64.9	69.9	29.3	Failed
	16:00-17:00	65.5	60.4	64.9	68.2	64.9	69.9	9.5	Pass
DAY 6	08:00-09:00	56.0	51.8	64.9	65.4	64.9	69.9	18.1	Failed
	09:00-10:00	50.4	41.8	64.9	65.1	64.9	69.9	28.1	Failed
	10:00-11:00	49.8	40.9	64.9	65.0	64.9	69.9	29.0	Failed
	11:00-12:00	59.6	52.8	64.9	66.0	64.9	69.9	17.1	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	59.7	54.0	64.9	66.0	64.9	69.9	15.9	Failed
	14:00-15:00	53.3	43.8	64.9	65.2	64.9	69.9	26.1	Failed
	15:00-16:00	61.4	57.1	64.9	66.5	64.9	69.9	12.8	Failed
	16:00-17:00	68.5	61.6	64.9	70.1	64.9	69.9	8.3	Pass
	Standard	-						10.0	

Remark: 1/ The noise level from the Project at the receptor is calculated using Equation (1).
2/ The total noise level at the receptor or the noise level during annoyance is calculated using Equation (2).
3/ Calculate the noise level during annoyance according to Equation (4).
4/ Annoyance noise level = Noise level during annoyance (after adjustments) – Background noise level.
5/ 24-hour equivalent noise level standards as per the National Environmental Committee Announcement No. 15 (1997) and Announcement No. 29 (2007) on Noise Disturbance Levels.

Source: Consultants of Technology Company Limited, B.E. 2566 (2013).

Table 4.2.1.2-5

Annoyance Noise Levels from Construction Activities of the Project (Farm Dwelling)

Time		Measurement value		Noise level at the receptor			Adjusting the noise level	Annoyance level during construction 4/	Result
		(Leq 1 hr)	(L_{90})	Attenuated noise level from the project 1/	Total noise level during the construction activity 2/	Noise level in the presence of annoyance 3/	+ 5 dbA for noise originates from sources with sharp echoes or vibrations		
		A	B	C	D	E	F	H = F-B	
DAY 1	08:00-09:00	48.4	42.6	58.9	59.3	58.9	63.9	21.3	Failed
	09:00-10:00	49.9	43.8	58.9	59.4	58.9	63.9	20.1	Failed
	10:00-11:00	49.1	42.6	58.9	59.3	58.9	63.9	21.3	Failed
	11:00-12:00	49.7	43.5	58.9	59.4	58.9	63.9	20.4	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	50.3	42.4	58.9	59.5	58.9	63.9	21.5	Failed
	14:00-15:00	49.3	42.4	58.9	59.4	58.9	63.9	21.5	Failed
	15:00-16:00	48.9	38.3	58.9	59.3	58.9	63.9	25.6	Failed
	16:00-17:00	54.0	42.1	58.9	60.1	58.9	63.9	21.8	Failed
DAY 2	08:00-09:00	50.0	45.7	58.9	59.4	58.9	63.9	18.2	Failed
	09:00-10:00	51.8	46.3	58.9	59.7	58.9	63.9	17.6	Failed
	10:00-11:00	50.5	43.9	58.9	59.5	58.9	63.9	20.0	Failed
	11:00-12:00	50.2	44.0	58.9	59.4	58.9	63.9	19.9	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	47.4	39.8	58.9	59.2	58.9	63.9	24.1	Failed
	14:00-15:00	47.6	40.7	58.9	59.2	58.9	63.9	23.2	Failed
	15:00-16:00	51.6	43.7	58.9	59.6	58.9	63.9	20.2	Failed
	16:00-17:00	53.7	45.5	58.9	60.0	58.9	63.9	18.4	Failed
DAY 3	08:00-09:00	53.7	45.4	58.9	60.0	58.9	63.9	18.5	Failed
	09:00-10:00	49.8	42.5	58.9	59.4	58.9	63.9	21.4	Failed
	10:00-11:00	49.4	42.6	58.9	59.4	58.9	63.9	21.3	Failed
	11:00-12:00	49.6	41.3	58.9	59.4	58.9	63.9	22.6	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	46.9	40.3	58.9	59.2	58.9	63.9	23.6	Failed
	14:00-15:00	49.6	41.6	58.9	59.4	58.9	63.9	22.3	Failed
	15:00-16:00	50.8	44.8	58.9	59.5	58.9	63.9	19.1	Failed
	16:00-17:00	50.0	42.9	58.9	59.4	58.9	63.9	21.0	Failed
DAY 4	08:00-09:00	49.4	41.9	58.9	59.4	58.9	63.9	22.0	Failed
	09:00-10:00	50.3	40.3	58.9	59.5	58.9	63.9	23.6	Failed
	10:00-11:00	52.4	46.9	58.9	59.8	58.9	63.9	17.0	Failed
	11:00-12:00	48.1	39.1	58.9	59.2	58.9	63.9	24.8	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	46.2	38.7	58.9	59.1	58.9	63.9	25.2	Failed
	14:00-15:00	47.4	37.9	58.9	59.2	58.9	63.9	26.0	Failed
	15:00-16:00	51.5	45.3	58.9	59.6	58.9	63.9	18.6	Failed
	16:00-17:00	52.3	42.5	58.9	59.8	58.9	63.9	21.4	Failed
DAY 5	08:00-09:00	63.0	48.9	58.9	64.4	58.9	63.9	15.0	Failed
	09:00-10:00	50.7	43.0	58.9	59.5	58.9	63.9	20.9	Failed
	10:00-11:00	54.0	47.0	58.9	60.1	58.9	63.9	16.9	Failed
	11:00-12:00	48.8	40.5	58.9	59.3	58.9	63.9	23.4	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	46.8	39.0	58.9	59.2	58.9	63.9	24.9	Failed
	14:00-15:00	49.7	40.1	58.9	59.4	58.9	63.9	23.8	Failed
	15:00-16:00	47.6	38.4	58.9	59.2	58.9	63.9	25.5	Failed
	16:00-17:00	49.5	38.0	58.9	59.4	58.9	63.9	25.9	Failed
DAY 6	08:00-09:00	53.3	46.8	58.9	60.0	58.9	63.9	17.1	Failed
	09:00-10:00	52.5	41.0	58.9	59.8	58.9	63.9	22.9	Failed
	10:00-11:00	50.1	40.3	58.9	59.4	58.9	63.9	23.6	Failed
	11:00-12:00	50.0	37.8	58.9	59.4	58.9	63.9	26.1	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	63.7	59.0	58.9	64.9	58.9	63.9	4.9	Pass
	14:00-15:00	60.1	53.5	58.9	62.6	58.9	63.9	10.4	Failed
	15:00-16:00	49.0	40.6	58.9	59.3	58.9	63.9	23.3	Failed
	16:00-17:00	65.5	60.4	58.9	66.4	58.9	63.9	3.5	Pass
DAY 6	08:00-09:00	56.0	51.8	58.9	60.7	58.9	63.9	12.1	Failed
	09:00-10:00	50.4	41.8	58.9	59.5	58.9	63.9	22.1	Failed
	10:00-11:00	49.8	40.9	58.9	59.4	58.9	63.9	23.0	Failed
	11:00-12:00	59.6	52.8	58.9	62.3	58.9	63.9	11.1	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	59.7	54.0	58.9	62.3	58.9	63.9	9.9	Pass
	14:00-15:00	53.3	43.8	58.9	60.0	58.9	63.9	20.1	Failed
	15:00-16:00	61.4	57.1	58.9	63.3	58.9	63.9	6.8	Pass
	16:00-17:00	68.5	61.6	58.9	69.0	58.9	63.9	2.3	Pass
	Standard	-						10.0	

Remark: 1/ The noise level from the Project at the receptor is calculated using Equation (1).
2/ The total noise level at the receptor or the noise level during annoyance is calculated using Equation (2).
3/ Calculate the noise level during annoyance according to Equation (4).
4/ Annoyance noise level = Noise level during annoyance (after adjustments) – Background noise level.
5/ 24-hour equivalent noise level standards as per the National Environmental Committee Announcement No. 15 (1997) and Announcement No. 29 (2007) on Noise Disturbance Levels.

Source: Consultants of Technology Company Limited, B.E. 2566 (2013).

4) Installation of Project Noise Barriers

Within the construction area of the Project, there are sensitive receptors, notably Ban Nong Hin School, Wat Nong Hin, and farm dwelling at the north of the Project located nearby. To mitigate potential impacts from construction activities, the Project has decided to install temporary noise barriers, 2 meters in height, 160 meters along the side facing Ban Nong Hin School and 300 meters along the side facing farm dwelling (**Figure 4.2.1.2-2**) before commencing construction. These barriers are Steel, 18 ga or other materials with a sound transmission loss greater than 25 dBA (**Table 4.2.1.2-6**). This measure aims to reduce the noise impact resulting from the Project's construction activities.

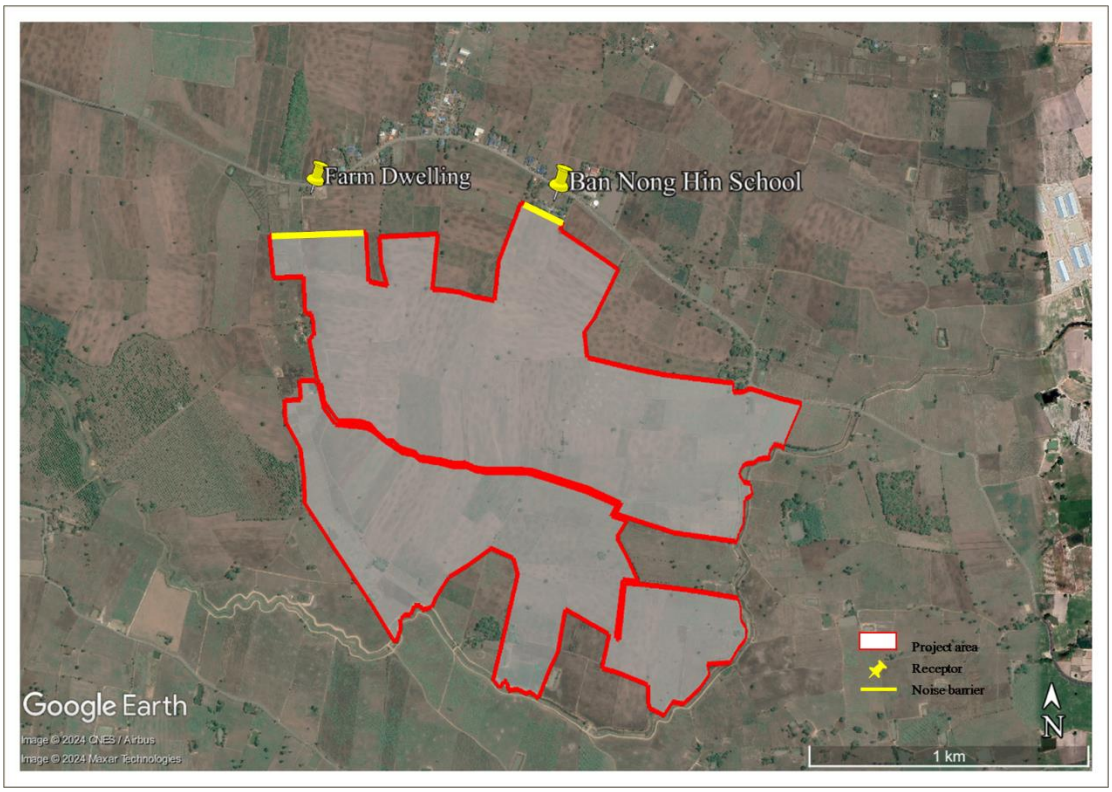


Figure 4.2.1.2-2 Picture Shows Project's Noise Barrier

Table 4.2.1.2-6

Transmission Loss of Different Noise Absorption Material

Material	Thickness (mm)	Surface Density (Kg/m^2)	Transmission Loss* (dB)
Polycarbonate	8-12	10-14	30-33
Acrylic (Poly-Methyl-Acrylate (PPMA)	15	18	32
Concrete block 200x200x400 light weight	200	151	34
Dense concrete	100	244	40
Light concrete	150	244	39
Light concrete	100	161	36
Brick	150	288	40
Steel, 18 ga	1.27	9.8	25
Steel, 20 ga	0.95	7.3	22

Material	Thickness (mm)	Surface Density (Kg/m^2)	Transmission Loss* (dB)
Steel, 22 ga	0.79	6.1	20
Steel, 24 ga	0.64	4.9	18
Aluminium sheet	1.59	4.4	23
Aluminium sheet	3.18	8.8	25
Aluminium sheet	6.35	17.1	27
Wood	25	18	21
Plywood	13	8.3	20
Plywood	25	16.1	23
Absorptive panels with polyester film backed by sheet	50-125	20-30	30-47

Remark: * Value assuming no openings or gaps in the barriers
Source: Environmental Protection Department and Highway Department, Government of the Hong Kong SAR., 2003

During the construction phase, the contractor is stipulated to install temporary noise barriers with the capability of reducing noise transmission loss by more than 10 dBA. Therefore, the noise level at the receptor represents the specific noise level that cross barriers, which can be calculated by using the Fresnel Number **Equation (5)**. The reference distance used in the calculation is as shown in **Figure 4.2.1.2-3**. Subsequently, the Fresnel Number (N_0) is used to find the reduced noise level, as determined by examining the graph depicting the relationship between the Fresnel Number and the reduced noise level, as illustrated in **Figure 4.2.1.2-4**.

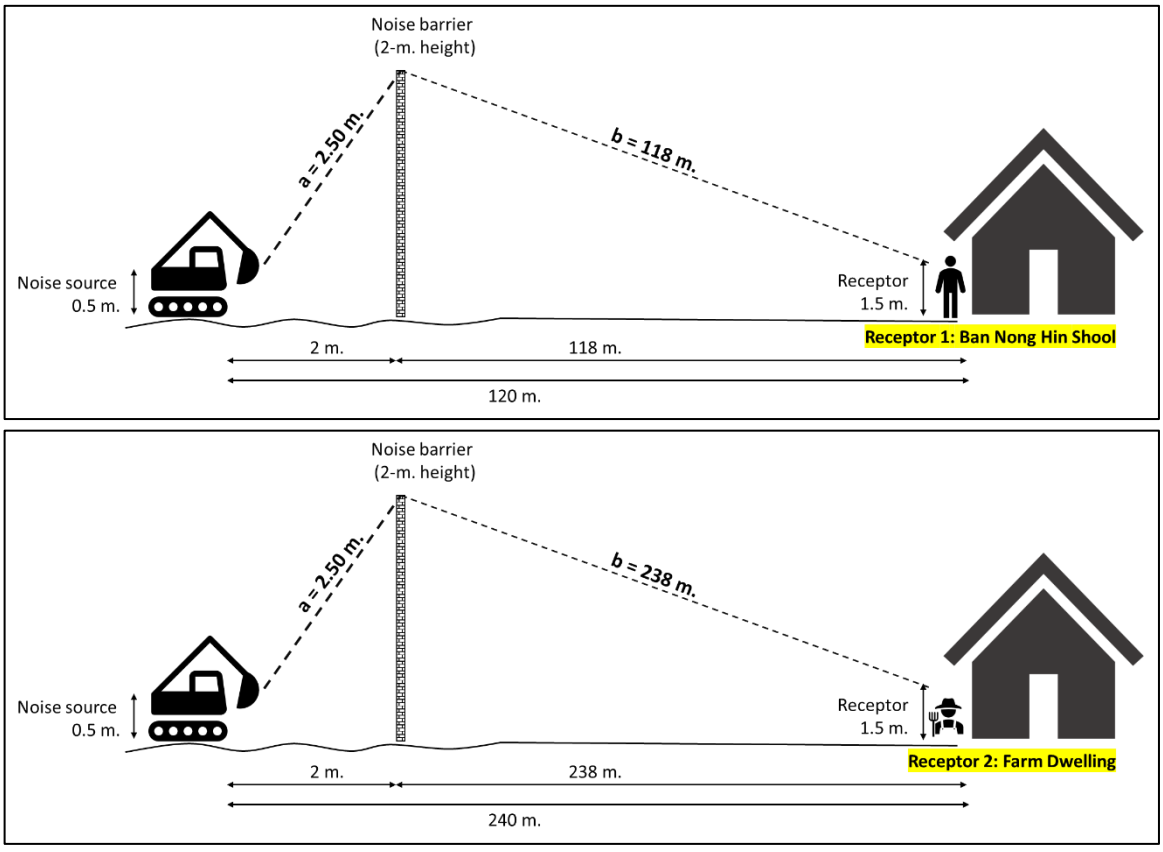


Figure 4.2.1.2-3 Values for a Calculation of Fresnel Number

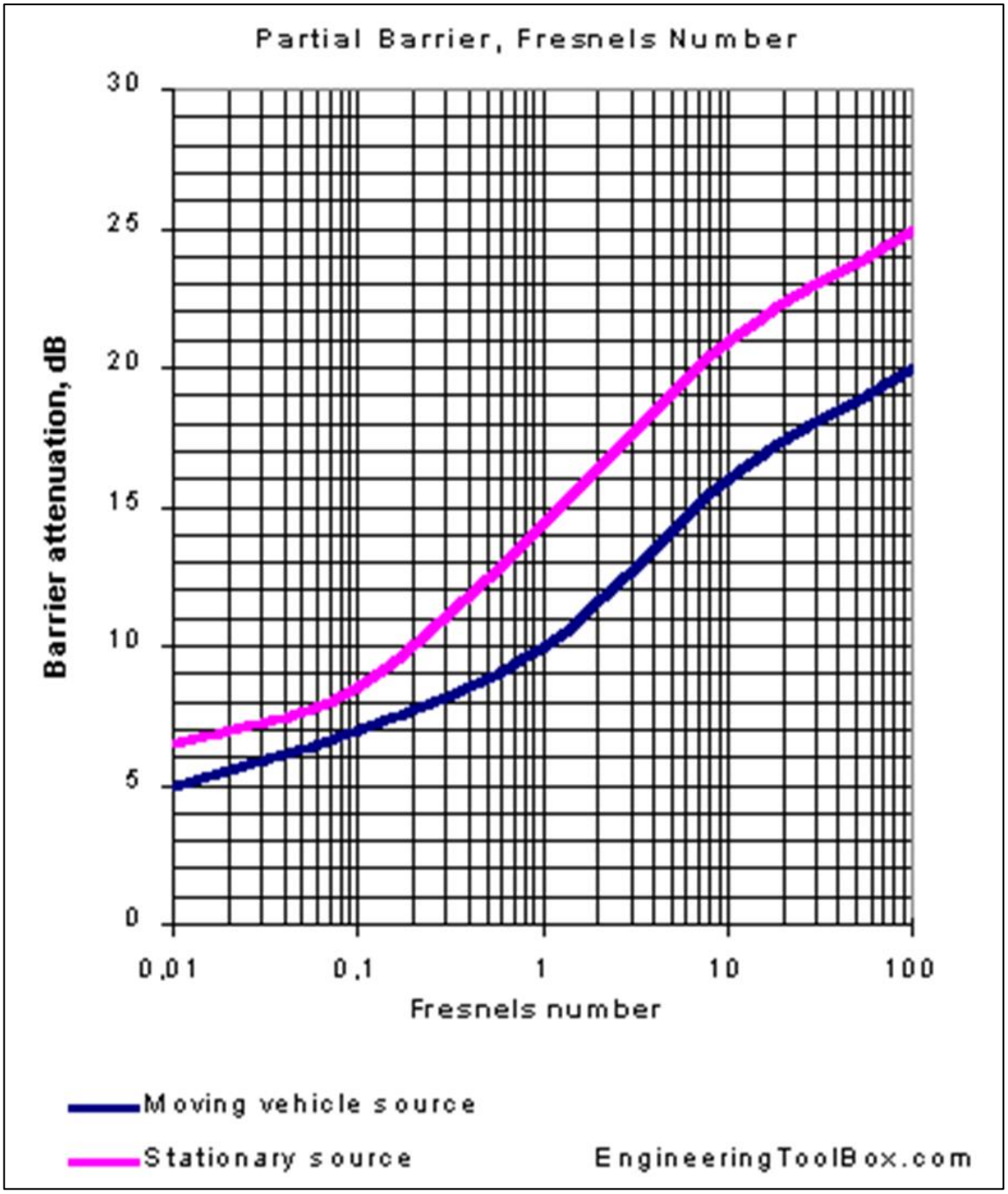


Figure 4.2.1.2-4 Graph Shows Correlation Between N_0 Values and the Corresponding Noise Level Reduction

For calculating the noise level reduction due to noise barrier attenuation at various distances from the noise source to the receptor point, which can be calculated using Equation (5) with a reference distance used to calculate the Fresnel number (N_0) as shown in **Table 4.2.1.2-7**.

$$N_0 = \frac{2\,(a + b - c)}{w} \quad (5)$$

Where; N_0 = Fresnel number
a = Distance from the noise source to the top edge of the barrier
b = Distance from the top edge of the barrier to the receiver
c = Distance from the noise source to the receiver
w = Sound wave length (m)
= v/f
v = Speed of sound (m/s)
= 331.4 [1 + (Tc/273.2)] ^0.5
Tc = Average air temperature (28.5 degrees Celsius), based on the 30-year climatic data (B.E. 2535-2564) from the Suphanburi Meteorological Station
F = Sound wave frequency = 550 Hz
Calculate v = 331.4 [1 + (28.5/273.2)] ^0.5
= 348.26
Calculate w = 348.26/550 = 0.63

Assumption

Temporary installation of a 2-meter height noise barrier made of Steel, 18 ga or other materials with a transmission loss greater than 25 dBA.

Table 4.2.1.2-7
Calculating of Fresnel Number and Barrier Attenuation
In Case 2-m Height Noise Barrier Installation

Distance (m.)						Fresnel number	Barrier attenuation, dBA
Distance from noise source to receptor	Distance from noise source to barrier	Distance from barrier to receptor	a	b	c		
120	2	118	2.50	118	120	1.59	15.4
240	2	238	2.50	238	240	1.59	15.4

Remark: a = Distance from the noise source to the top edge of the barrier
b = Distance from the top edge of the barrier to the receiver
c = Distance from the noise source to the receiver

5) Evaluate Annoyance Noise after Installation of Noise Barrier

After install a noise barrier, annoyance noise falls within a range of -10.7 to 13.1 dBA at Ban Nong Hin School and within a range of -16.7 to 7.1 dBA at farm dwelling, (**Table 4.2.1.2-8** and **Table 4.2.1.2-9**) when compared to the standards set by the National Environmental Board's Announcement No. 29 (B.E. 2550 (2007)) regarding annoyance noise levels, pass the standard at most of the time.

6) Conclusion

Assessment results with EHS guideline

The assessment of the noise level from the project construction was done only daytime (08.00-17.00 excepted lunch time, 12.00-13.00). Total noise level at both receptors, even without noise barriers, does no result in increasing in background level over 3 dB(A). Therefore, comply with IFC noise level guidelines.

Assessment results with national guideline

- Leq 24 hr: the total noise level at Ban Nong Hin school and farm dwelling are 65.9 and 62.0 dBA, falls within the standard (not exceed 70 dBA).
- Annoyance noise: the annoyance noise levels at both Ban Nong Hin school and the farm dwelling exceed 10 dBA. Therefore, the installation of a noise barrier was proposed to mitigate the noise impacts. Assessments indicate that with a noise barrier in place, annoyance noise drops below 10 dBA during certain hours. However, it's important to note that the surrounding environmental conditions during measurements can greatly influence annoyance noise levels. In some cases, the surroundings may be extremely quiet, leading to very low background noise levels, which can result in annoyance noise being generated even at relatively low levels from the noise source. Therefore, impact from annoyance noise is considered moderate. The construction activities are specified to be conducted during day time, 8 hours per day, from 8 a.m. to 5 p.m. (with a 1-hour break at noon). Therefore, the consideration of the annoyance noise level at the receptor will be limited to day time.

(2) Operation Phase

The process of generating electricity from solar energy during the Project's operation phase does not produce loud noises. This is because the project does not involve any machinery or equipment that generates significant noise levels. In addition, the project has a standby generator with a capacity of 4,500 – 5,500 watts, but it is not regularly used. It serves as a backup for areas where electricity is not accessible and is used only for short durations, such as powering cutting machines or welding machines. So, the impact is considered insignificant.

Table 4.2.1.2-8
Annoyance Noise Levels from Construction Activities of the Project (Ban Nong Hin School, noise barrier equipped)

Time		Measurement value		Noise level at the receptor			Adjusting the noise level	Annoyance level during construction 4/	Result
		(Leq 1 hr)	(L_{90})	Attenuated noise level from the project 1/	Total noise level during the construction activity 2/	Noise level in the presence of annoyance 3/	+ 5 dbA for noise originates from sources with sharp echoes or vibrations		
		A	B	C	D	E	F	H = F-B	
DAY 1	08:00-09:00	48.4	42.6	45.9	50.3	45.9	50.9	8.3	Pass
	09:00-10:00	49.9	43.8	45.9	51.4	45.9	50.9	7.1	Pass
	10:00-11:00	49.1	42.6	45.9	50.8	45.9	50.9	8.3	Pass
	11:00-12:00	49.7	43.5	45.9	51.2	45.9	50.9	7.4	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	50.3	42.4	45.9	51.6	45.9	50.9	8.5	Pass
	14:00-15:00	49.3	42.4	45.9	50.9	45.9	50.9	8.5	Pass
	15:00-16:00	48.9	38.3	45.9	50.7	45.9	50.9	12.6	Failed
	16:00-17:00	54.0	42.1	45.9	54.6	45.9	50.9	8.8	Pass
DAY 2	08:00-09:00	50.0	45.7	45.9	51.4	45.9	50.9	5.2	Pass
	09:00-10:00	51.8	46.3	45.9	52.8	45.9	50.9	4.6	Pass
	10:00-11:00	50.5	43.9	45.9	51.8	45.9	50.9	7.0	Pass
	11:00-12:00	50.2	44.0	45.9	51.6	45.9	50.9	6.9	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	47.4	39.8	45.9	49.7	45.9	50.9	11.1	Failed
	14:00-15:00	47.6	40.7	45.9	49.8	45.9	50.9	10.2	Failed
	15:00-16:00	51.6	43.7	45.9	52.6	45.9	50.9	7.2	Pass
	16:00-17:00	53.7	45.5	45.9	54.4	45.9	50.9	5.4	Pass
DAY 3	08:00-09:00	53.7	45.4	45.9	54.4	45.9	50.9	5.5	Pass
	09:00-10:00	49.8	42.5	45.9	51.3	45.9	50.9	8.4	Pass
	10:00-11:00	49.4	42.6	45.9	51.0	45.9	50.9	8.3	Pass
	11:00-12:00	49.6	41.3	45.9	51.1	45.9	50.9	9.6	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	46.9	40.3	45.9	49.4	45.9	50.9	10.6	Failed
	14:00-15:00	49.6	41.6	45.9	51.1	45.9	50.9	9.3	Pass
	15:00-16:00	50.8	44.8	45.9	52.0	45.9	50.9	6.1	Pass
	16:00-17:00	50.0	42.9	45.9	51.4	45.9	50.9	8.0	Pass
DAY 4	08:00-09:00	49.4	41.9	45.9	51.0	45.9	50.9	9.0	Pass
	09:00-10:00	50.3	40.3	45.9	51.6	45.9	50.9	10.6	Failed
	10:00-11:00	52.4	46.9	45.9	53.3	45.9	50.9	4.0	Pass
	11:00-12:00	48.1	39.1	45.9	50.1	45.9	50.9	11.8	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	46.2	38.7	45.9	49.1	45.9	50.9	12.2	Failed
	14:00-15:00	47.4	37.9	45.9	49.7	45.9	50.9	13.0	Failed
	15:00-16:00	51.5	45.3	45.9	52.6	45.9	50.9	5.6	Pass
	16:00-17:00	52.3	42.5	45.9	53.2	45.9	50.9	8.4	Pass
DAY 5	08:00-09:00	63.0	48.9	45.9	63.1	45.9	50.9	2.0	Pass
	09:00-10:00	50.7	43.0	45.9	51.9	45.9	50.9	7.9	Pass
	10:00-11:00	54.0	47.0	45.9	54.6	45.9	50.9	3.9	Pass
	11:00-12:00	48.8	40.5	45.9	50.6	45.9	50.9	10.4	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	46.8	39.0	45.9	49.4	45.9	50.9	11.9	Failed
	14:00-15:00	49.7	40.1	45.9	51.2	45.9	50.9	10.8	Failed
	15:00-16:00	47.6	38.4	45.9	49.8	45.9	50.9	12.5	Failed
	16:00-17:00	49.5	38.0	45.9	51.1	45.9	50.9	12.9	Failed
DAY 6	08:00-09:00	53.3	46.8	45.9	54.0	45.9	50.9	4.1	Pass
	09:00-10:00	52.5	41.0	45.9	53.4	45.9	50.9	9.9	Pass
	10:00-11:00	50.1	40.3	45.9	51.5	45.9	50.9	10.6	Failed
	11:00-12:00	50.0	37.8	45.9	51.4	45.9	50.9	13.1	Failed
	12:00-13:00	Lunch Break							
	13:00-14:00	63.7	59.0	45.9	63.8	45.9	50.9	-8.1	Pass
	14:00-15:00	60.1	53.5	45.9	60.3	45.9	50.9	-2.6	Pass
	15:00-16:00	49.0	40.6	45.9	50.7	45.9	50.9	10.3	Failed
	16:00-17:00	65.5	60.4	45.9	65.5	45.9	50.9	-9.5	Pass
DAY 6	08:00-09:00	56.0	51.8	45.9	56.4	45.9	50.9	-0.9	Pass
	09:00-10:00	50.4	41.8	45.9	51.7	45.9	50.9	9.1	Pass
	10:00-11:00	49.8	40.9	45.9	51.3	45.9	50.9	10.0	Failed
	11:00-12:00	59.6	52.8	45.9	59.8	45.9	50.9	-1.9	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	59.7	54.0	45.9	59.9	45.9	50.9	-3.1	Pass
	14:00-15:00	53.3	43.8	45.9	54.0	45.9	50.9	7.1	Pass
	15:00-16:00	61.4	57.1	45.9	61.5	45.9	50.9	-6.2	Pass
	16:00-17:00	68.5	61.6	45.9	68.5	45.9	50.9	-10.7	Pass
	Standard	-						10.0	

Remark: 1/ The noise level from the Project at the receptor is calculated using Equation (1).
2/ The total noise level at the receptor or the noise level during annoyance is calculated using Equation (2).
3/ Calculate the noise level during annoyance according to Equation (4).
4/ Annoyance noise level = Noise level during annoyance (after adjustments) - Background noise level.
5/ 24-hour equivalent noise level standards as per the National Environmental Committee Announcement No. 15 (1997) and Announcement No. 29 (2007) on Noise Disturbance Levels.

Source: Consultants of Technology Company Limited, B.E. 2566 (2013).

Table 4.2.1.2-9
Annoyance Noise Levels from Construction Activities of the Project (Farm Dwelling, noise barrier equipped)

Time		Measurement value		Noise level at the receptor			Adjusting the noise level	Annoyance level during construction 4/	Result
		(Leq 1 hr)	(L_{90})	Attenuated noise level from the project 1/	Total noise level during the construction activity 2/	Noise level in the presence of annoyance 3/	+ 5 dbA for noise originates from sources with sharp echoes or vibrations		
		A	B	C	D	E	F	H = F-B	
DAY 1	08:00-09:00	48.4	42.6	39.9	49.0	39.9	44.9	2.3	Pass
	09:00-10:00	49.9	43.8	39.9	50.3	39.9	44.9	1.1	Pass
	10:00-11:00	49.1	42.6	39.9	49.6	39.9	44.9	2.3	Pass
	11:00-12:00	49.7	43.5	39.9	50.1	39.9	44.9	1.4	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	50.3	42.4	39.9	50.7	39.9	44.9	2.5	Pass
	14:00-15:00	49.3	42.4	39.9	49.8	39.9	44.9	2.5	Pass
	15:00-16:00	48.9	38.3	39.9	49.4	39.9	44.9	6.6	Pass
	16:00-17:00	54.0	42.1	39.9	54.2	39.9	44.9	2.8	Pass
DAY 2	08:00-09:00	50.0	45.7	39.9	50.4	39.9	44.9	-0.8	Pass
	09:00-10:00	51.8	46.3	39.9	52.1	39.9	44.9	-1.4	Pass
	10:00-11:00	50.5	43.9	39.9	50.9	39.9	44.9	1.0	Pass
	11:00-12:00	50.2	44.0	39.9	50.6	39.9	44.9	0.9	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	47.4	39.8	39.9	48.1	39.9	44.9	5.1	Pass
	14:00-15:00	47.6	40.7	39.9	48.3	39.9	44.9	4.2	Pass
	15:00-16:00	51.6	43.7	39.9	51.9	39.9	44.9	1.2	Pass
	16:00-17:00	53.7	45.5	39.9	53.9	39.9	44.9	-0.6	Pass
DAY 3	08:00-09:00	53.7	45.4	39.9	53.9	39.9	44.9	-0.5	Pass
	09:00-10:00	49.8	42.5	39.9	50.2	39.9	44.9	2.4	Pass
	10:00-11:00	49.4	42.6	39.9	49.9	39.9	44.9	2.3	Pass
	11:00-12:00	49.6	41.3	39.9	50.0	39.9	44.9	3.6	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	46.9	40.3	39.9	47.7	39.9	44.9	4.6	Pass
	14:00-15:00	49.6	41.6	39.9	50.0	39.9	44.9	3.3	Pass
	15:00-16:00	50.8	44.8	39.9	51.1	39.9	44.9	0.1	Pass
	16:00-17:00	50.0	42.9	39.9	50.4	39.9	44.9	2.0	Pass
DAY 4	08:00-09:00	49.4	41.9	39.9	49.9	39.9	44.9	3.0	Pass
	09:00-10:00	50.3	40.3	39.9	50.7	39.9	44.9	4.6	Pass
	10:00-11:00	52.4	46.9	39.9	52.6	39.9	44.9	-2.0	Pass
	11:00-12:00	48.1	39.1	39.9	48.7	39.9	44.9	5.8	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	46.2	38.7	39.9	47.1	39.9	44.9	6.2	Pass
	14:00-15:00	47.4	37.9	39.9	48.1	39.9	44.9	7.0	Pass
	15:00-16:00	51.5	45.3	39.9	51.8	39.9	44.9	-0.4	Pass
	16:00-17:00	52.3	42.5	39.9	52.5	39.9	44.9	2.4	Pass
DAY 5	08:00-09:00	63.0	48.9	39.9	63.0	39.9	44.9	-4.0	Pass
	09:00-10:00	50.7	43.0	39.9	51.0	39.9	44.9	1.9	Pass
	10:00-11:00	54.0	47.0	39.9	54.2	39.9	44.9	-2.1	Pass
	11:00-12:00	48.8	40.5	39.9	49.3	39.9	44.9	4.4	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	46.8	39.0	39.9	47.6	39.9	44.9	5.9	Pass
	14:00-15:00	49.7	40.1	39.9	50.1	39.9	44.9	4.8	Pass
	15:00-16:00	47.6	38.4	39.9	48.3	39.9	44.9	6.5	Pass
	16:00-17:00	49.5	38.0	39.9	50.0	39.9	44.9	6.9	Pass
DAY 6	08:00-09:00	53.3	46.8	39.9	53.5	39.9	44.9	-1.9	Pass
	09:00-10:00	52.5	41.0	39.9	52.7	39.9	44.9	3.9	Pass
	10:00-11:00	50.1	40.3	39.9	50.5	39.9	44.9	4.6	Pass
	11:00-12:00	50.0	37.8	39.9	50.4	39.9	44.9	7.1	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	63.7	59.0	39.9	63.7	39.9	44.9	-14.1	Pass
	14:00-15:00	60.1	53.5	39.9	60.1	39.9	44.9	-8.6	Pass
	15:00-16:00	49.0	40.6	39.9	49.5	39.9	44.9	4.3	Pass
	16:00-17:00	65.5	60.4	39.9	65.5	39.9	44.9	-15.5	Pass
DAY 6	08:00-09:00	56.0	51.8	39.9	56.1	39.9	44.9	-6.9	Pass
	09:00-10:00	50.4	41.8	39.9	50.8	39.9	44.9	3.1	Pass
	10:00-11:00	49.8	40.9	39.9	50.2	39.9	44.9	4.0	Pass
	11:00-12:00	59.6	52.8	39.9	59.6	39.9	44.9	-7.9	Pass
	12:00-13:00	Lunch Break							
	13:00-14:00	59.7	54.0	39.9	59.7	39.9	44.9	-9.1	Pass
	14:00-15:00	53.3	43.8	39.9	53.5	39.9	44.9	1.1	Pass
	15:00-16:00	61.4	57.1	39.9	61.4	39.9	44.9	-12.2	Pass
	16:00-17:00	68.5	61.6	39.9	68.5	39.9	44.9	-16.7	Pass
	Standard	-						10.0	

Remark: 1/ The noise level from the Project at the receptor is calculated using Equation (1).
2/ The total noise level at the receptor or the noise level during disturbances is calculated using Equation (2).
3/ Calculate the noise level during disturbances according to Equation (4).
4/ Noise disturbance level = Noise level during disturbances (after adjustments) - Background noise level.
5/ 24-hour equivalent noise level standards as per the National Environmental Committee Announcement No. 15 (1997) and Announcement No. 29 (2007) on Noise Disturbance Levels.

Source: Consultants of Technology Company Limited, B.E. 2566 (2013)

4.2.1.3 Reflection and Heat

(1) Construction Phase

The impact of light reflection and heat during the construction phase of the Project may occur after solar panels are installed on the supporting structures. However, the solar panels used in the Project have an Anti-Reflection coating with the lowest light reflection coefficient. Additionally, the project specifies that the solar panels will be installed at an angle of approximately 10 degrees to the ground, which prevents light reflection towards the surrounding area. Therefore, it is anticipated that there will be no significant impact from light reflection and heat generated by the solar panels.

(2) Operation Phase

Regarding the impact of light reflection during the operation phase, factors that contribute to this impact include the direction of light impact angles and the type of solar panels used. Current solar panel manufacturing technologies have improved significantly, with external coatings that reduce light reflection. According to the report "PV Systems: Low Levels of Glare and Reflectance vs. Surrounding Environment" by Mark Shields in 2010, which studied light reflection when impacting various materials (details in **Table 4.2.1.3-1**), it was found that the light reflection coefficient of solar glass is lower than that of other materials.

Table 4.2.1.3-1

Reflection Percentage of Light at Different Intermediary Material

Intermediary Material	Reflection percentage of light *****
Anti Reflection (w/AR coating)	3
Solar glass	4
Smooth water	4
Plastic	7
Plexiglass	4
Standard glass	9
Snow	23
Steel	39

Remark: * Reflection percentage at an angle of 15 degrees.

Source: PV Systems: Low Levels of Glare and Reflectance vs. Surrounding Environment; Mark Shields, 2010

However, when an Anti-Reflection coating is applied, the light reflection coefficient is further reduced. Therefore, there will be no impact on the community. Furthermore, the project specifies that solar panels be installed at an angle of approximately 10 degrees to the ground, preventing light reflection towards the surrounding area. Hence, it is expected that light reflection and heat from the solar panels will not have any significant impact.

4.2.2 NATURAL CONDITIONS

4.2.2.1 Impact on Terrestrial Ecology

Critical Habitat Assessment (CHA)

(1) Assessment Approach and Criteria

According to the IFC Performance Standard 6 (Biodiversity), critical habitat assessment can be done following these steps;

Step 1: Stakeholder Consultation and Literature Review

This step involves a comprehensive process of stakeholder consultation and literature review. This includes collaborating with specialists, and acknowledged external experts. Both in-field consultations and desktop research are conducted within project areas, recognize ongoing conservation issues.

Step 2: Field Survey Data Collection

COT conducted wildlife resources survey in four primary categories: mammals, birds, reptiles and amphibians, covering the Project area, transmission route line, and the study area. The first field survey was conducted on June 23rd to 25th, B.E. 2566 (2023) for rainy season. Then, the second field survey was conducted to re-confirm the result, during the migratory bird season on November 29th, B.E. 2566 (2023). The survey involved direct observation and inquiries with the local residents regarding rare or significant wildlife species that might be found in the area. For the direct survey, the area was divided into two zones: the Project area and the study area within a 3-kilometer radius from the Project's boundary which also included the transmission route line.

Step 3: Critical Habitat Determination

The Critical Habitat assessment comprised an analysis of biodiversity values within the Project area and area of influence, habitats of high biodiversity value, species of conservation concern and general flora and fauna assemblages. The five (5) criteria are 'triggers' in that if an area of habitat meets any one of the criteria, it will be considered Critical Habitat irrespective of failing to meet any other criterion. Therefore, Critical Habitat can be determined through a single criterion or where a habitat holds biodiversity meeting all five criteria.

Criterion 1: Critically Endangered (CR) / Endangered (EN) species
Criterion 2: Endemic and/or restricted range species
Criterion 3: Migratory species and/or congregatory species
Criterion 4: Highly threatened and/or unique ecosystems
Criterion 5: Key evolutionary processes

(2) Stakeholder Consultation and Literature Review

1) Consultation with Expert

Based on the proximity report generated from IBAT, there were several endangered species within 50 kilometers of the Project site. Based on the expert judgement, the project's location which is a modified habitat that dedicated to agricultural area for a long time and it has been served as habitats where some wildlife species can disperse. COT decided to study 6 endangered species namely Asian Elephant (*Elephas maximus*), Greater Adjutant (*Leptoptilos dubius*), Green Peafowl (*Pavo muticus*), Southeast Asian Box Turtle (*Cuora amboinensis*), Steppe Eagle (*Aquila nipalensis*) and Milky Stork (*Mycteria cinerea*) with the followings reason;

South East Asian (SEA) Box Turtle: The turtle is likely to be found in both the project area and the surrounding areas due to the proximity to agricultural land. SEA Box Turtles can temporarily inhabit or forage in the project area during the rainy season when temporary water sources emerge. However, the project area is not their primary habitat. If they enter the project area, they can be relocated to a suitable environmental system near the project without impacting their habitat.

Steppe Eagle: Steppe Eagles reside and forage in dried areas. Presently, there are instances of their migration to Thailand, and there is a chance they may be observed or fly through the project area. They tend to migrate into agricultural areas during the winter season. There is a possibility of spotting them in Suphanburi Province.

Greater Adjutant and **Milky Stork**: Both species are not native to Thailand, but they are temporary migrants that occasionally inhabit Thai territories. They disperse in rice fields in provinces such as Suphanburi, Ayutthaya, Nakhon Sawan, Kamphaeng Phet, and Uthai Thani. There might be a chance of observation through the project area. However, the project area is not a necessary or significant habitat or feeding ground for these birds.

Green Peafowl: It is classified as Endangered (EN) according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017). It inhabits Deciduous forests and Mixed deciduous forests, often found near sandy beaches or open areas close to water sources for mating. It is a resident bird, challenging to find, and is occasionally observed in specific areas (Jarujin et al., B.E. 2561 (2022)). The Green Peafowl will be limited in an area where ecosystem suitable for living and breeding. It can only be seen in protected forests or national parks. Therefore, the Green Peafowl cannot be easily found.

2) Consultation with Local People

From questioning the people residing along the Project's transmission line those who living near existing transmission lines, it was found that commonly encountered bird species include the Little Egret and Asian Openbill. These are typically found in areas where land is utilized for rice cultivation. Small-sized birds like the Common Tailorbird and Zebra Dove are often seen perching on power lines. As for larger birds, not witness them perching on power lines; instead, they prefer trees.

Moreover, during the migratory bird survey, the staff also questioned local people (**Figure 4.2.2.1-1**) about the presence of six concerned species (Elephant, SEA Box Turtle, Steppe Eagle, Green Peafowl, Greater Adjutant, and Milky Stork). None of them responded that they have seen these species in the area before. This may be due to various factors such as the nonforest nature of the area, the presence of sandy areas near water sources, inadequate territorial size for sustaining life, insufficient food sources, human disturbances, loss of nesting areas, and a high risk of predation. Consequently, these factors contribute to the low population of these wildlife species, leading to the absence of these wildlife species in the study area.



Figure 4.2.2.1-1 Consultation with Local People

3) Literature Review

Document review of the habitats of six wildlife species, including *Elephas maximus*, *Cuora amboinensis*, *Aquila nipalensis*, *Pavo muticus*, *Leptoptilos dubius*, and *Mycteria cinerea* were conducted. The results of the review are as follows:

(a) The Asian Elephant (*Elephas maximus)*

The Asian Elephant is a large, milk-feeding mammal classified as Endangered (EN) according to the Office of Natural Resources and Environmental Policy and Planning (B.E. 2560 (2017)). It has a foraging and living range of 184-407 square kilometers. The gestation period for elephants is 22 months, and they give birth to one calf at a time, with each calving occurring every four years. Harmful factors to the calf population include death after birth, predation by natural predators, and aggression by male elephants outside the herd. These serve as natural control mechanisms for the elephant population. Asian Elephants inhabit various ecosystems, including grasslands, mixed deciduous forests, dry evergreen forests, and human agricultural areas. They are predominantly found in the wild rather than in community areas (WCS Thailand, 2007; Pratumthong & Khlaipet, 2022).

From the survey, no elephants were found in the project area. However, the Asian elephant still has populations dispersed in various national parks and wildlife sanctuaries across Thailand. The location where elephants are most commonly observed near the Project area is in Kanchanaburi Province (Srinakarin Dam National Park), approximately 190 kilometers. Additionally, elephants have been sighted in the adjacent area in Phetchaburi Province (Kaeng Krachan National Park), approximately 224 kilometers. The specific locations where Asian elephants were spotted are illustrated in **Figure 4.2.2.1-2** (Thbif, B.E. 2566 (2023)).

In conclusion, the Project construction area has been transformed into agricultural land for an extended period, causing a definite reduction in the natural habitat for wild elephants. Villages, roads, and various structures have encroached upon the dispersed habitat of elephants, preventing them from inhabiting the area. Consequently, the Project area is no longer suitable for the current survival of wild elephants, and it can be confirmed that there are no remaining wild elephants in the area.

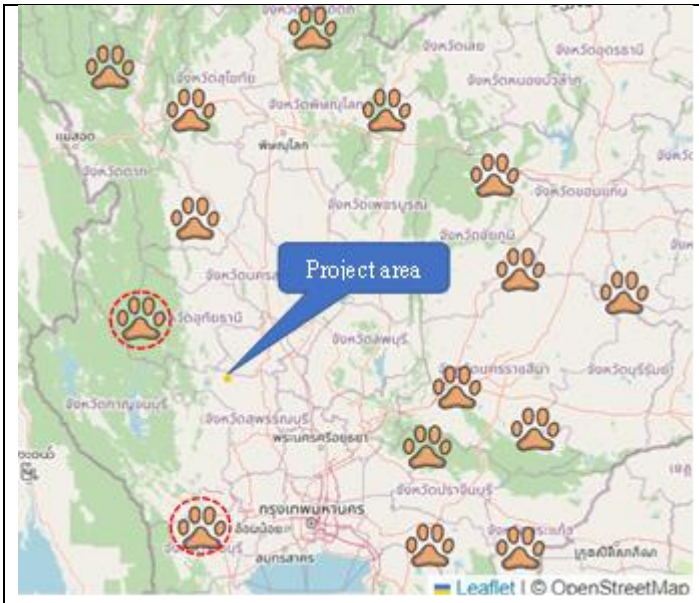


Figure 4.2.2.1-2 Location of sighting Asian Elephants in Thailand
Source: https://thbif.onep.go.th/

(b) The SEA Box Turtle (*Cuora amboinensis*)

The SEA Box Turtle is classified as Near Threatened (NT) according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017), and it is also categorized as Near Threatened (EN) according to the IUCN. The population has decreased, and one of the causes is hunting for food (IUCN, 2022). In Thailand, it is commonly found in the central and southern regions, particularly near water bodies in lowland areas, such as ponds, rice fields, canals, rivers, and sometimes even in mountain streams. However, based on the surveys and inquiries conducted in the project area and study area, the SEA Box Turtle has not been observed.

However, sightings of the SEA Box Turtle are still reported in Thailand. The highest number of sightings near the Project area is in Kanchanaburi Province (Srinakarin Dam National Park), approximately 190 kilometers. Additionally, sightings have been recorded in the adjacent area in Nakhon Sawan Province (rice fields in Wat Sai Sub-district, Mueang Nakhon Sawan District), approximately 95 kilometers. Specific locations where the Southeast Asian box turtle was observed are illustrated in **Figure 4.2.2.1-3** (Thbif, B.E. 2566 (2023)).

In conclusion, it is possible that there may be SEA Box Turtle residing in various water sources in the Project and the study area. They may not be detected during surveys since the water sources in the Project area are mostly temporary and abundant only during the rainy season. SEA Box Turtles are known to move between different water sources as part of their normal behavior. When the water sources in the area dry up, they tend to migrate to nearby water sources. Vigilance is necessary, and if they are found in the Project area, they can be relocated to a suitable habitat that supports their survival.

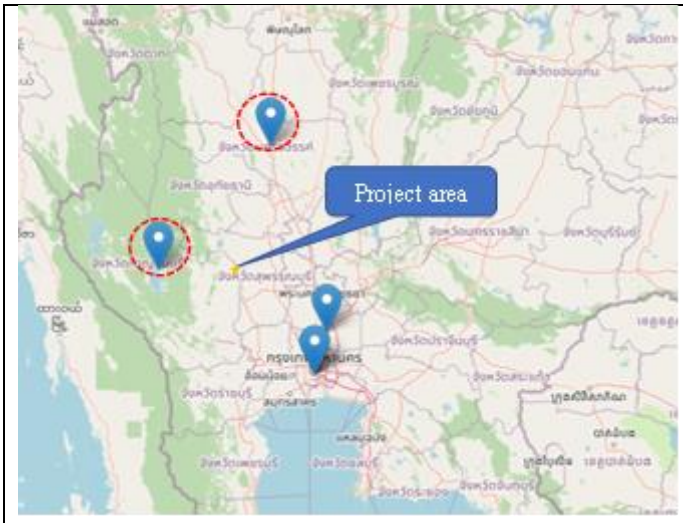


Figure 4.2.2.1-3 Location of sighting The SEA Box Turtle in Thailand
Source: https://thbif.onep.go.th/

(c) The Steppe Eagle (*Aquila nipalensis*)

The Steppe Eagle is a winter visitor or a wandering bird that is difficult to find (Jarujin et al., 2022). It is classified as Near Threatened (NT) according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017), and it is also categorized as Endangered (EN) according to the IUCN. This eagle searches for food in open areas, fields, or agricultural areas. From the foraging habitat characteristics of the Steppe Eagle and the features of its hunting flight, the Project area and its vicinity exhibit an open landscape, including fields, or agricultural areas that are suitable for foraging.

In Thailand, there have been reports of sightings of the Steppe Eagle, with the highest number of sightings near the Project area being in Chai Nat Province (Khao Khayai Mountain), approximately 50 kilometers. Additionally, sightings have been recorded in the adjacent area in Lopburi Province (Wat Kroen Ka Thin), approximately 75 kilometers. Specific locations where the Steppe Eagle was observed are illustrated in **Figure 4.2.2.1-4** (eBird, 2023).

In conclusion, the Steppe Eagle is a bird that prefers to inhabit open areas and is known to migrate during certain seasons. The Project area is characterized by open spaces and is contiguous with surrounding agricultural areas. If Steppe Eagles enter the Project area, they may only stay temporarily or pass through, as they can independently move to more suitable surrounding areas.

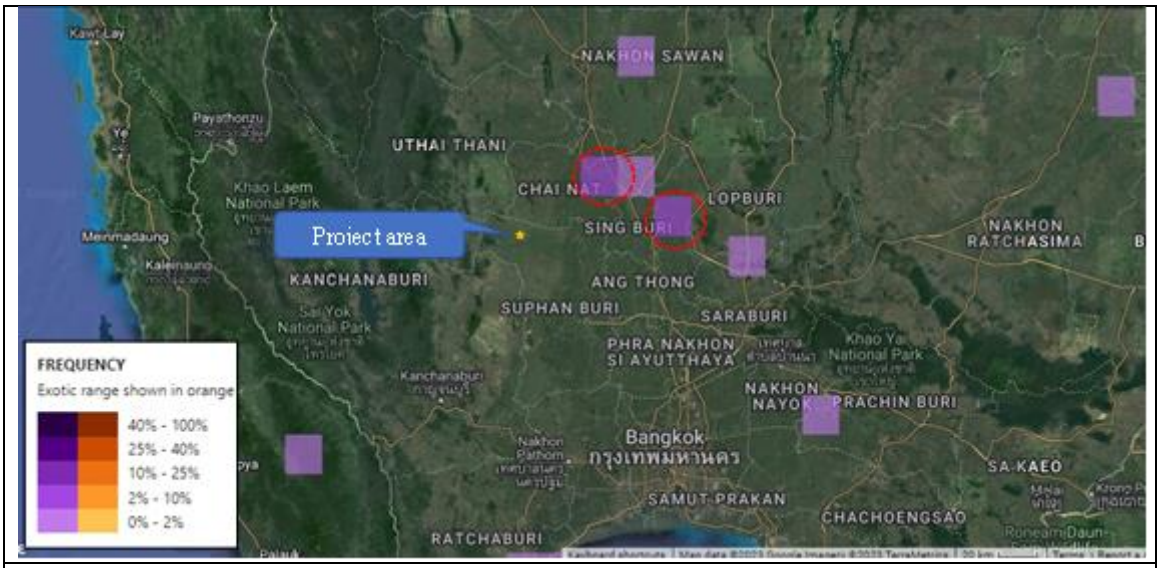


Figure 4.2.2.1-4 Location of sighting the Steppe Eagle in Thailand
Source: https://ebird.org/home

(d) The Green Peafowl (*Pavo muticus*)

The Green Peafowl is classified as Endangered (EN) according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017). It inhabits Deciduous forests and Mixed deciduous forests, often found near sandy beaches or open areas close to water sources for mating. It is a resident bird, challenging to find, and is occasionally observed in specific areas (Jarujin et al., B.E. 2561 (2022)). The Green Peafowl will be limited in an area where ecosystem suitable for living and breeding. It can only be seen in protected forests or national parks. Therefore, the Green Peafowl cannot be easily found.

However, there have also been sightings of the green peafowl scattered throughout Thailand. The most frequent sightings near the project area are in Uthai Thani Province (Huai Kha Khaeng Wildlife Sanctuary), approximately 95 kilometers and Kanchanaburi Province (Erawan National Park), approximately 95 kilometers. The sightings area is illustrated in **Figure 4.2.2.1-5** (ebird, 2023).

In conclusion, The Project area has been converted into agricultural land for an extended period, definitively eliminating the dispersion area for Green Peafowls. Villages, roads, and various structures have encroached upon the dispersed habitat of Green Peafowls, preventing them from inhabiting the area. Consequently, the Project area is no longer suitable for the current survival of Green Peafowls, and it can be confirmed that there are no remaining Green Peafowls in the area.



Figure 4.2.2.1-5 Location of sighting the Green Peafowl in Thailand
Source: https://ebird.org/home

(e) The Greater Adjutant (*Leptoptilos dubius*)

The Greater Adjutant is an extremely rare and critically endangered species according to the Office of Natural Resources and Environmental Policy and Planning (ONEP) B.E. 2560 (2017). The main cause of its critical status is the loss of nesting areas due to urban expansion, leading to the felling of large trees. Additionally, the greater adjutant has a negative perception among local people as it is considered a dirty bird. This perception arises from its scavenging behavior for carcasses and food scraps in garbage dumps. When building nests on large trees near homes, the stork emits a foul odor, and its droppings can dirty the surroundings, leading locals to discourage the presence of Greater Adjutant near their homes (The Cornell Lab, 2021).

Nevertheless, there have also been sightings of the Greater Adjutant distributed in Thailand. The most frequent sightings near the project area are in Lopburi Province, approximately 117 kilometers, and Phra Nakhon Si Ayutthaya Province, approximately 101 kilometers. The Greater Adjutant sightings are depicted in **Figure 4.2.2.1-6** (ebird, 2023).

Currently, they are merely migratory birds or rarely seen birds in Thailand. Sightings are mostly of them flying through or foraging in large water sources for short periods. In the Project area and its vicinity, there is not sufficient suitability to serve as a permanent habitat for these herons. There have been no reports of heron sightings in the nearby areas of the Project for a long time.

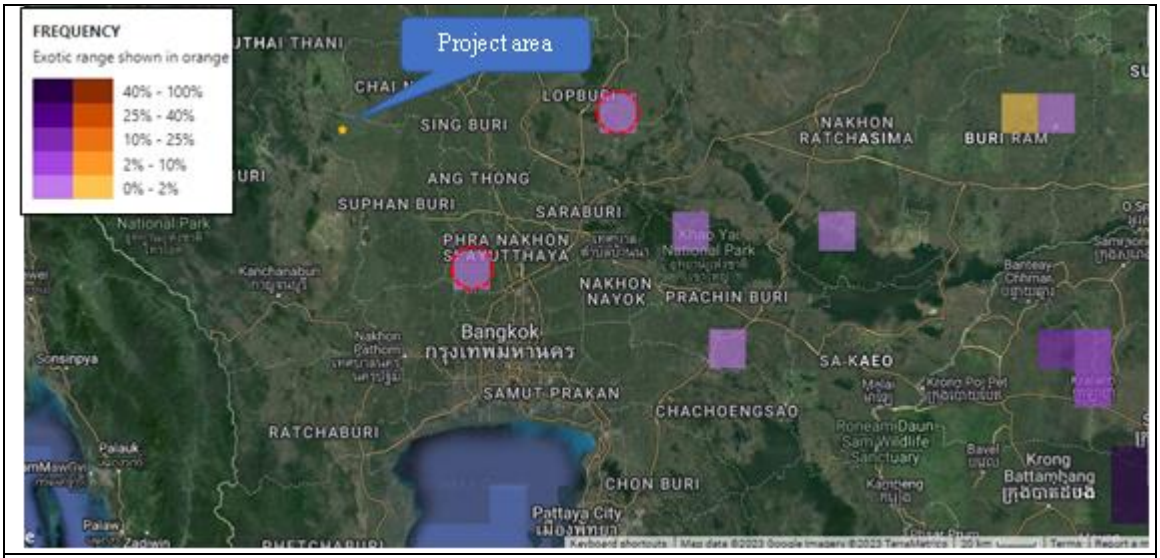


Figure 4.2.2.1-6 Location of sighting the Greater Adjutant in Thailand
Source: https://ebird.org/home

(f) The Milky Stork (*Mycteria cinerea*)

The Milky Stork is a species that is critically endangered (CR) with a very small population in Thailand, estimated to be around 15 individuals. They are found in limited numbers in the southern region, and Samut Prakan Province. Their habitat includes wetland areas such as marshes, ponds, and reservoirs in the western Gulf of Thailand and wetland areas in the northeastern region.

In Thailand, there have been no documented instances of Milky Storks laying eggs. However, in Java, Indonesia, they have been observed nesting alongside other birds such as *Microcarbo niger* and *Anhinga melanogaster*. They lay 2-4 eggs per clutch. Threats to their population include encroachment for agricultural purposes, the expansion of human settlements, resulting in the loss of nesting areas, and illegal hunting and trading (Wildlife Research Group, B.E. 2559 (2016)).

Nevertheless, there have also been sightings of the Milky Stork dispersed in Thailand. The most frequent sightings near the Project area are in Sing Buri Province, approximately 55 kilometers, and Nakhon Nayok Province, approximately 171 kilometers. The Milky Stork sightings are depicted in **Figure 4.2.2.1-7** (ebird, 2023).

In conclusion, they are merely migratory or stray birds that come to inhabit large water sources. They can be found in temporary flooded rice fields and marshy areas. The Project area lacks suitable conditions for these birds, and if they are spotted in the future, it will likely be a temporary occurrence due to straying.

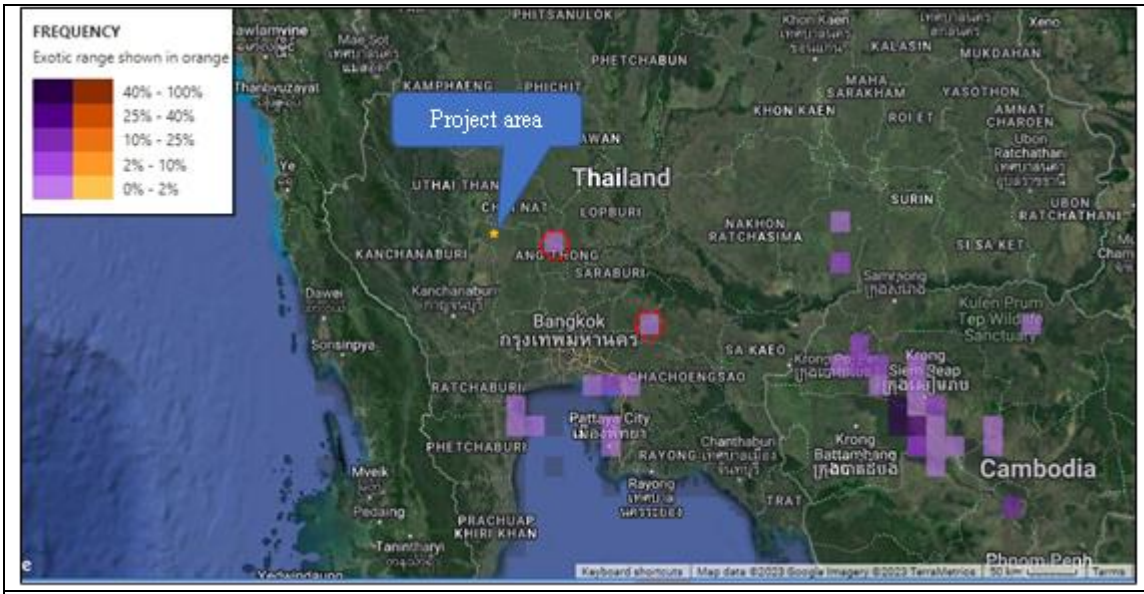


Figure 4.2.2.1-7 Location of sighting the Milk Stork in Thailand
Source: https://ebird.org/home

Base on the survey conducted in the project area, which is predominantly agricultural land consisting of rice fields, sugarcane plantations, and human-inhabited community areas, the mentioned areas are not suitable for the livelihood of the concerned species of wildlife (Elephant, SEA Box Turtle, Steppe Eagle, Green Peafowl, Greater Ajutant, and Milky Stork). This is due to various factors such as the non-forest nature of the area, the presence of sandy areas near water sources, inadequate territorial size for sustaining life, insufficient food sources, human disturbances, loss of nesting areas, and a high risk of predation. Consequently, these factors contribute to the low population of these wildlife species, leading to the absence of these wildlife species in the study area.

(3) Critical Habitat Determination

Wildlife species: From both field surveys, 3 species of mammal, 88 species of bird, 13 species of reptile, and 9 species of amphibians were identified (**Table 4.2.2.1-1**).

Plant species: According to the field survey, at least 146 plant species were identified, with the majority still not evaluated (NE) by IUNC (2023). Among them, one species, Siamese Rosewood (*Dalbergia cochinchinensis* Pierre), is critically endangered (CR), and one species, Burma Padauk (*Pterocarpus macrocarpus* Kurz), are endangered (EN). (**Table 4.2.2.1-2**)

Table 4.2.2.1-1

List of wildlife species identified from the survey

No.	Thai Name	Scientific Name	IUCN 2023	Population Trend	Screened in	Criterion
Mammals						
1	ค้างคาวกินแมลง	-	-	No information	No	-
2	กระรอกหลากสี	*Callosciurus finlaysonii*	LC	Stable	No	-
3	หนู	*Rattus* sp.	LC	No information	No	-
Birds						
1	นกเอี้ยงหงอน	*Acridotheres grandis*	LC	Stable	No	-
2	นกเอี้ยงสาริกา	*Acridotheres tristis*	LC	Increasing	No	-
3	นกขมิ้นน้อยธรรมดา	*Aegithina tiphia*	LC	Unknown	No	-
4	นกกวัก	*Amaurornis phoenicurus*	LC	Unknown	No	-
5	นกปากห่าง	*Anastomus oscitans*	LC	Unknown	No	-
6	นกเด้าดินทุ่งเล็ก	*Anthus rufulus*	LC	Stable	No	-
7	นกแอ่นบ้าน	*Apus affinis*	LC	Increasing	No	-
8	นกยางโทนใหญ่	*Ardea alba*	LC	Unknown	No	-
9	นกยางโทนน้อย	*Ardea intermedia*	LC	Decreasing	No	-
10	นกกระสาแดง	*Ardea purpurea*	LC	Decreasing	No	-
11	นกยางกรอกพันธุ์ชวา	*Ardeola speciosa*	LC	Unknown	No	-
12	นกแอ่นพง	*Artamus fuscus*	LC	Stable	No	-
13	นกยางควาย	*Bubulcus coromandus*	LC	No information	No	-
14	เหยี่ยวปีกแดง	*Butastur liventer*	LC	Decreasing	No	
15	นกอีวาบตั๊กแตน	*Cacomantis merulinus*	LC	Stable	No	-
16	นกตบยุงหางยาว	*Caprimulgus macrurus*	LC	Increasing	No	-
17	นกกะปูดใหญ่	*Centropus bengalensis*	LC	Stable	No	-
18	นกกินปลีอกเหลือง	*Cinnyris jugularis*	LC	Stable	No	-
19	นกยอดข้าวหางแพนลาย	*Cisticola juncidis*	LC	Increasing	No	-
20	นกพิราบป่า	*Columba livia*	LC	Decreasing	No	-
21	นกกางเขนบ้าน	*Copsychus saularis*	LC	Stable	No	-
22	อีกา	*Corvus macrorhynchos*	LC	Stable	No	-
23	นกแอ่นตาล	*Cypsiurus balasiensis*	LC	Stable	No	-
24	เป็ดแดง	*Dendrocygna javanica*	LC	Decreasing	No	-
25	นกสีชมพูสวน	*Dicaeum cruentatum*	LC	Stable	No	-

No.	Thai Name	Scientific Name	IUCN 2023	Population Trend	Screened in	Criterion
26	นกแซงแซวหางปลา	*Dicrurus macrocercus*	LC	Unknown	No	-
27	นกยางเปีย	*Egretta garzetta*	LC	Increasing	No	-
28	เหยี่ยวขาว	*Elanus caeruleus*	LC	Stable	No	-
29	นกกาเหว่า	*Eudynamys scolopaceus*	LC	Stable	No	-
30	นกเขาชวา	*Geopelia striata*	LC	Stable	No	-
31	นกเอี้ยงด่าง	*Gracupica contra*	LC	Increasing	No	-
32	นกกิ้งโครงคอดำ	*Gracupica nigricollis*	LC	Increasing	No	-
33	นกกะเต็นอกขาว	*Halcyon smyrnensis*	LC	Increasing	No	-
34	นกตีนเทียน	*Himantopus himantopus*	LC	Increasing	No	-
35	นกแอ่นใหญ่หัวตาขาว	*Hirundapus giganteus*	LC	Decreasing	No	-
36	นกยางไฟหัวดำ	*Ixobrychus sinensis*	LC	Unknown	No	-
37	นกกระติ๊ดขี้หมู	*Lonchura punctulata*	LC	Stable	No	-
38	นกจาบคาหัวสีส้ม	*Merops leschenaulti*	LC	Increasing	No	-
39	นกจาบคาเล็ก	*Merops orientalis*	LC	Increasing	No	-
40	นกพริก	*Metopidius indicus*	LC	Unknown	No	-
41	นกกาน้ำเล็ก	*Microcarbo niger*	LC	Unknown	No	-
42	นกจาบฝนปีกแดง	*Mirafra erythrocephala*	LC	Stable	No	-
43	นกกาบบัว	*Mycteria leucocephala*	LC	Decreasing	No	-
44	นกกระจิบธรรมดา	*Orthotomus sutorius*	LC	Stable	No	-
45	นกกระจอกใหญ่	*Passer domesticus*	LC	Decreasing	No	-
46	นกกระจอกตาล	*Passer flaveolus*	LC	Stable	No	-
47	นกกระจอกบ้าน	*Passer montanus*	LC	Decreasing	No	-
48	นกปั้งรอกใหญ่	*Phaenicophaeus tristis*	LC	Stable	No	-
49	นกช้อนหอยดำเหลือบ	*Plegadis falcinellus*	LC	Decreasing	No	-
50	นกกระจาบทอง	*Ploceus hypoxanthus*	NT	Decreasing		
51	นกกระจาบธรรมดา	*Ploceus philippinus*	LC	Stable	No	-
52	นกกระจิบหญ้าท้องเหลือง	*Prinia flaviventris*	LC	Decreasing	No	-
53	นกกระจิบหญ้าสีเรียบ	*Prinia inornata*	LC	Stable	No	-
54	นกตีทอง	*Psilopogon haemacephalus*	LC	Increasing	No	-
55	นกโพระดกธรรมดา	*Psilopogon lineatus*	LC	Stable	No	-
56	นกปรอดสวน	*Pycnonotus blanfordi*	LC	Stable	No	-
57	นกปรอดหน้านวล	*Pycnonotus goiavier*	LC	Increasing	No	-

No.	Thai Name	Scientific Name	IUCN 2023	Population Trend	Screened in	Criterion
58	นกอีแพรดแถบอกดำ	*Rhipidura javanica*	LC	Stable	No	-
59	นกโป่งวิด	*Rostratula benghalensis*	LC	Decreasing	No	-
60	นกเขาใหญ่	*Spilopelia chinensis*	LC	Increasing	No	-
61	นกเขาไฟ	*Streptopelia tranquebarica*	LC	Decreasing	No	-
62	นกแสก	*Tyto javanica*	LC	No information	No	
63	นกกะรางหัวขวาน	*Upupa epops*	LC	Decreasing	No	-
64	นกกระแตแต้แว้ด	*Vanellus indicus*	LC	Unknown	No	-
65	เหยี่ยวผึ้ง	*Pernis ptilorhynchus*	LC	Decreasing	No	-
66	นกเป็ดผีเล็ก	*Tachybaptus ruficollis*	LC	Decreasing	No	-
67	นกแซงแซวสีเทา	*Dicrurus leucophaeus*	LC	Unknown	No	-
68	นกกระติ๊ดตะโพกขาว	*Lonchura striata*	LC	Stable	No	-
69	นกกระติ๊ดสีอิฐ	*Lonchura atricapilla*	LC	Stable		
70	นกกระทาทุ่ง	*Francolinus pintadeanus*	LC	Stable	No	-
71	นกกะเต็นน้อยธรรมดา	*Alcedo atthis*	LC	Unknown	No	-
72	นกกะเต็นหัวดำ	*Halcyon pileate*	LC	No information	No	
73	นกจับแมลงคอแดง	*Ficedula albicilla*	LC	Stable	No	-
74	นกจับแมลงสีน้ำตาล	*Muscicapa dauurica*	LC	Stable	No	-
75	นกจาบคาหัวเขียว	*Merops philippinus*	LC	Stable	No	-
76	นกตะขาบทุ่ง	*Coracias benghalensis*	LC	Increasing	No	-
77	นกนางแอ่นบ้าน	*Hirundo rustica*	LC	Decreasing	No	-
78	นกปรอดคอลาย	*Pycnonotus finlaysoni*	LC	Stable	No	-
79	นกปรอดหัวสีเขม่า	*Pycnonotus aurigaster*	LC	Decreasing	No	-
80	นกพงใหญ่พันธุ์ญี่ปุ่น	*Acrocephalus orientalis*	LC	Decreasing	No	-
81	นกพงคิ้วดำ	*Acrocephalus bistrigiceps*	LC	Stable	No	-
82	นกยอดข้าวหางแพนลาย	*Cisticola juncidis*	LC	Increasing	No	-
83	นกยอดหญ้าหลังดำ	*Saxicola jerdoni*	LC	Stable		
84	นกยอดหญ้าหัวดำ	*Saxicola stejnegeri*	LC	No information	No	-
85	นกอ้ายงั่ว	*Anhinga melanogaster*	NT	Decreasing		
86	นกอีเสือสีน้ำตาล	*Lanius cristatus*	LC	Decreasing	No	-
87	นกอีเสือหลังแดง	*Lanius collurioides*	LC	Stable	No	-
88	นกอีล้ำ	*Gallinula chloropus*	LC	Stable	No	-
Reptiles						
1	กิ้งก่าหัวสีฟ้า	*Calotes mystaceus*	LC	Stable	No	-

No.	Thai Name	Scientific Name	IUCN 2023	Population Trend	Screened in	Criterion
2	กิ้งก่าหัวแดง	*Calotes versicolor*	-	Stable	No	-
3	งูก้นขบ	*Cylindrophis ruffus*	LC	Increasing	No	-
4	จิ้งเหลนบ้าน	*Eutropis multifasciata*	LC	Stable	No	-
5	ตุ๊กแกบ้าน	*Gekko gecko*	LC	Unknown	No	-
6	จิ้งจกหางหนาม	*Hemidactylus frenatus*	LC	Stable	No	-
7	งูปลิง	*Hypsiscopus plumbea*	LC	Stable	No	-
8	แย้เหนือ	*Leiolepis belliana* subsp. *ocellata*	LC	Stable	No	-
9	งูเหลือม	*Malayopython reticulatus*	LC	Unknown	No	-
10	งูสิงบ้าน	*Ptyas korros*	NT	Decreasing	No	-
11	งูไซ	*Subsessor bocourti*	LC	Unknown	No	-
12	เห้ี	*Varanus salvator* subsp. *macromaculatus*	LC	Unknown	No	-
13	งูแสงอาทิตย์	*Xenopeltis unicolor*	LC	Stable	No	-
Amphibians						
1	คางคกบ้าน	*Duttaphrynus melanostictus*	LC	Increasing	No	-
2	กบหนอง	*Fejervarya limnocharis*	LC	Stable	No	-
3	กบนา	*Hoplobatrachus rugulosus*	LC	Decreasing	No	-
4	กบบัว	*Hylarana erythraea*	LC	Decreasing	No	-
5	อึ่งอ่างบ้าน	*Kaloula pulchra*	LC	Stable	No	-
6	อึ่งน้ำเต้า	*Microhyla mukhlesuri*	LC	No information	No	-
7	เขียดจะนา	*Occidozyga lima*	LC	Decreasing	No	-
8	เขียดทราย	*Occidozyga martensii*	LC	Decreasing	No	-
9	ปาดบ้าน	*Polypedates leucomystax*	LC	Stable	No	-

Table 4.2.2.1-2

List of botanical species identified from the survey

No.	Thai Name	Botanical Name	IUCN 2023	Population Trend	Screened in	Criteria
1	ผักเบี้ยหิน	*Trianthema portulacastrum* L.	NE	No information	No	-
2	ควยงู	*Achyranthes aspera* L.	NE	No information	No	-
3	ผักโขม	*Amaranthus viridis* L.	NE	No information	No	-
4	บานไม่รู้โรยป่า	*Gomphrena celosioides* Mart.	NE	No information	No	-
5	กุ๊ก	*Lannea coromandelica* (Houtt.) Merr.	LC	Unknown	No	-
6	มะม่วงป่า	*Mangifera caloneura* Kurz	NE	No information	No	-
7	มะกอกป่า	*Spondias pinnata* (L.f.) Kurz	NE	No information	No	-
8	กล้วยเต่า	*Polyalthia debilis* (Pierre) Finet & Gagnep.	NE	No information	No	-
9	เครือไส้ตัน	*Amphineurion marginatum* (Roxb.) D.J.Middleton	NE	No information	No	-
10	รักร้อยมาลัย	*Calotropis gigantea* (L.) W.T.Aiton	NE	No information	No	-
11	เถาประสงค์	*Streptocaulon juventas* (Lour.) Merr.	NE	No information	No	-
12	โมกมัน	*Wrightia arborea* (Dennst.) Mabb.	LC	Unknown	No	-
13	อบเชยเถา	*Zygostelma benthamii* Baill.	NE	No information	No	-
14	ตาล	*Borassus flabellifer* L.	NE	No information	No	-
15	สาบแร้งสาบกา	*Ageratum conyzoides* (L.) L.	NE	No information	No	-
16	สาบเสือ	*Chromolaena odorata* (L.) R.M.King & H.Rob.	NE	No information	No	-
17	หญ้าละออง	*Cyanthillium cinereum* (L.) H.Rob.	NE	No information	No	-
18	พญามุตดิ	*Grangea maderaspatana* (L.) Poir.	LC	Stable	No	-
19	ผักแครด	*Synedrella nodiflora* (L.) Gaertn.	NE	No information	No	-
20	ตานหม่อน	*Tarlmounia elliptica* (DC.) H.Rob., S.C.Keeley, Skvarla & R.Chan	NE	No information	No	-
21	ตีนตุ๊กแก	*Tridax procumbens* L.	NE	No information	No	-
22	แคบิด	*Fernandoa adenophylla* (Wall. ex G.Don) Steenis	NE	No information	No	-
23	เหลืองปรีดียาธร	*Tabebuia aurea* (Silva Manso) Benth. & Hook.f. ex S.Moore	NE	No information	No	-
24	คอมขาว	*Ehretia* sp.	NE	No information	No	-
25	ตะคร้ำ	*Garuga pinnata* Roxb.	NE	No information	No	-
26	กุ่มบก	*Crateva adansonii* DC.	LC	Stable	No	-
27	แจง	*Maerua siamensis* (Kurz) Pax	NE	No information	No	-
28	มะละกอ	*Carica papaya* L.	DD	Decreasing	No	-
29	มะดูก	*Siphonodon celastrineus* Griff.	LC	No information	No	-
30	ผักเสี้ยนผี	*Cleome viscosa* L.	NE	No information	No	-

No.	Thai Name	Botanical Name	IUCN 2023	Population Trend	Screened in	Criteria
31	ผักบุ้งไทย	*Ipomoea aquatica* Forssk.	LC	Unknown	No	-
32	สะอึก	*Ipomoea obscura* (L.) Ker Gawl.	NE	No information	No	-
33	ขยุ้มตีนหมา	*Ipomoea pes-tigridis* L.	NE	No information	No	-
34	จิงจ้อนวล	*Merremia hirta* (L.) Merr.	NE	No information	No	-
35	จิ้งจ้อแดง	*Operculina turpethum* (L.) Silva Manso	NE	No information	No	-
36	ตำลึง	*Coccinia grandis* (L.) Voigt	NE	No information	No	-
37	มะระขี้นก	*Momordica charantia* L.	NE	No information	No	-
38	ขี้กาแดง	*Trichosanthes scabra* Lour.	NE	No information	No	-
39	แตงโม	*Citrullus lanatus* (Thunb.) Matsum. & Nakai	NE	No information	No	-
40	แตงไทย	*Cucumis melo* L.	NE	No information	No	-
41	หญ้าหนวดแมว	*Bulbostylis barbata* (Rottb.) C.B.Clarke	NE	No information	No	-
42	แห้วหมูเทียม	*Cyperus mitis* Steud	LC	Stable	No	-
43	หญ้าแห้วหมู	*Cyperus rotundus* L.	LC	Stable	No	-
44	พะยอม	*Anthoshorea roxburghii* (G.Don) P.S.Ashton & J.Heck.	VU	No information	Yes*	C1
45	ยางเหียง	*Dipterocarpus obtusifolius* Teijsm. ex Miq.	NT	No information	No	-
46	-	*Diospryros* sp.	-	No information	No	-
47	ลำตาควาย	*Diospyros coaetanea* H.R.Fletcher	NE	No information	No	-
48	มะเกลือ	*Diospyros mollis* Griff.	NE	No information	No	-
49	ตะโกนา	*Diospyros rhodocalyx* Kurz	NE	No information	No	-
50	เปล้าพุ่ง	*Croton bonplandianus* Baill.	NE	No information	No	-
51	เปล้าแพะ	*Croton hutchinsonianus* Hosseus	NE	No information	No	-
52	เปล้าใหญ่	*Croton persimilis* Müll.Arg.	NE	No information	No	-
53	หญ้ายาง	*Euphorbia heterophylla* L.	LC	Stable	No	-
54	น้ำนมราชสีห์	*Euphorbia hirta* L.	NE	No information	No	-
55	มันสำปะหลัง	*Manihot esculenta* Crantz	NE	Decreasing	No	-
56	ขันทองพยาบาท	*Suregada multiflora* (A.Juss.) Baill.	NE	No information	No	-
57	โลดทะนง	*Trigonostemon reidioides* (Kurz) Craib	NE	No information	No	-
58	พฤกษ์	*Albizia lebbeck* (L.) Benth.	LC	Stable	No	-
59	คาง	*Albizia lebbekoides* (DC.) Benth.	LC	Unknown	No	-
60	ถั่วลิสงนา	*Alysicarpus vaginalis* (L.) DC.	NE	No information	No	-
61	เสี้ยวส้ม	*Bauhinia malabarica* Roxb.	LC	Stable	No	-
62	เสี้ยวเครือ	*Bauhinia saccocalyx* Pierre	NE	No information	No	-
63	เถาวัลย์เปรียง	*Brachypterum scandens* (Roxb.) Wight & Arn. ex Miq.	NE	No information	No	-

No.	Thai Name	Botanical Name	IUCN 2023	Population Trend	Screened in	Criteria
64	พะยูง	*Dalbergia cochinchinensis* Pierre	CR (A2cd+4cd) [1]	Decreasing	Yes*	C1
65	ถั่วปากนก	*Dunbaria punctata* (Wight & Arn.) Benth.	NE	No information	No	-
66	กระถินยักษ์	*Leucaena leucocephala* (Lam.) de Wit	NE	No information	No	-
67	ถั่วผี	*Macroptilium lathyroides* (L.) Urb.	NE	No information	No	-
68	กระพี้จั่น	*Millettia brandisiana* Kurz	NE	No information	No	-
69	มะขามเทศ	*Pithecellobium dulce* (Roxb.) Benth.	LC	Stable	No	-
70	ประดู่ป่า	*Pterocarpus macrocarpus* Kurz	EN (A3cd) [1]	Decreasing	Yes*	C1
71	ชะอม	*Senegalia pennata* (L.) Maslin	LC	Stable	No	-
72	แสมสาร	*Senna garrettiana* (Craib) H.S.Irwin & Barneby	NE	No information	No	-
73	ขี้เหล็ก	*Senna siamea* L.	LC	Decreasing	No	-
74	มะค่าแต้	*Sindora siamensis* Teijsm. ex Miq.	LC	Decreasing	No	-
75	มะขาม	*Tamarindus indica* L.	LC	Stable	No	-
76	คราม	*Tephrosia purpurea* (L.) Pers.	NE	Stable	No	-
77	ถั่วเขียว	*Vigna radiata* (L.) R.Wilczek	LC	Unknown	No	-
78	แมงลักคา	*Mesosphaerum suaveolens* (L.) Kuntze	NE	No information	No	-
79	ผ่าเสี้ยน	*Vitex canescens* Kurz	LC	Unknown	No	-
80	ฝีหมอบ	*Beilschmiedia roxburghiana* Nees	LC	Unknown	No	-
81	หมีเหม็น	*Litsea glutinosa* (Lour.) C.B.Rob.	LC	Unknown	No	-
82	ครอบจักรวาล	*Abutilon indicum* (L.) Sweet	NE	Unknown	No	-
83	กระเจานา	*Corchorus aestuans* L.	NE	No information	No	-
84	กระเจี๊ยบแดง	*Hibiscus sabdariffa* L.	NE	No information	No	-
85	เส้งดอกม่วง	*Melochia corchorifolia* L.	LC	Stable	No	-
86	พลับพลา	*Microcos tomentosa* Sm.	LC	Stable	No	-
87	หญ้าขัดใบขาว	*Sida acuta* Burm.f.	NE	No information	No	-
88	หญ้าขัดใบป้อม	*Sida cordifolia* L.	NE	No information	No	-
89	หญ้าขัดมอน	*Sida rhombifolia* L.	NE	No information	No	-
90	สำโรง	*Sterculia foetida* L.	NE	No information	No	-
91	ขี้ครอก	*Urena lobata* L.	LC	Stable	No	-
92	สะเดา	*Azadirachta indica* A.Juss.	LC	Stable	No	-
93	เถาย่านาง	*Tiliacora triandra* (Colebr.) Diels	NE	No information	No	-
94	ชิงช้าชาลี	*Tinospora baenzigeri* Forman	NE	No information	No	-

[1] Source: IUCN RED LIST CATEGORY AND CRITERIA (https://www.iucnredlist.org/species/33028/2831736), retrieved on January 5, 2024

No.	Thai Name	Botanical Name	IUCN 2023	Population Trend	Screened in	Criteria
95	ผักขวง	*Glinus oppositifolius* (L.) Aug.DC.	LC	Stable	No	-
96	มะหาด	*Artocarpus lacucha* Buch.-Ham.	NE	No information	No	-
97	โพขี้นก	*Ficus rumphii* Blume	NE	No information	No	-
98	ข่อย	*Streblus asper* Lour.	LC	Stable	No	-
99	ตะขบฝรั่ง	*Muntingia calabura* L.	NE	No information	No	-
100	ยูคาลิปตัส	*Eucalyptus camaldulensis* Dehnh.	NT	Stable	No	-
101	ฝรั่ง	*Psidium guajava* L.	LC	Unknown	No	-
102	ผักโขมหินดอกม่วง	*Boerhavia diffusa* L.	NE	No information	No	-
103	ผักโขมหินดอกขาว	*Boerhavia erecta* L.	NE	No information	No	-
104	เทียนนา	*Ludwigia hyssopifolia* (G.Don) Exell	LC	Stable	No	-
105	กระทกรก	*Passiflora foetida* L.	NE	No information	No	-
106	ลูกใต้ใบ	*Phyllanthus amarus* Schumach. & Thonn.	NE	No information	No	-
107	มะขามป้อม	*Phyllanthus emblica* L.	LC	Decreasing	No	-
108	ลูกหมึก	*Phyllanthus reticulatus* Poir.	LC	Unknown	No	-
109	กรดน้ำ	*Scoparia dulcis* L.	NE	No information	No	-
110	ไผ่เลี้ยง	× *Thyrsocalamus liang* Sungkaew & W.L.Goh	NE	No information	No	-
111	ไผ่สีสุก	*Bambusa blumeana* Schult.f.	NE	No information	No	-
112	หญ้าขี้หมา	*Bothriochloa bladhii* (Retz.) S.T.Blake	NE	No information	No	-
113	หญ้าตดเลือด	*Bothriochloa pertusa* (L.) A.Camus	NE	No information	No	-
114	หญ้าปุ้ง	*Cenchrus brownii* Roem. & Schult.	NE	No information	No	-
115	หญ้าสอนกระจับ	*Cenchrus echinatus* L.	LC	Stable	No	-
116	หญ้าขจรจบ	*Cenchrus polystachios* (L.) Morrone	NE	Stable	No	-
117	หญ้ารังนก	*Chloris barbata* Sw.	NE	No information	No	-
118	หญ้าแพรก	*Cynodon dactylon* (L.) Pers.	NE	No information	No	-
119	หญ้าปากควาย	*Dactyloctenium aegyptium* (L.) Willd.	NE	No information	No	-
120	หญ้าแหวน	*Dichanthium caricosum* (L.) A.Camus	NE	No information	No	-
121	หญ้าตีนนกช่อขน	*Digitaria ciliaris* (Retz.) Koel.	NE	No information	No	-
122	หญ้านกสีชมพู	*Echinochloa colona* (L.) Link	LC	Stable	No	-
123	หญ้าไข่เห็บเล็ก	*Eragrostis tenella* (L.) P.Beauv. ex Roem. & Schult.	NE	No information	No	-
124	หญ้าหนวดฤาษี	*Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult.	NE	No information	No	-
125	หญ้าคา	*Imperata cylindrica* (L.) Raeusch.	NE	No information	No	-
126	หญ้าดอกขาว	*Leptochloa chinensis* (L.) Nees	NE	No information	No	-

No.	Thai Name	Botanical Name	IUCN 2023	Population Trend	Screened in	Criteria
127	หญ้าชันกาด	*Panicum repens* L.	LC	Stable	No	-
128	แขม	*Phragmites karka* (Retz.) Trin. ex Steud.	LC	Unknown	No	-
129	อ้อย	*Saccharum officinarum* L.	NE	No information	No	-
130	หญ้าขน	*Urochloa mutica* (Forssk.) T.Q.Nguyen	LC	Stable	No	-
131	หญ้าสลอย	*Urochloa subquadripara* (Trin.) R.D.Webster	LC	Stable	No	-
132	เลา	*Saccharum spontaneum* L.	LC	Stable	No	-
133	ไผ่รวก	*Thyrsostachys siamensis* Gamble	NE	No information	No	-
134	ผักเบี้ยใหญ่	*Portulaca oleracea* L.	NE	Unknown	No	-
135	พุทรา	*Ziziphus mauritiana* Lam.	LC	Stable	No	-
136	ยอป่า	*Morinda coreia* Buch.-Ham.	NE	No information	No	-
137	หญ้าลิ้นงู	*Oldenlandia corymbosa* L.	NE	Unknown	No	-
138	คัดเค้า	*Oxyceros sp.*	NE	No information	No	-
139	หญ้าท่าพระ	*Richardia brasiliensis* Gomes	NE	No information	No	-
140	กรวยป่า	*Casearia grewiifolia* Vent.	LC	Stable	No	-
141	หนามพุงดอ	*Azima sarmentosa* (Blume) Benth. & Hook. f.	LC	No information	No	-
142	ตะคร้อ	*Schleichera oleosa* (Lour.) Merr.	LC	Stable	No	-
143	ขี้หนอน	*Zollingeria dongnaiensis* Pierre	DD	No information	No	-
144	หนามคนทา	*Harrisonia perforata* (Blanco) Merr.	LC	Stable	No	-
145	เถาคันขาว	*Causonis trifolia* (L.) Mabb. & J.Wen	NE	No information	No	-
146	หนามกระสุน	*Tribulus terrestris* L.	LC	Stable	No	-

Remark: * These plant species in Thailand hold economic value, and the Department of Forestry distributes seedlings and promotes their cultivation in the country, resulting in widespread planting by farmers in various locations, including fields, agricultural areas, plantation, and households.

1) Species Level

(a) Criterion 1 is triggered by species listed as Vulnerable (VU), Critically Endangered (CR) or Endangered (EN) on the International Union for Conservation of Nature (IUCN) Red List, and nationally/regionally listed species assessed using similar criteria.

Wildlife: From secondary data, field surveys, and information obtained from the local people there were neither Critically Endangered (CR) nor Endangered (EN) species found.

Plant: In the project area, one species, Siamese Rosewood (*Dalbergia cochinchinensis* Pierre), is classified as Critically Endangered (CR), one species, Burma Padauk (*Pterocarpus macrocarpus* Kurz), is classified as Endangered (EN), and White Meranti (*Anthoshorea roxburghii* (G.Don) P.S.Ashton & J.Heck.) is classified as Vulnerable (VU).

Based on IUCN red list (https://www.iucnredlist.org/), *Dalbergia cochinchinensis* Pierre. (Siamese Rosewood) listed as critically endangered (CR) under criteria A2cd+4cd. Criteria A2 refers to species with those population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased or may not be understood or may not be reversible. In Thailand the species is mostly found in the North, Northeast and East regions of the country and has been recorded from 14 provinces. A recent quantitative study based on species distribution modeling estimated the species' potential natural range at 441,912 km^2 (Gaisberger *et al*. 2022). Using herbarium and observation records the extent of occurrence is 624,595 km^2.

Pterocarpus macrocarpus Kurz. (Burma Padauk), listed as endangered (EN) under criteria A3cd. Criteria A3 refers to species with those population reductions projected, inferred or suspected to be met in the future 10 years or three generations. In Thailand, the subpopulation is small and has only been found along the borders of Myanmar and Lao PDR (Liengsiri *et al*. 1998, Winfield *et al*. 2016). The highest densities of the tree are found in protected areas (Liengsiri *et al*. 1998).

Anthoshorea roxburghii (G. Don) P. S. Ashton & J. Heck. (White Meranti) listed as vulnerable (VU) under criteria A2cd. This species is very common and widespread species. It is considered an important component of dry, semi-evergreen forests in the Eastern Ghats (Raju *et al*. 2011). Within Malaysia, although the species has a small

area of occurrence (AOO) it exhibits gregarious growth and a large population (Chua *et al*. 2010). Overall, population is in decline and there has been at least a 30% population reduction in the last 300 years due to exploitation of the species and habitat loss.

Based on the field survey by COT, the identified plant species did not originally occur in conservation areas but exist within the project area, which was previously used for agriculture. These plant species in the project area were introduced and cultivated by the previous landowners for personal benefits as these plant species in Thailand hold economic value, and the Department of Forestry distributes seedlings and promotes their cultivation in the country, resulting in widespread planting by farmers in various locations, including fields, agricultural areas, plantation, and households. To encourage the presence of these plant species in the area, the project can assist by promoting the cultivation of local plant species. This can be achieved by obtaining superior trees from the local forestry authority, a measure taken to prevent genetic pollution or undesirable gene flow into wild populations. Additionally, the project may provide support to the local forestry department in executing these initiatives.

(b) Criterion 2 is triggered by habitats of significant importance for endemic or restricted-range species.

Wildlife: Based on the BirdLife database[2], there are six Endemic Bird Area (EBA) in Thailand include

1. Doi Chiang Dao, Chiang Mai Province, which is designated as a Wildlife Sanctuary (IUCN 1992c),
2. Malayan peninsula lowlands, the lowland rain forests of Peninsular Malaysia and extreme southern peninsular Thailand are included.,
3. Myanmar-Thailand mountains, this area is defined by the range of Burmese Yuhina *Yuhina humilis*, which is known from two localities in north-west Thailand and several localities in Myanmar. One of the localities where Y. humilis has been recorded in Thailand lies within the large contiguous area protected in Mae Ping National Park and Mae Tuen and Om Koi Wildlife Sanctuaries (Round 1988; see IUCN 1992c). This EBA, includes three IBAs in Thailand such as Mae Wong, Om Koi, and Umphang,

[2] https://datazone.birdlife.org/eba

4. Peninsular Thailand lowland forests, the range of the threatened Gurney's Pitta *Pitta gurneyi* (classified as Critical) defines this Secondary Area. It is found in southern peninsular Thailand and adjacent southern Tenasserim in Myanmar, in level lowland semi-evergreen rain forest below 150 m. Level lowland forest has been almost completely lost within its range in Thailand, where intensive survey work has located birds at four localities, but the only possibly viable population is at Khao Nor Chuchi in Krabi province, where 24-34 pairs are estimated. This EBA includes one IBAs in Thailand, Khao Nor Chuchi, Krabi Province.
5. Sumatra and Peninsular Malaysia, this EBA includes mountains on the Indonesian island of Sumatra (in the provinces of Aceh, Sumatera Utara, Sumatera Barat, Jambi, Bengkulu, Sumatera Selatan and Lampung) and in Peninsular Malaysia. It is defined as comprising a single EBA because they share more restricted-range species than are endemic to the mountains of Peninsular Malaysia alone. This EBA includes two IBAs in Thailand, Hala Sector, Hala-Bala Wildlife Sanctuary (Yala Province and Narathiwat Province) and Bang Lang National Park (Yala Province)., and
6. Thailand-Cambodia mountains., this area includes the mountains of south-east Thailand and the Cardamom and Elephant mountains in south-west Cambodia. This EBA includes one IBAs in Thailand, Khao Soi Dao, Chantaburi Province.

From the database, no Restricted-range species found in Suphanburi Province or found in the survey conducted by COT. All IBAs do not encompass Suphanburi Province, where the Project to be developed. Therefore, the area does not fall under Criterion 2.

(c) Criterion 3 is triggered by migratory and/or congregatory species occurring in the CHAA. All migratory or congregatory species were screened to determine if the CHAA contained irreplaceable and/or extremely vulnerable habitats used either periodically or consistently.

Wildlife: Bird species that found from the field survey are mostly classified as Least Concern (LC), indicating a low risk of extinction. However, there is one species of migratory bird, the Painted Stork (*Mycteria leucocephala*), classified as Near

Threatened (NT) according to ONEP (2017). Additionally, according to ONEP (2017), three other migratory bird species are identified as Vulnerable (VU). These include the Black-capped Kingfisher (*Halcyon pileate*) and Purple Heron (*Ardea purpurea*).

Regarding the mentioned migratory bird species, it was observed that they are not a significant portion of the population that migrates in a crucial pattern from one geographic area to another. There is no evidence that they form a large group along the migration route, and there is no indication of communal nesting or breeding behavior in the Project area (Suphanburi Province). Moreover, the Project area is not situated along the major migratory routes of Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian - Australasian Flyway Partnership (EAAFP).

The project area is therefore not a bottleneck area where birds are essential to migrate through in large numbers during a specific timeframe for their migration. It also does not fall under areas that regularly sustain at least 1 percent of the global population of a migratory or congregatory species throughout the species' lifecycle. Furthermore, it is not an area that consistently supports 10 percent of the global population of a species during periods of environmental stress. Therefore, the Project area does not meet the criteria for Criterion 3.

2) Ecosystem Level

Criterion 4 is triggered by ecosystems that are threatened, house unique assemblages of biome restricted species, or are recognized for high conservation value, including protected areas. In the Project area and the study area, there are no evident ecosystems that might be threatened, as it is situated at a distance of 30 kilometers from the Phu Toei National Park, and the project area is primarily agricultural land (**Figure 4.2.2.1-8**).

3) Landscape Level

Criterion 5 applies to landscape-level features that can influence key evolutionary processes. Key landscape features such as unique topography that creates unique habitats and areas important for climate change adaptation were identified using literature review and through expert consultation. In the Project area and the study area, there are no evident ecosystems that might be threatened, as it is situated at a distance of 30 kilometers from the Phu Toei National Park, and the project area is primarily agricultural land (**Figure 4.2.2.1-8**).

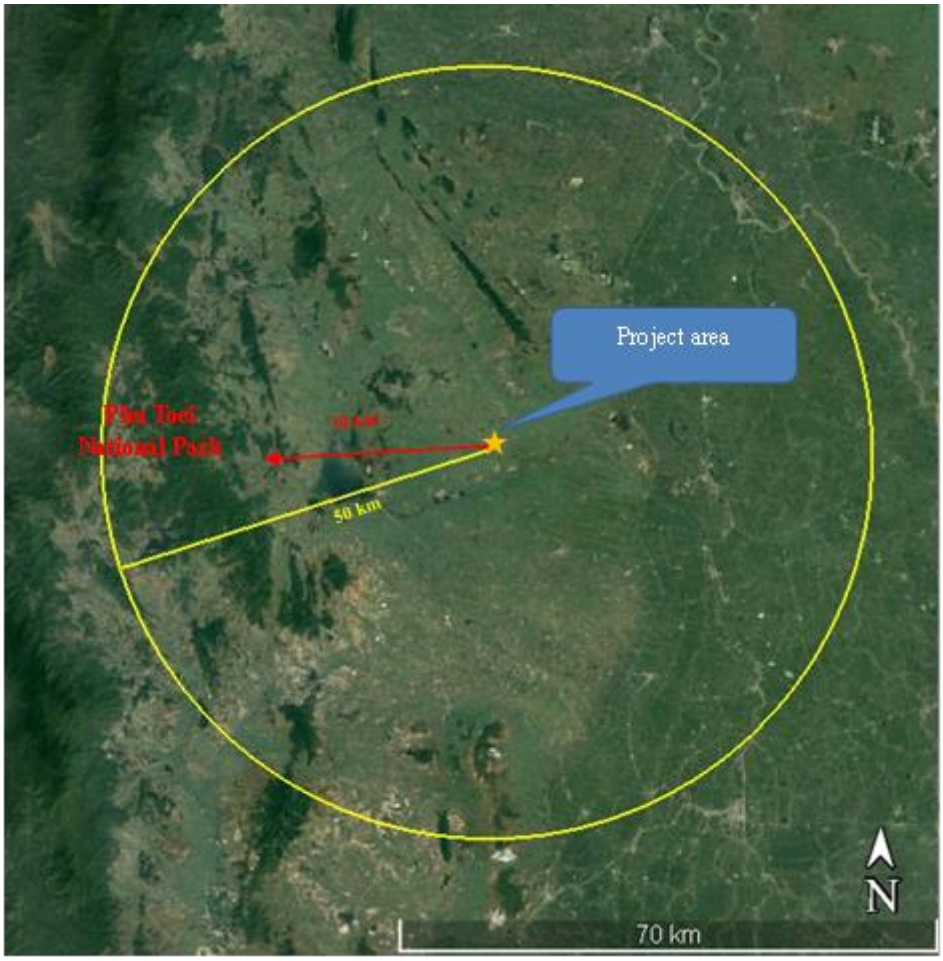


Figure 4.2.2.1-8 Distance from the project area and Phu Toei National Park

Impact Assessment

(1) Assessment of Impacts – Loss of Terrestrial Habitat from Construction

The project area is located in the central region of Thailand, in the Tha Chin River Basin, approximately 30 kilometers away from the Phu Toei National Park (**Figure 4.2.2.1-8**). The current condition of the Project area is characterized by an agroecosystem, including sugarcane, and cassava. However, with the opening and construction of the Project area, there will be changes to the existing agroecosystem, leading to the loss of the agricultural system and transformation into an open area with solar panels. Nevertheless, nearby areas still maintain agricultural spaces and water sources. Wildlife in the Project area mainly consists of birds and small animals that can move and disperse to find food in the nearby agroecosystem areas within the study and surrounding areas.

(2) Assessment of Impacts - Disturbance or Displacement of Fauna

During the construction phase, there will be a gradual opening of the area for construction activities. The process of the construction will impact the food sources and habitats of small wildlife. The project will systematically open different parts of the area, avoiding the simultaneous opening of the entire space at once. This approach aims to minimize the impact on small wildlife, allowing them to move out of the area gradually. If construction contractors encounter wildlife during the construction process, they are required to relocate the wildlife to a nearby ecosystem. Additionally, hunting or harming wildlife in the construction and surrounding areas is strictly prohibited for construction personnel.

(3) Assessment of Impacts – Temporary and Permanent Barrier Creation, Edge Effects and Fragmentation

Construction activities may result in temporary habitat fragmentation, primarily caused by construction machinery and accommodations for workers. These disruptions temporarily obstruct the habitats and food sources of wildlife due to the opening and modification of the land surface in the affected areas. Consequently, the environmental system undergoes changes, limiting the temporary access of wildlife to their habitats and food sources.

Once construction is completed, certain types of wildlife, such as small birds and small-sized crawling animals, can move in and establish habitats and foraging grounds in the area. In the case of permanent barriers, including control building, switchyard area, BESS area, and area under solar panels these structures can act as long-term obstacles to larger wildlife requiring significant space. Small-sized wildlife, such as birds and small mammals capable of quickly adapting to continuous human agricultural activities in the vicinity. In the Project area, small wildlife can still find food, thrive, and reproduce. Nevertheless, the project area was originally an agricultural zone that had already undergone modifications for farming activities leading to alterations to the landscape and the presence of disturbances caused by human activities in the area. The Project's operation, therefore, result in low-level of limiting the habitat, and food sources.

(4) Assessment of Impacts – Temporary Degradation of Habitat during Construction Phase

During construction, there will be an opening of the area and the use of construction machinery. The habitats of wildlife will be temporarily disturbed, and there will be noise during the construction period of 12 months. Once construction is completed, the Project will create some green areas.

(5) Assessment of Impacts - Mortality: Vehicle Strike, Hunting & Poaching

During the construction phase, machinery and construction workers will enter the area. The Project will require the contractor to supervise and ensure that construction vehicles are driven cautiously to avoid wildlife collisions, not exceeding the specified speed limit (10-15 kilometers per hour). This is to allow passing wildlife to safely cross the road in a timely manner without causing collisions. Additionally, construction workers are prohibited from hunting wildlife in the Project area and nearby areas. If wildlife is encountered in the area or if construction is blocking their path, the wildlife should be safely relocated to the nearby environmental system.

(6) Assessment of Impacts - Degradation of Habitat during Operations

Once construction is completed, the Project will create some green areas. Moreover, the project shall maintain and care for the green areas, and replant in case of tree loss, ensuring the sustainability of the green spaces (is the intent to restore some natural habitat).

(7) Assessment of No-Net-Loss of Biodiversity Values

From the field surveys, no species of wildlife classified as Critically Endangered (CR) or Endangered (EN), were found. However, the majority of species observed fall into the category of Least Concern (LC), indicating low risk of extinction. Regarding the Project's potential impacts, it may lead to a low decrease in biodiversity within a particular species. The environmental system is at a low risk level since the Project is not located in a crucial conservation area, nor area significant for the evolution of wildlife or a geographic area of Thailand or the World. Furthermore, the Project area is not a region with a high number of genes, species, or individual living organisms within a biological community. The Project's occurrence has a limited impact on reducing the biodiversity, and it does not contribute to a significant decline in the number, genetic variability, and diversity of species and biological communities in the specific area. Therefore, the Project does not cause a substantial loss of diversity in the mentioned living organisms, and it does not jeopardize the functionality of the environmental system or lead to its collapse.

4.2.2.3 Aquatic Ecology

(1) Construction Phase

The nearest surface water source of the Project is Huai Hin. It is located approximately 100 meters away from the Project area. Activity during construction involves having construction workers come to work on the site and use the water, thus, generating wastewater at the construction camp site. During the construction phase, there will be maximum 1,596 workers at the camp site at a given time. Estimated wastewater generated is 89.38 cubic meters per day (80% of 70 liters per capita per day). The Project will treat wastewater with a septic tank provided by the contractor. If the contractor discharges treated waste or sewage outside into natural water sources or private areas, the contractor must obtain permission from relevant government agencies or landowner to ensuring that the discharged sewage will not have adverse environmental impacts in the future. In addition, the contractor shall provide a retention pond at workers' camp and conduct water quality monitoring once a month to ascertain the water quality before discharging. The impact shall occur temporarily only if wastewater is discharged into the surrounding environment; hence, the impact on aquatic organisms is considered low.

Wastewater from construction activities will be water from equipment cleaning mainly. An estimated 50 cubic meters per day of wastewater will be generated from equipment cleaning. The wastewater will be collected in onsite drainage gutters and collected in the wastewater collection pond. The water will be reused for dust suppression.

Moreover, the project has provided retention ponds with a size of 700 cubic meters to accommodate excess rainwater. The prepared retention pond can handle the excess rainfall occurring within a 3-hour period adequately. Therefore, the project has not implemented a drainage system around the project area. Nevertheless, during the construction phase, there will be a temporary office set up in the construction area, defined to be at least 30 meters away from water sources, to prevent water pollution from on-site activities. This includes establishing temporary drainage channels and sedimentation ponds to control construction runoff and minimize the impact on the surrounding area. Hence, the anticipated impact during construction to aquatic organism is expected to be low.

(2) Operation Phase

There will be maximum of 1.40 cubic meter per days of wastewater from workers consumption (peak consumption at PV cleaning period) which will be treated by a septic tank and no discharging to surrounding environment. There will be wastewater from

PV cell cleaning activity, which is expected to be 494.52 cubic meters for one cleaning. The water is not contaminated with impurities such as oils but it only contains dust. Therefore, the wastewater from PV cell cleaning can be directly discharged onto the ground.

For the runoff that may be contaminated with oil from the transformer area where engine oil is used, it will be sent to an oil sump to separate oil and treat further. The project doesn't discharge wastewater to the environment; thus, it has no impact on surface water quality.

4.2.3 SOCIO-ECONOMIC CONDITIONS

4.2.3.1 Socio-economics

(1) Construction Phase

1) Potential Positive Impacts from the Project

(a) Employment of Local People

The Project has a policy to hire non-skilled workers, such as gardeners, maids, and security guards. The Project requires the contractor to consider hiring locals first. Works that require special qualifications, knowledge, and skills for the Company's needs, such as installation and electrical systems, local people will be considered as a priority as well. However, employment of employees with special skills require training to ensure safety and efficiency of work and employees will be trained regularly according to the Project's policy. Therefore, during the construction phase, there will be limited and temporary positive impact in terms of development of local people and improvement of the quality of life for people in the community.

(b) Local Economic Promotion

The Project determines the construction and installation phase to last about 12 months and use a maximum of 1,596 workers a day. More people from this Project will increase the cash flow and improve the local economy. However, the economic promotion will last only for a short time. Therefore, the impact level is low.

2) Potential Negative Impacts from the Project

In the construction phase, construction activities may generate noise disturbance. There will be transportation of construction materials, machinery, and workers, which may increase the traffic volume on Rural Highway 4086 temporarily at certain times of each day. This may cause traffic problem, road damage, road obstruction, and accidents. This activity will disturb the serenity and safety of communities near the construction site. However, the Project has determined environmental impact mitigation measures for the construction phase. The impact will last for a short time. Therefore, the impact level is low.

(2) Operation Phase

1) Potential Positive Impacts from the Project

(a) Local Development and Improvement of the Quality of Life for Local People

In the operation phase, local administrative organizations will collect taxes from the Project, such as local maintenance tax, building and land tax, and a share of value-added tax. This revenue can be used for local development and improving the quality of life for local people. In addition, the Project has several community relations campaigns to establish positive relationships and pay back to the community. The Project will also support local activities throughout the operation phase. Therefore, there will be overall positive impacts in terms of local development and improvement of the quality of life for local people. The positive impact level is moderate.

(b) Employment of Local People

In the operation phase, there will be staff administering the solar power generating system and security guards (5 people in total) and there are approximately 20 solar panel cleaning staff per time. Since the project cleans the panels twice a year, with a duration of about 2 months per once cleaning cycle, therefore, during the operation period, there will be some days where the maximum number of employees working in the project area is 25 people per day. The Project understands that local communities want their community members to work for the Project. To serve this need, the Project will consider hiring people in local communities whose qualifications fit the requirements of the Project first, especially during the two times of solar panel cleaning per year. Therefore, the overall impact of employment of local people is positive, and the impact level is moderate.

(c) Activities Promoting Community Relations

The Project has public relations campaigns about its operations regularly to establish an accurate understanding and minimize concerns among people living near the Project. The purpose is to establish a good relationship between the Project and the community. All these activities will be implemented throughout the operation phase. Therefore, activities promoting community relations are positive impacts, and their level is moderate.

2) Potential Negative Impacts from the Project

In the operation phase, the communities around the Project area may have concerns about the Project operations. However, the Project controls the concerns from the design and installation of machinery to be distant from the communities and sensitive receptors as much as possible to mitigate concerns of the communities near the Project. In addition, the Project has several plans to establish an accurate understanding. These plans will assure confidence in the Project development. There are channels to receive complaints and resolve the impacts from the Project development and hear suggestions from relevant parties. Therefore, the impact is low.

4.2.3.2 Gender Related Impact

Gender impacts refer to the diverse ways in which project initiatives can affect individuals, communities, and societies through the lens of gender identity and roles. Understanding these impacts is crucial not only for ensuring equitable development but also for fostering sustainable and inclusive practices at the project level, as well as at the corporate level and within the renewable energy / solar power sector.

Historically, projects and their impacts have been predominantly viewed from a gender-blind perspective, failing to acknowledge the nuanced ways in which the project activities and impacts intersect with gender dynamics. However, recent discourse and research have shed light on the ways projects have impacts and implications for different genders.

Gender impacts in the renewable energy sector encompass a wide array of considerations, ranging from workforce participation to access to energy resources and decision-making roles within the industry. Understanding these impacts is crucial for promoting gender equality and ensuring that the benefits of Gulf's renewable energy project are distributed equitably across genders. From employment opportunities and labor conditions to access to infrastructure and urban spaces, gender impacts permeate various facets of the projects, influencing societal outcomes at both micro and macro levels.

As part of this IEE, a gender assessment entailed review of national legislation and institutions, summarized with key findings below. Gender engagement in consultation is also summarized, followed by assessment of potential gender impacts associated with the Project. Project commitments to avoid and/or mitigate these impacts are included in Chapter 5. A review of gender equality at the national and local levels can provide the following information:

(1) Gender Equality at the National Level

On B.E. 2558 (2015), Thailand enacted the Gender Equality Act with the aim of protecting everyone, including males, females, and individuals who express themselves differently from their inborn gender, from gender-based discrimination. The Act mandates the establishment of two committees:

1) The Committee for the Promotion of Gender Equality (Committee for the PGE), which is empowered to formulate policies, mitigation measures, and action plans for promoting gender equality in all sectors. It also outlines guidelines for providing assistance, compensation, and remedies to individuals who have experienced unfair gender discrimination.

2) The Committee on the Determination of Unfair Gender Discrimination and the Department of Women's Affairs and Family Development (Committee on DUGD), which is tasked with considering issues submitted by petitions claiming unfair gender discrimination.

Based on the Gender Gap Index, Thailand scored 0.711 in B.E. 2566 (2023), increase from 0.706 in B.E. 2558 (2015), primarily due to improvements in education attainment and political empowerment dimensions.

(2) Gender Equality at the Local Level

From the two public meetings held by COT as part of this IEE process, there were 17 female participants and 26 male participants during the pre-engagement, and 169 female participants and 88 male participants during the public meeting. All were allowed to express their opinion as per their willingness. This indicates that gender discrimination is not an obvious problem among the locals. Additionally, during the public meeting of the project, a representative from the women's group in the area also participated, and no concerns were raised about project gender impacts.

Following are some key gender impacts in the renewable energy sector, considered and identified as potentially present for this project:

1) Workforce Participation: Women are underrepresented in the renewable energy workforce in Thailand, particularly in technical and leadership roles. Although Gulf's Sustainability Policy has a commitment to "Provide a safe and healthy work environment that promotes non-discrimination, gender equality, personal development and well-being", the Project does not have gender targets for its workforce participation levels. It can be predicted that there will be an underrepresentation of women in the Project workforce, which results from various factors, including lack of access to education and training opportunities, gender stereotypes, and biases in hiring and promotion practices.

2) Income and Economic Empowerment: By providing women with opportunities for employment and entrepreneurship in the project or to support the project (through supply chain opportunities), projects, it is possible that the Project could enhance their income-generating capabilities, increase women's' empowerment and strengthen local economies.

3) Community Engagement and Benefits Sharing: Project approaches to community engagement and benefits sharing may disproportionately benefit men unless there is awareness, guidelines and targets for gender participation in community relations and community development activities. These are essential for maximizing the social and economic benefits of the project and ensuring that women are equally involved. Gender balanced targeting and participation by the project can conversely have a positive impact, providing example to other stakeholders locally. Targeting women' involvement in program decision-making processes, ensuring that their voices are heard, and that they have equitable access to project benefits can enhance the project sustainability and contribute to positive social outcomes.

4) Gender-Based Violence and Safety: Depending on contractor workforce accommodation plans, some women working in the project or in the nearby communities may face gender-based violence, harassment, and safety risks. This can be avoided by designing facilities, transport and HR mechanisms to prevent the potential impacts. Examples for prevention strategies include creating safe and supportive working environments, implementing gender-sensitive security measures, and providing training on gender equality and workplace conduct, to help address these challenges and ensuring the well-being of all workers.

Regarding the construction of the project, the first priority for labor will be given to local people for both skilled and non-skilled workers. However, a substantial number of workers will come from outside. As such, GBVH risks and issues may arise most specifically from labor influx, as set out below.

Risk Factor	Why this increase GBVH risk
Workforce - Labor Influx	- The sudden increase in a temporary workforce can strain local resources and exacerbate tensions between local communities and workers, increasing the risk of GBVH both within the workplace and in the surrounding community.
- Worker Accommodation	- Inadequately segregated and secured accommodations can increase the risk of GBVH. Poorly designed living spaces may lack privacy and safety measures, making some workers more vulnerable to abuse.
Discrimination - Labor and working conditions	- Unsafe or discriminatory working conditions can increase the vulnerability of workers to GBVH, particularly for women and marginalized genders. Power imbalances between supervisors and workers can lead to exploitation and harassment.
- Local recruitment	- Discriminatory recruitment practices can exacerbate gender inequalities and create environments conducive to GBVH. Lack of equal opportunity for local women and marginalized groups in employment can lead to economic disparities and increased vulnerability.
Service Provision - Community health and safety	- Projects can negatively impact community health and safety, increasing GBVH risks. For example, disruption of social structures and increased stress on community resources can lead to heightened domestic violence and community conflict.
Security Personnel - Security arrangement	- Overly militarized or untrained security forces may themselves become perpetrators of GBVH, especially if they lack awareness and training on gender sensitivity and human rights.

Source: Addressing Gender-Based Violence and Harassment by IFC, 2020.

Overall, addressing potential Project gender impacts requires a holistic approach that considers the intersecting factors of gender, social norms, economic structures, and institutional arrangements. By mainstreaming gender equality principles across all aspects of the Project development and implementation, it is possible to avoid and effectively mitigate potential negative impacts. Furthermore, it is possible for Gulf solar projects gender strategies to help lead the way and harness the sector's potential to advance gender equality, social inclusion, and sustainable development.

To prevent and mitigate GBVH risk, the Project mandates the following measures;

(1) Establish policies on GBVH to safeguard workers and nearby community of the Project.

(2) Ensure gender-sensitive policies are in place, promoting equal opportunities for employment, training, and advancement.

(3) Make a project-specific commitment to provide employment and supply chain opportunities for local women. For example, in service cleaning contracts, no gender specific within local content requirements to ensure the inclusion and participation of women in these opportunities.

(4) Establish Corporate social responsibility (CSR) activities to ensure that all gender can be involved.

(5) Ensure that all facilities (restrooms, changing rooms) are safe, accessible, and respectful of privacy for all genders.

(6) Conduct gender sensitivity training for all project work teams, managers, and contractors. This training aims to increase awareness of gender issues, promote inclusivity, and enhance understanding of the importance of gender equality in project implementation.

4.2.3.3 Influx Management

(1) Construction Phase

The influx of construction workers during construction phase could cause adverse health impacts to workers and communities. The impact assessment related to influx of construction workers on issues mentioned as follows:

1) Impacts within Construction Area and Workers' Camp

(a) Sanitation within the Construction Workers' Camp

There are 1,596 construction workers (Maximum) during construction phase. Potential workers' camp location has not yet finalized at this stage however, it is expected to be located near the construction area. The contractor will provide the workers' camp with proper welfare and utilities comply with the Notification of the Labor Welfare Committee on Standards of Residence as Labor Welfare for Employees of Construction Activity B.E. 2559 (2016) and relevant laws or international standards, including recommendations and suggestions from ADB, as well as the Project developer's own experiences include; surrounding environment, accommodation, bathrooms and toilets, electricity system and equipment, drinking water, wastewater management, solid waste management, rainwater drainage, health management, and fire prevention. Details are shown in **Section 2.4.1**.

(b) Medical Welfare Provision

The construction workers may be at risk from contagious diseases or epidemic among construction workers due to the high density of living in workers' camps, and also be facing personal hygiene problems. For example, sexually transmitted diseases, diarrhea, respiratory diseases, and diseases that are carried by insects, such as dengue fever. By providing proper welfare and utilities as discussed in **Section 2.4.1** include accommodation, bathrooms and toilets, electricity system and equipment, drinking water, wastewater management, solid waste management, rainwater drainage, health management, and fire prevention, the Project and the contractors can avoid burdening the health service.

2) Impact to the surrounding communities

(a) Pollution and environmental impacts

a) Wastewater Management

At the workers' camp, the contractor shall provide a septic tank or a prefabricated wastewater treatment systems at suitable size with the number of workers to treat wastewater from worker consumption include toilets and bathrooms.

Waste or sewage that is generated from the prefabricated wastewater treatment systems will be disposed of according to sanitary principles by a local authority. The septic tanks/treatment systems must be located at least 30 meters away from rivers or public water sources. If the contractor discharges treated waste or sewage outside into natural water sources or private areas, the contractor must obtain permission from relevant government agencies or landowner to ensuring that the discharged sewage will not have adverse environmental impacts in the future. In addition, the contractor shall provide a retention pond at workers' camp and conduct water quality monitoring once a month to ascertain the water quality before discharging.

b) Noise level

Noise impact from workers' camp may disturb the communities at nighttime because of high number of workers. This could cause conflict with local people. The Project and the contractors shall strictly implement preventive and mitigative measures to control and monitor the workers so that they do not create problems to surrounding communities at nighttime.

c) Transportation

Another majority of impacts may arise from accidents during the logistics of construction equipment. This is one of the concerns expressed by the community at the hearing meeting. Construction equipment will be transported from Laem Chabang Port through Highway No. 3702 to Suphanburi Province along Highway No. 340, cut onto Highway No. 3350 and Highway No. 4086 to enter the project area. Transportation activity may cause traffic problem, road damage, road obstruction, and accidents. This activity will disturb the serenity and safety of communities near the construction site.

There will be 27 medium trucks and 1 light truck provided for workers' transportation. According to the assessment in Section 4.2.4.2, the results showed that the project's transportation activities during the construction phase do not significantly impact the service level of Rural Road No. 4086. The road's level of service remains the same (Level A), allowing vehicles to move freely at free-flow speed, where the driver can select the speed of travel without being influenced by other means of transport in the traffic flow. Nevertheless, there are Wat Nong Hin and Ban Nong Hin School locate nearby the construction area so the Project is required to avoid transportation during rush hour.

However, the Project has determined environmental and social impact mitigation measures for the construction phase. The impact will last for a short time. Therefore, the impact on the surrounding communities related to the pollution and environmental impacts from the construction activities will be low.

(b) Impact on public health services and public infrastructure

With a large number of construction workers, if there is a contagious disease or epidemic occurs in the workers’ camp, there is a chance that the disease may spread to the surrounding communities. Communicable diseases such as sexually transmitted diseases, hepatitis, pneumonia, diarrhea, and diseases that are carried by insects, such as dengue fever could be areas of concern. Common cold and flu caused by probably new strains are very well possible, as well as respiratory tract diseases.

Even though the agricultural area is the majority in the area with a radius of 3 kilometers surrounding the project, there are places where the people gather for community activities, namely Wat Nong Hin and Ban Nong Hin School. There are vulnerable groups that need to be given importance in monitoring the impacts of communicable disease outbreaks. In addition, there are also other communities surrounding

the project area, especially Moo. 3, Ban Nong Po, which is the community closest to the project area. If illness occurs, it will increase the service burden on the local primary health care unit, namely Nong Krathum Sub-district Health Promoting Hospital. It is necessary that the Project and the contractors strictly comply with the relevant laws and regulations.

The nearest medical health service to the construction area is Nong Krathum Sub-district Health Promoting Hospital, located 4.9 kilometers away from the Project. It is a primary-level healthcare facility with a mission to promote health, restore health, prevent disease, and provide medical treatment services for outpatients (OPD). The Nong Krathum Sub-district Health Promoting Hospital serves an area covering five villages with a total population of 3,166 people with limited number of healthcare personnel. In the event of illness or injury that exceeds the capability of the local facility, the patient can be transferred to another public facility or private hospital for further treatment. The Project and the contractors can avoid burdening the health service by strictly comply with the Notification of the Labor Welfare Committee regarding standards for residential welfare for construction labor, B.E. 2559 (2016), and provide first aid equipment and medical supplies within the construction area, including a medical shuttle, according to the Ministry of Labor Regulations on the provision of welfare in business establishments B.E. 2548 (2005).

(c) Conflict with the local people

Construction workers from other areas, including foreign workers, could have conflicts with local people within the surrounding communities due to differences in culture, value and ways of life. The influx of workers may result in problems such as crime, gambling, theft, drugs, etc. This is in line with the comments from the hearing meeting where the participants gave their opinion on the social impact that there are concerns about employment.

However, the project has given priority to hiring local workers. If the local workers do not have the qualifications specified by the project, it is necessary to hire foreign workers. The project has established preventive and mitigative measures to control and monitor these workers so that they do not create problems for surrounding communities. In order to ensure the efficient operation of the project without causing social and environmental impacts or annoyance and conflict problems between the project and surrounding communities, the project has established procedures for handling complaints. When the complaint is resolved, the project will urgently notify the complainant of the results and actions of the project.

(d) Economic impact from influx of workers

The potential influx of people to the project area may create economic opportunity but may also cause negative social impacts such as increased competition for resources and social services, distortion in property values and changes in social dynamics. These potential impacts are elaborated below.

Population influx as well as the presence of sizeable outsider workforce can disturb social dynamics, for example with the increased demand or pressure on services and resources such as housing, education, health services. Differences in social norms as well as income levels can create social jealousy. Artificial inflation of prices locally can also create potential tension.

Population influx and general interest in the development of the Project can give rise to speculative investment in the area, especially at construction stage, with possible positive or negative outcomes. Given the relatively low number of operations employment opportunities and few, long-term spin off economic effects, any over-investment by the community or outsiders at the early stage may result in heavy economic losses.

Changes in land use will affect the previous land owners as well as the users such as farmers and related off-taking entrepreneurs, possibly reducing individuals' incomes or agricultural employment opportunities. However, with the availability of other arable land in the wider area at this time, the immediate impacts on land owners and land users seems negligible, in the longer term, land acquisition contributes to land conversion patterns, with increased pressure for resources and conflicts over competing land use.

(2) Operation Phase

During the normal operation phase, only 5 permanent employees work in the Project area. Additionally, approximately 20 individuals, who are expected to be local residents, will be hired occasionally for cleaning solar panels. Therefore, this will not significantly increase the demand for medical personnel to serve the population.

4.2.3.4 Occupational Health Impact Assessment

(1) Construction Phase

The construction activities may cause occupational diseases. For instance, working in open areas and/or in conditions with sweltering heat, the body will try to adjust its temperature to a normal level all the time by eliminating heat from the body. In case that the heat elimination in a timely manner is unable, it will affect the body such as rashes on the skin, itching, sweat ducts blocked, muscle cramps, headaches, dizziness, muscle spasms, fatigue, and possibly loss of consciousness.

The occupational health risk such as fall of objects, hit on head, electric shock, traffic accident, etc. may be occurred by various causes such as the carelessness on the part of workers, improper planning and wrong sequence of operations, inadequate training with respect to handling of the machinery and equipment, and etc. could be effect to the personal health of construction worker and damage to the project properties. Therefore, the project determined the mitigation and prevention measures and adequate training program in occupational health and safety to minimize the occupational health impact.

Moreover, the contractor provides first aid equipment and medical supplies within the construction area, including a medical shuttle, according to the Ministry of Labor Regulations on the provision of welfare in business establishments B.E. 2548 (2005). Therefore, the occupational health impacts on the construction workers will be low.

Dust (Particulate Matter) and noise from the construction activities include land clearance for the construction of the power generation control building, the storage areas of spare parts, equipment and materials, solid waste, and maintenance area, the switchyard or substation area, and the supporting areas related to power generation and could be caused adverse health impact to the construction workers. Besides, the high noise level may interfere with communication and conversation, impact on workers' hearing ability and further causing errors while working.

However, the project spraying water at the area with topsoil stripping, material stacking, and entrance of the construction site, and keeping construction materials tidily to minimizes the dust dispersion and provide personal protective equipment (PPE), consisting of safety helmets, safety shoes, goggles, and task-specific personal safety equipment appropriate to working conditions and risks that may arise from work. Therefore, the occupational health impacts on the construction workers will be low.

(2) Operation Phase

The Project's activities involve generating electricity from solar panels, with approximately 5 employees responsible for monitoring and controlling the electrical systems. Risks associated with the Project's operations include field inspections, safety maintenance, and cleaning of the solar panels. If employees perform maintenance work without proper caution in tool usage, it may pose potential dangers. The project determined the mitigation and prevention measures and adequate training program in occupational health and safety associated with the Project's operations include field inspections, safety maintenance, and cleaning of the solar panels. Regularly inspection and safety shall be carried out in accordance with the criteria prescribed by relevant law and guideline to minimize the occupational health impact. Therefore, the occupational health impacts on the project staff will be low. As a result, the impact on occupational health and safety for employees is considered low.

4.2.3.5 Health Impact Assessment

(1) construction phase

Considering the Project Descriptions in Chapter 2, existing environmental conditions in Chapter 3 ,and environmental impact assessment in Chapter 4, result in the identification of activities that may cause health impacts, health hazards, vulnerable groups that are expected to be affected In the construction phase Including construction workers and the public as presented in **Table 4.2.3.5-1**, where the consultant used the Qualitative Risk Assessment approach to evaluate the health impact assessment with a Health Risk Matrix as presented in **Table 4.2.3.5-2**, It has a score depending on the likelihood of health impact in **Table 4.2.3.5-3**, and a score depending on severity of consequences in **Table 4.2.3.5-4**. The definition of overall impact level between the likelihood and severity of consequences using the risk matrix is presented in **Table 4.2.3.5-5**. In the construction phase, the health assessment can be summarized by using the health risk matrix assessment are presented in **Table 4.2.3.5-6**.

Table 4.2.3.5-1

Health Impact, Health Hazards, and Vulnerable Groups

Health Impact	Health Hazards	Vulnerable Groups
Construction Phase		
Air Quality	- Dust from land clearing - Operations of machinery - Pollutants from transportation	- Construction workers - The public
Noise	- Loud noise, disturbance noise, and vibration from construction activities - Stress and panic about noise and vibration	- Construction workers - The public
Solid Waste	- Waste accumulation may attract disease carriers.	- Construction workers - The public
	- Environmental contamination	- The public
Transportation	- Accidents from transporting construction workers, and machines - Obstruction to traffic	- The public
Occupational Health and Safety	- Accidents caused by unsafe working environment - Accidents caused by unsafe act - Safety concerns	- Construction workers
Public Health Services	- Sharing public health services caused by illnesses or accidents of workers - Communicable diseases that come with migrant workers	- The public
Operation Phase		
Solid Waste	- Waste accumulation may attract disease carriers.	- Project's employee - The public
Transportation	- Accidents from transporting construction workers, and machines - Obstruction to traffic	- The public
Occupational Health and Safety	- Accidents caused by unsafe working environment - Accidents caused by unsafe act - Safety concerns	- Project's employee

Table 4.2.3.5-2

The Risk Matrix for Health Impact Assessment

Likelihood	Severity of Consequences				
	Very low (1)	**Low (2)**	**Moderate (3)**	**High (4)**	**Very high (5)**
Very low (1)	1	2	3	4	5
Low (2)	2	4	6	8	10
Moderate (3)	3	6	9	12	15
High (4)	4	8	12	16	20
Very high (5)	5	10	15	20	25

Remark: The definition of risk levels in **Table 4.2.3-5** can be summarized below.
1-2 points = low impact
3-9 points = moderate impact
10-16 points = high impact
20-25 points = very high impact

Source: Adapted from the Health Impact Assessment Guidelines, Office of Natural Resources and Environmental Policy and Planning, March 2022.

Table 4.2.3.5-3

Definition and Scoring Principles for the Likelihood of Health Impact

Likelihood		Definition
Level of impact	Score	
Very low	1	No evidence/ low possibility to have happened/ no possibility of stress.
Low	2	Theoretically possible, but no report of occurrence/ very low possibility of stress.
Moderate	3	There are statistics from the available data to support the prediction of the likelihood that this may happen. /Stressful at times.
High	4	This event occurred during the operation of a similar project. / Stress happens often.
Very high	5	This event is happening during the operation of a similar project, or it has occurred more than once in the past 5 years. Stressful all the time.

Source: Adapted from the Health Impact Assessment Guidelines, Office of Natural Resources and Environmental Policy and Planning, March 2022.

Table 4.2.3.5-4

Scoring Principles for the Severity of Consequences

Severity of Consequence		Definition
Level of impact	Score	
Very low	1	No injury/no illness/no stress
Low	2	Minor injury/illness/stress
Moderate	3	Moderate injury/illness/stress
High	4	Severe injury/illness/stress
Very high	5	Very severe injury/illness/stress

Source: Adapted from the Health Impact Assessment Guidelines, Office of Natural Resources and Environmental Policy and Planning, March 2022.

Table 4.2.3.5-5

Definition of Risk Level Criteria for Impact Assessment Using the Risk Matrix

Score from Risk Matrix	Impact level	Definition
1-2	Low	not causing negative effects on health status
3-9	Moderate	Increasing illness rate, injury, stress, or concerns: It may affect the budget and need to monitor whether the existing mitigation measures are adequate and appropriate.
10-16	High	Having widespread impact on health status, chronic diseases, severe mental health, or prolonged stress: It may need more budget and mitigation measures. If unavoidable, changes of operation method may be needed.
20-25	Very high	Having very widespread impact on health status, disabilities, loss of lives, severe mental health or stress to the level of mental care, prolonged stress to the suicidal level: Immediate budget required. Specific mitigation measures required. Change of operation method required. Immediate care of a consultant needed.

Source: Adapted from the Health Impact Assessment Guidelines, Office of Natural Resources and Environmental Policy and Planning, March 2022.

(2) Operation phase

Considering the Project Descriptions in Chapter 2, existing environmental conditions in Chapter 3 ,and environmental impact assessment in Chapter 4, result in the identification of activities that may cause health impacts, health hazards, vulnerable groups that are expected to be affected In the operation phase Including the Project staff and the public as presented in **Table 4.2.3.5-1** , where the consultant used the Qualitative Risk Assessment approach to evaluate the health impact assessment with a Health Risk Matrix as presented in **Table 4.2.3.5-2**, It has a score depending on the likelihood of health impact in **Table 4.2.3.5-3** , and a score depending on severity of consequences in **Table 4.2.3.5-4 .** The definition of overall impact level between the likelihood and severity of consequences using the risk matrix is presented in **Table 4.2.3.5-5**. In the operation phase, the health assessment can be summarized by using the health risk matrix assessment as presented in **Table 4.2.3.5-7**

Table 4.2.3.5-6

Assessment and Significance Levels of Health Impacts, and Mitigation Measures for Health Impacts (Construction Phase)

Impact Issues	Health Risk Matrix			Measures (presented in Chapter 5)
	Likelihood	Severity	Health Impact Level	
Air Quality - Construction workers - The public	 High (4) Moderate (3)	 Low (2) Low (2)	 (4) x (2) = Moderate (8) (3) x (2) = Moderate (6)	Prevention Measures: air quality, and socio-economic and public participation
Noise - Construction workers - The public	 High (4) Moderate (3)	 Low (2) Low (2)	 (4) x (2) = Moderate (8) (3) x (2) = Moderate (6)	Prevention Measures: noise, and socio-economic and public participation
Solid Waste - Construction workers	 Moderate (3)	 Moderate (3)	 (3) x (3) = Moderate (9)	Prevention Measures: waste management
Transportation - The public	Low (2)	High (4)	(2) x (4) = Moderate (8)	Prevention Measures: transportation, and socio-economic and public participation
OHS - Construction workers	Moderate (3)	High (4)	(3) x (4) = High (12)	Prevention Measures and monitoring measures: occupational health and safety
Public Health Services - The public	Moderate (3)	Moderate (3)	(3) x (3) = Moderate (9)	Prevention Measures: community health, and socio-economic and public participation

Table 4.2.3.5-7

Assessment and Significance Levels of Health Impacts, and Mitigation Measures for Health Impacts (Operation Phase)

Impact Issues	Health Risk Matrix			Measures (presented in Chapter 5)
	Likelihood	Severity	Health Impact Level	
Solid Waste - Project's employees - The public	 Low (2) Low (2)	 Moderate (3) Moderate (3)	 (2) x (3) = Moderate (6) (2) x (3) = Moderate (6)	Prevention Measures: waste management, and socio-economic and public participation
Transportation - The public	Low (2)	High (4)	(2) x (4) = Moderate (8)	Prevention Measures: transportation, and socio-economic and public participation
OHS - Project's employees	Moderate (3)	High (4)	(3) x (4) = High (12)	Prevention Measures and monitoring measures: occupational health and safety

4.2.3.6 History and Cultural Heritage

The project is located in the area of Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province. Based on the examination of cultural heritage data in the Department of Fine Arts' geographic information system, within a radius of 3 kilometers from the Project boundary, there are no historical sites, archaeological sites, or cultural heritage sites. Therefore, the project's operations will not have any impact on historical and archaeological aspects.

In conclusion, both the construction and operation phases have been evaluated with low significance in terms of impact on history and archaeology. The assessment shows that the Project's activities during both construction and operation phases are not expected to cause significant harm or disruption to the history and archaeology in the area.

4.2.4 HUMAN USE VALUES

4.2.4.1 Land Use

The Project area is predominantly devoted to agriculture, specifically the cultivation of cassava. The Project acquired land tenure through agreements and land purchases from private landowners, with the purchase price being mutually determined by the Project and the previous landowners. Presently, the land in the Project area is owned by the Project developer, Breeze and Shine Power Company Limited. Consequently, there are no issues related to either physical or economic displacement to be concerned.

(1) Construction Phase

The construction of the Project will directly impact the land-use pattern in the Project area. Originally an agricultural area, it will be transformed into an area with solar panels integrated with a battery energy storage system. The construction activities are planned to take place on prepared ground. It is expected that these Project activities during the construction phase will result in a low-level impact on land use.

(2) Operation Phase

Once the Project is operational, the utilization of land will change from its previous agricultural use to an area with solar panels integrated with battery energy storage system. The solar power plant will generate electricity using clean energy, supporting the country's greenhouse gas reduction policies. Therefore, it is anticipated that the project activities will have low impact on land use.

4.2.4.2 Land Transportation

(1) Project Transportation Activities

The primary transportation activity of the Project mainly occurs during the construction phase from the transportation of machinery, equipment, and construction materials, especially solar panels, inverters, and workers. Details are provided in **Table 4.2.4.2-1**. The transportation of construction equipment from Laem Chabang Port to Suphanburi Province involves the use of Highway No. 3702, which connects to Highway No. 340, and then changes to Highway No. 3350 before switching to Rural Highway No. 4086 to enter the Project area. The contractor must arrange transportation routes for materials and equipment from outside using public roads, and it is essential to control traffic volume to minimize the impact on the surrounding communities. Safety considerations are also of utmost importance.

Table 4.2.4.2-1

Transportation and Logistics during Construction Phase

Vehicle type	Number (vehicle/day)	Frequency (trip/day)[1/]	PCU factor	PCU/day	PCU/hr
Employee transportation					
Medium truck (6 wheels)	27	108[2/]	1.0	108	13.5
Light truck (4 wheels)	1	2	1.0	2	0.25
Machinery and equipment transportation					
Full trailer	5	10	2.5	25	3.125
Medium truck (6 wheels)	4	8	1.0	8	1.0
Light truck (4 wheels)	2	4	1.0	4	0.5
Total	**133**	**266**	**-**	**147**	**18.375**

Remark: 1/ Number of trips per day (including round-trip) calculated in the case of the highest traffic volume per day. Work time is calculated as 8 hours per day.

2/ Number of transportation trips in the morning (including round-trip) and evening (including round-trip)

(2) Assessment Methodology

The assessment of transportation impacts from traffic volumes during construction involves evaluating the traffic density on Rural Highway No. 4086 using the Volume Capacity Ratio index, under the following criteria (referenced from the Traffic Congestion and Traffic Density Analysis Report for B.E. 25665 (2022), Department of Highways, March B.E. 2566 (2023)). This assessment includes several steps as follows:

$$\textbf{Traffic index} = \frac{V}{C}$$

Where: V = The traffic volume on the highway during peak hours

C = The capacity of the highway

1) Calculation of the Traffic Volume Using Passenger Car Unit

The data used in this analysis were from the traffic statistics of the Highway No. 4089 (Access route to the Project area), recorded by the Office of Safety Administration, Department of Highways. The traffic volume was assessed by assuming the number of cars as passenger car unit (PCU) and employing the passenger car equivalents (PCEs) for each type of car to adjust the recorded car volume to be in the same unit as the passenger car as follows:

Passenger car < 7 Person	=	1.0	PCU
Passenger car > 7 Person	=	1.0	PCU
Light bus	=	1.5	PCU
Medium bus	=	1.5	PCU
Heavy bus	=	2.1	PCU
Light truck or pick up (4 wheels)	=	1.0	PCU
Medium truck (6 wheels)	=	2.1	PCU
Heavy truck (10 wheels)	=	2.5	PCU
Full trailer	=	2.5	PCU
Semi-trailer	=	2.5	PCU
Motorcycle	=	0.333	PCU

2) Calculation of Peak Hour Volumes on Highways (V)

The following is used in estimating the percentage of traffic volume during peak hours:

- Highways in Bangkok and metropolitan areas use;
  $\mathbf{Y = 0.07889X^{0.97494}}$
- Highways outside Bangkok and metropolitan areas use;
  $\mathbf{Y = 0.1122X^{0.9387}}$

Where: Y = Percentage of peak hour volume per the average daily volume

X = Annual average daily traffic (AADT)

The result of Y on highways is then used to calculate the traffic volume during peak hours

$$\mathbf{V = (Y \times (1-HV/100)) + (Y \times (HV/100) \times 2)}$$

Where: V = Traffic during peak hours (PCU/peak hours)

Y = Percentage of peak hour volume

HV= Percentage of truck compare to the annual average daily traffic

3) Calculation of the Highway Capacity (C)

The calculation of the highway capacity (C) using the decreasing capacity from following factors:

For highways with multilane

$$C = 2{,}200 \times R_L \times R_C \times R_N \times R_I \times R_J \times N$$

For highways with two lanes, two directions

$C = 2{,}500 \times R_L \times R_C \times R_N \times R_I \times R_J$

Where: C = represents capacity of the highway

N = represents number of traffic lanes

R_L = represents capacity of the highway corrected by lane width

R_L = 1.00 when the lane width (W_L) ≥ 3.25 meters

R_L = $0.24 \times W_L + 0.27$ when $W_L < 3.25$ meters

R_C = represents the capacity of the highway corrected by lateral clearance

R_C = 1.00 when the lateral clearance (W_C) ≥ 0.75 meter

R_C = $0.18 \times W_C + 0.86$ when $W_C < 0.75$ meter

R_N = represents the capacity of the highway corrected by mixed with two-wheel vehicles

$$R_N = \frac{100}{100 + 0.75 \times M_C}$$

Where: M_C = represents the percentage of motorcycles to all vehicles

R_I = represents the capacity of highway corrected by the roadside situation. In this analysis,

R_I = 0.90 for corrected by outside Bangkok and metropolitan areas roadside situation

R_I = 0.70 for corrected by Bangkok and metropolitan areas roadside situation roadside situation

R_J = represents the capacity of highway corrected by volume of heavy vehicles

$$RJ = \frac{1}{(1\text{-}HV/100) \times 1 + (HV/100 \times 2)}$$

Where: HV = represents the percentage of heavy vehicles to all vehicles

For the assessment of the road capacity (C) of the project, it will be evaluated on Rural Road No. 4086 (the road leading to the project), which is a 2-lane road.

(3) Current Traffic Volume within the Project Area

The assessment of future traffic volume on Rural Road No. 4086 (the road leading to the project) is based on traffic volume data collected over 2 days, covering both regular weekdays and weekends. The data collection took place on Friday, June 9th, B.E. 2566 (2023), and Saturday, June 10th, B.E. 2566 (2023), with details provided in **Table 4.2.4.2-2** to **Table 4.2.4.2-5**.

Table 4.2.4.2-2

Assessment Results of Traffic Volume at Point 1 (Rural Highway No. 4086 Before Reaching the Intersection with Rural Highway No. 4027)

Friday, June 9th, B.E. 2566 (2023)

Vehicle - Type	PCU Factor	Morning Rush Hour (7 a.m. – 8 a.m.)			Off-peak hours (9 a.m. – 10 a.m.)			Evening Rush Hour (5 p.m. – 6 p.m.)		
		Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane
Passenger Car, less than 7 persons	1	6	6	3.00	1	1	0.50	7	7	3.50
Passenger Car, more than 7 persons	1	0	0	0.00	0	0	0.00	0	0	0.00
Light Bus	1.5	0	0	0.00	0	0	0.00	0	0	0.00
Medium Bus	1.5	0	0	0.00	0	0	0.00	0	0	0.00
Heavy Bus	2.1	0	0	0.00	0	0	0.00	0	0	0.00
Light Truck (4 wheels)	1	19	19	9.50	10	10	5.00	14	14	7.00
Medium Truck (6 wheels)	2.1	0	0	0.00	0	0	0.00	0	0	0.00
Heavy Truck (10 wheels)	2.5	0	0	0.00	0	0	0.00	0	0	0.00
Full Trailer	2.5	0	0	0.00	0	0	0.00	0	0	0.00
Semi-Trailer	2.5	1	3	1.25	1	3	1.25	0	0	0.00
Motorcycles	0.333	14	5	2.33	5	2	0.83	9	3	1.50
Total		**40**	40	32.16	16.08	17	15.17	7.58	30	24.00
V/C ratio		**0.02**			**0.01**			**0.02**		
Level of Service		**A**			**A**			**A**		

Table 4.2.4.2-3

Assessment Results of Traffic Volume at Point 1 (Rural Highway No. 4086 Before Reaching the Intersection with Rural Highway No. 4027)

Saturday, June 10th, B.E. 2566 (2023)

Vehicle - Type	PCU Factor	Morning Rush Hour (7 a.m. – 8 a.m.)			Off-peak hours (9 a.m. – 10 a.m.)			Evening Rush Hour (5 p.m. – 6 p.m.)		
		Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr	PCU/hr./lane
Passenger Car, less than 7 persons	1	1	1.00	3.00	1	1	0.50	7	7	3.50
Passenger Car, more than 7 persons	1	0	0.00	0.00	0	0	0.00	0	0	0.00
Light Bus	1.5	0	0.00	0.00	0	0	0.00	0	0	0.00
Medium Bus	1.5	0	0.00	0.00	0	0	0.00	0	0	0.00
Heavy Bus	2.1	0	0.00	0.00	0	0	0.00	0	0	0.00
Light Truck (4 wheels)	1	11	11.00	9.50	10	10	5.00	14	14	7.00
Medium Truck (6 wheels)	2.1	0	0.00	0.00	0	0	0.00	0	0	0.00
Heavy Truck (10 wheels)	2.5	0	0.00	0.00	0	0	0.00	0	0	0.00
Full Trailer	2.5	0	0.00	0.00	0	0	0.00	0	0	0.00
Semi-Trailer	2.5	0	0.00	1.25	1	3	1.25	0	0	0.00
Motorcycles	0.333	17	5.66	2.33	5	2	0.83	9	3	1.50
Total		**40**	**29**	**17.66**	**17**	**15.17**	**7.58**	**30**	**24.00**	**12.00**
V/C ratio		**0.02**			**0.01**			**0.02**		
Level of Service		**A**			**A**			**A**		

Table 4.2.4.2-4

Assessment Results of Traffic Volume at Point 2 (Rural Highway No. 4086 Near the Nong Krathum Sub-district Health Promoting Hospital)

Friday, June 9th, B.E. 2566 (2023)

Vehicle - Type	PCU Factor	Morning Rush Hour (7 a.m. – 8 a.m.)			Off-peak hours (9 a.m. – 10 a.m.)			Evening Rush Hour (5 p.m. – 6 p.m.)		
		Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane
Passenger Car, less than 7 persons	1	61	61	30.50	30	30	15.00	13	13	6.50
Passenger Car, more than 7 persons	1	0	0	0.00	0	0	0.00	0	0	0.00
Light Bus	1.5	0	0	0.00	0	0	0.00	0	0	0.00
Medium Bus	1.5	0	0	0.00	0	0	0.00	0	0	0.00
Heavy Bus	2.1	0	0	0.00	0	0	0.00	0	0	0.00
Light Truck (4 wheels)	1	23	23	11.50	11	11	5.50	25	25	12.50
Medium Truck (6 wheels)	2.1	3	6	3.15	2	4	2.10	1	2	1.05
Heavy Truck (10 wheels)	2.5	1	3	1.25	1	3	1.25	0	0	0.00
Full Trailer	2.5	1	3	1.25	0	0	0.00	0	0	0.00
Semi-Trailer	2.5	1	3	1.25	0	0	0.00	0	0	0.00
Motorcycles	0.333	129	43	21.48	50	17	8.33	84	28	13.99
Total		**219**	**140.76**	**70.38**	**94**	**64.35**	**32.18**	**123**	**68.07**	**34.04**
V/C ratio		**0.10**			**0.06**			**0.10**		
Level of Service		**A**			**A**			**A**		

Table 4.2.4.2-5

Assessment Results of Traffic Volume at Point 2 (Rural Highway No. 4086 Near the Nong Krathum Sub-district Health Promoting Hospital)

Saturday, June 10th, B.E. 2566 (2023)

Vehicle - Type	PCU Factor	Morning Rush Hour (7 a.m. – 8 a.m.)			Off-peak hours (9 a.m. – 10 a.m.)			Evening Rush Hour (5 p.m. – 6 p.m.)		
		Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane	Vehicle/hr.	PCU/hr.	PCU/hr./lane
Passenger Car, less than 7 persons	1	3	3.00	1.50	7	7.00	3.50	4	4	2.00
Passenger Car, more than 7 persons	1	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Light Bus	1.5	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Medium Bus	1.5	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Heavy Bus	2.1	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Light Truck (4 wheels)	1	22	22.00	11.00	28	28.00	14.00	24	24	12.00
Medium Truck (6 wheels)	2.1	2	4.20	2.10	5	10.50	5.25	0	0	0.00
Heavy Truck (10 wheels)	2.5	0	0.00	0.00	0	0.00	0.00	0	0	0.00
Full Trailer	2.5	0	0.00	0.00	0	0.00	0.00	1	3	1.25
Semi-Trailer	2.5	0	0.00	0.00	0	0.00	0.00	1	3	1.25
Motorcycles	0.333	48	15.98	7.99	45	14.99	7.49	43	14	7.16
Total			**75**	**45.18**	**22.59**	**85**	**60.49**	**30.24**	**73**	**47.32**
V/C ratio		**0.03**			**0.06**			**0.07**		
Level of Service		**A**			**A**			**A**		

(4) Assessing of Traffic Volume in the Future

The comparison of the volume capacity ratio (V/C) based on the Analysis Report of Traffic Congestion and Traffic Congestion in B.E. 2565 (2022) prepared by the Office of Safety Administration, Department of Highways in March, B.E. 2566 (2023) are as follows:

Service Level	Traffic Condition	V/C Ratio
A	The service level that the vehicle can move freely with free-flow speed where the driver can freely select the speed of travel without being influenced by other means of transport in the traffic flow. Vehicle traffic is not interrupted by other vehicles even in traffic conditions with the highest intensity of service level A. The distance between vehicles is approximately 167 meters (550 feet), or the approximate length of 27 cars. It is the service level that is the most comfortable to drive. Accidents and road conditions that impede driving will not have a big impact at this service level.	0.00 - 0.60
B	The service level that the vehicle can move freely with free-flow speed. The distance between vehicles is approximately 100 meters (330 feet), or the approximate length of 16 cars. Changing lanes may be slightly limited. Overall, it remains the service level that provides a comfortable drive the same service as level A. Accidents and road conditions that impede driving will not have a big impact at this service level.	0.61 - 0.70
C	The service level that the traffic speeds close to the free speed. Traffic flow will be more limited. Drivers need to be more careful when changing lanes. The average distance between vehicles is approximately 67 meters (220 feet), or the approximate length of 11 cars. Road accidents do not have a significant impact on traffic conditions but road conditions that impede driving may start to have a bigger impact and may cause waiting lines or traffic jams in locations where the road conditions significantly impede the traffic.	0.71 - 0.80
D	The service level that the traffic speed starts to decrease slightly as traffic volume and congestion begins to increase rapidly. The freedom to move in traffic flows has noticeably been eliminated. This reduces driving comfort and increases driving stress. Few accidents can lead to traffic jams at this service level because there are less traffic movement and limited maneuvering space. The average distance between vehicles is 50 meters (160 feet) or equivalent to the approximate length of 8 cars.	0.81 - 0.90
E	The service level at the highest level that the road can handle. Commuting is difficult. The interval between vehicles is uncertain, approximately comparable to the length of 6 cars, it has less space to move and change lanes. Still, the speed exceeds 80 kilometers/hour (50 miles per hour). The slightest interruption of traffic whether changing lanes or that the vehicle runs from the link into the main traffic stream, etc., can cause traffic jams. At this maximum traffic level, if there is a slight accident, it can cause severe traffic jams because there is not enough space. This is a traffic condition that causes a lot of discomfort and stress to the drivers.	0.91 - 1.00
F	The service level where traffic congestion occurs. This is generally observed from the queuing lines formed behind the jamming point. The main causes of traffic congestion are as follows: (a) An accident just happened. As a result, the road during the accident has reduced the ability to handle the traffic. The number of cars that come in is greater than the number of cars that should pass. (b) Traffic on-going in the location where traffic conflicts occurs such as merging, weaving, or lane drop, etc. is greater than the traffic exits in the location. (c) Wrong estimation of traffic volumes lead to peak-hour flow rates higher than the capacity of the road.	> 1.00

1) Current Condition

When comparing the level of service assessment results to the Volume Capacity Ratio (V/C) index, referring to the report on the analysis and calculation of traffic congestion and traffic density for the year B.E. 2565 (2022), prepared by the Department of Highways Safety in March, B.E. 2566 (2023), it was found that the current level of service for Rural Road No. 4086 (the road leading to the project) at both points is at level A. Level A represents a level of service where vehicles can move freely at free-flow speed without congestion.

2) Construction Phase

The traffic impact resulting from the Project's activities is limited to the construction phase of the project, which has a short duration of only 12 months. During the construction phase, project-related transportation activities include the transportation of personnel and equipment. The details of the number of transportation trips are referenced in **Table 4.2.4.2-1**. For a detailed assessment of the traffic impact, a comparison of the Volume Capacity Ratio (V/C ratio) is made between the scenarios with and without the project during the construction phase, as shown in **Table 4.2.4.2-6**.

Table 4.2.4.2-6

Comparison of Volume Capacity Ratio (V/C ratio) Between the Scenario without the Project and the Scenario with the Project during the Construction Phase

Point	w/o Project	Level of Service	w/o Project	Level of Service	w/o Project	Level of Service
Without Project Scenario						
Point 1	**Morning Rush Hour (7 a.m. – 8 a.m.)**		**Off-peak hours (9 a.m. – 10 a.m.)**		**Evening Rush Hour (5 p.m. – 6 p.m.)**	
Weekdays	0.02	A	0.01	A	0.02	A
Weekend	0.01	A	0.02	A	0.02	A
Point 2	**Morning Rush Hour (7 a.m. – 8 a.m.)**		**Off-peak hours (9 a.m. – 10 a.m.)**		**Evening Rush Hour (5 p.m. – 6 p.m.)**	
Weekdays	0.10	A	0.06	A	0.10	A
Weekend	0.03	A	0.06	A	0.07	A
Construction Phase						
Point 1	**w/o Project**	**Level of Service**	**w/o Project**	**Level of Service**	**w/o Project**	**Level of Service**
Weekdays	**Morning Rush Hour (7 a.m. – 8 a.m.)**		**Off-peak hours (9 a.m. – 10 a.m.)**		**Evening Rush Hour (5 p.m. – 6 p.m.)**	
Weekend	0.05	A	0.04	A	0.06	A
Point 2	0.04	A	0.05	A	0.07	A
Weekdays	**Morning Rush Hour (7 a.m. – 8 a.m.)**		**Off-peak hours (9 a.m. – 10 a.m.)**		**Evening Rush Hour (5 p.m. – 6 p.m.)**	
Weekend	0.14	A	0.10	A	0.15	A
Point 1	0.06	A	0.10	A	0.12	A

From the assessment results, it can be observed that the project's transportation activities during the construction phase do not significantly impact the service level of Rural Road No. 4086. Therefore, the impact remains at a low level.

3) Operation Phase

During the operation phase, transportation activities consist of the travel of 5 personnel and a solar panel cleaning team of 20 individuals (cleaning the solar panels twice a year, approximately every 2 months). They will use Rural Road No. 4086 as the main route to access the project site. Consequently, transportation during the operational phase remains unchanged from the baseline and has a low impact on traffic conditions.

4.2.4.3 Solid Waste Management

(1) Construction Phase

Waste from construction activities, 4 tons/month, such as scrap metal, leftover cement, wood pallets, and cardboard boxes, among others. The Project will collect, segregate, and consider reusing these materials, as well as ensuring proper disposal based on the waste type.

Food waste and food container refuse from the consumption of construction workers, estimated at a maximum of approximately 1,276.80 kilograms per day (calculated based on a waste generation rate of 0.8 kilograms per person per day multiplied by 1,596 workers). Containers based on the types of wastes i.e., biodegradable, non-biodegradable and hazardous wastes) with a capacity of 200 liters and tightly sealed lids will be provided at various points to accommodate the waste. These are in place to collect waste until authorized agencies, which typically collect waste 2-3 days per week, can properly dispose of. Therefore, the impact is considered low.

(2) Operation Phase

Consumption waste generated by regular employees, estimated to be around 5 individuals. The Project has prepared waste bins to accommodate three waste types: general waste, recyclable waste, and hazardous waste. The remaining waste after separation at the source will be collected and handed over to authorized agencies for proper disposal.

Waste from the operation activities, specifically broken PV solar during the operation phase. It is expected that there will be a very minimal quantity of such waste due to the use of solar panels certified according to IEC 61215 standards. The project will

collect and store in waste storage area, with clear labels indicating the type of waste. The Project will conduct regular inspections of the storage area. When there is a significant quantity of waste, the project will arrange for authorized companies to handle the disposal and report to the Office of the Energy Regulatory Commission (ERC) annually in compliance with the Announcement of the Ministry of Industry regarding the management of waste or unused materials in B.E. 2566 (2023). Therefore, there will be moderate significant impact on waste management during the operation phase.

4.2.4.4 Wastewater Management

(1) Construction Phase

Details of the water usage and wastewater balance for the Project during the construction phase are illustrated in **Figure 4.2.4.4-1**.

1) Wastewater from the Consumption of Construction Workers, approximately 89.38 cubic meters per day (Calculation: 80 liters per person per day×1,596 construction workers). The Project will treat wastewater with a septic tank provided by the contractor. If the contractor discharges treated waste or sewage outside into natural water sources or private areas, the contractor must obtain permission from relevant government agencies or landowner to ensuring that the discharged sewage will not have adverse environmental impacts in the future. In addition, the contractor shall provide a retention pond at workers' camp and conduct water quality monitoring once a month to ascertain the water quality before discharging. Therefore, the impact is considered low.

2) Wastewater from Construction Activities, approximately of 50 cubic meters per day. It will be collected in a temporary drainage system on-site before being directed to the project's wastewater storage pond. It is then recycled for various purposes, such as watering plants or spraying the ground within the construction area. Therefore, the impact is considered low.

(2) Operation Phase

Details of the water usage and wastewater balance for the Project during the operation phase are illustrated in **Figure 4.2.4.4-2**.

1) Wastewater from Staff Consumption

- Staff's consumption during normal operation estimated at approximately 0.28 cubic meters per day.

- Staff consumption, during panels cleaning period, there is also wastewater generated from 20 staff members added, estimated at 1.12 cubic meters per day. This wastewater will be treated through a septic tank system without being discharged into the public area. Any solid waste or pollutants generated from the wastewater treatment system will be handed over to local authorities for proper disposal in accordance with health regulations. So, the impact is considered low.

2) Wastewater from Solar Panel Cleaning, wastewater from cleaning solar panels will be about 8.24 m^3/day (cleaning two times a year). Wastewater from this cause is not contaminated with chemicals, but only dust particle. It will be left to evaporate and flow naturally. It will have no impact on the quality of surface water.

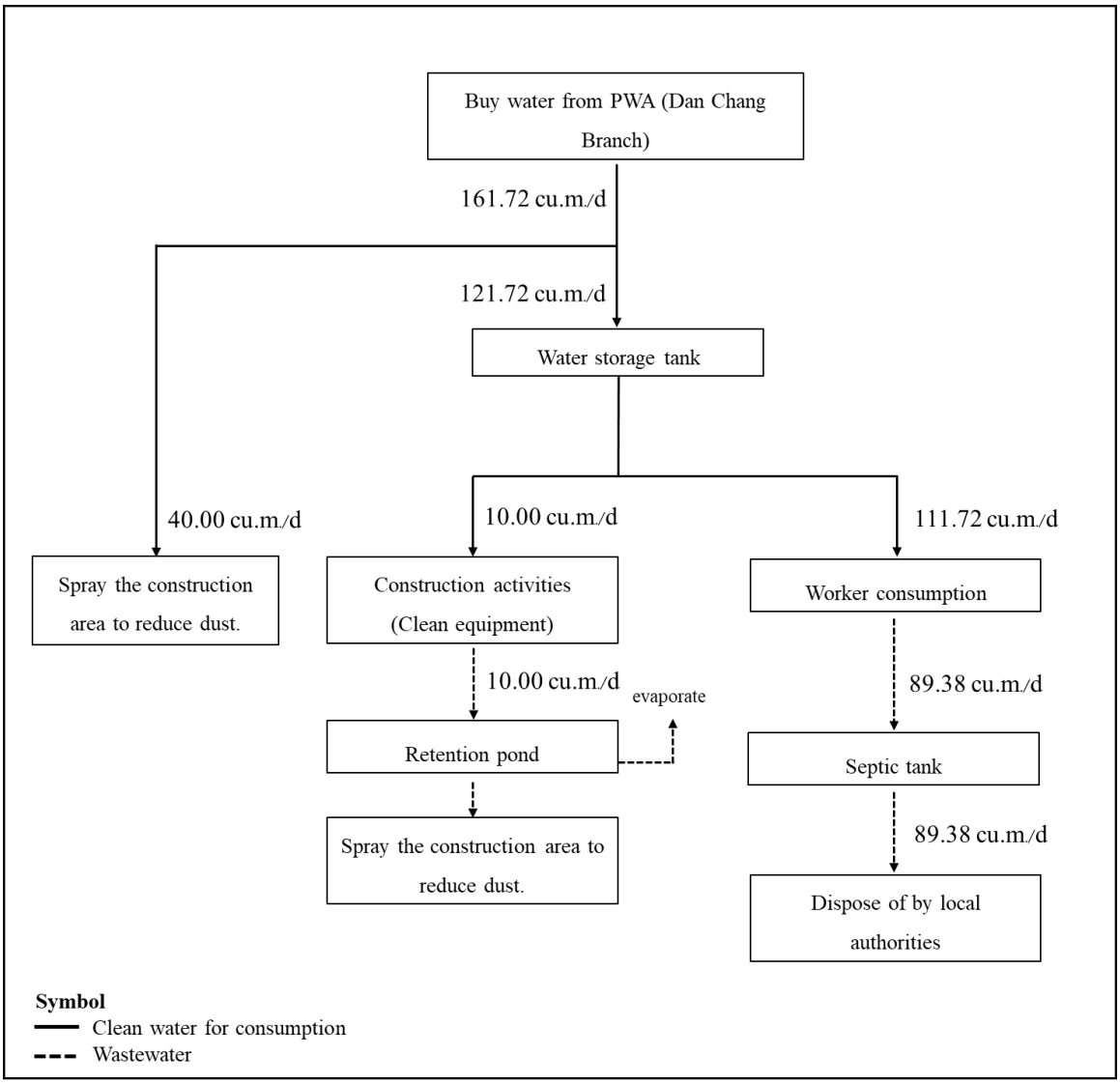


Figure 4.2.4.4-1 Water Balance for Construction Phase

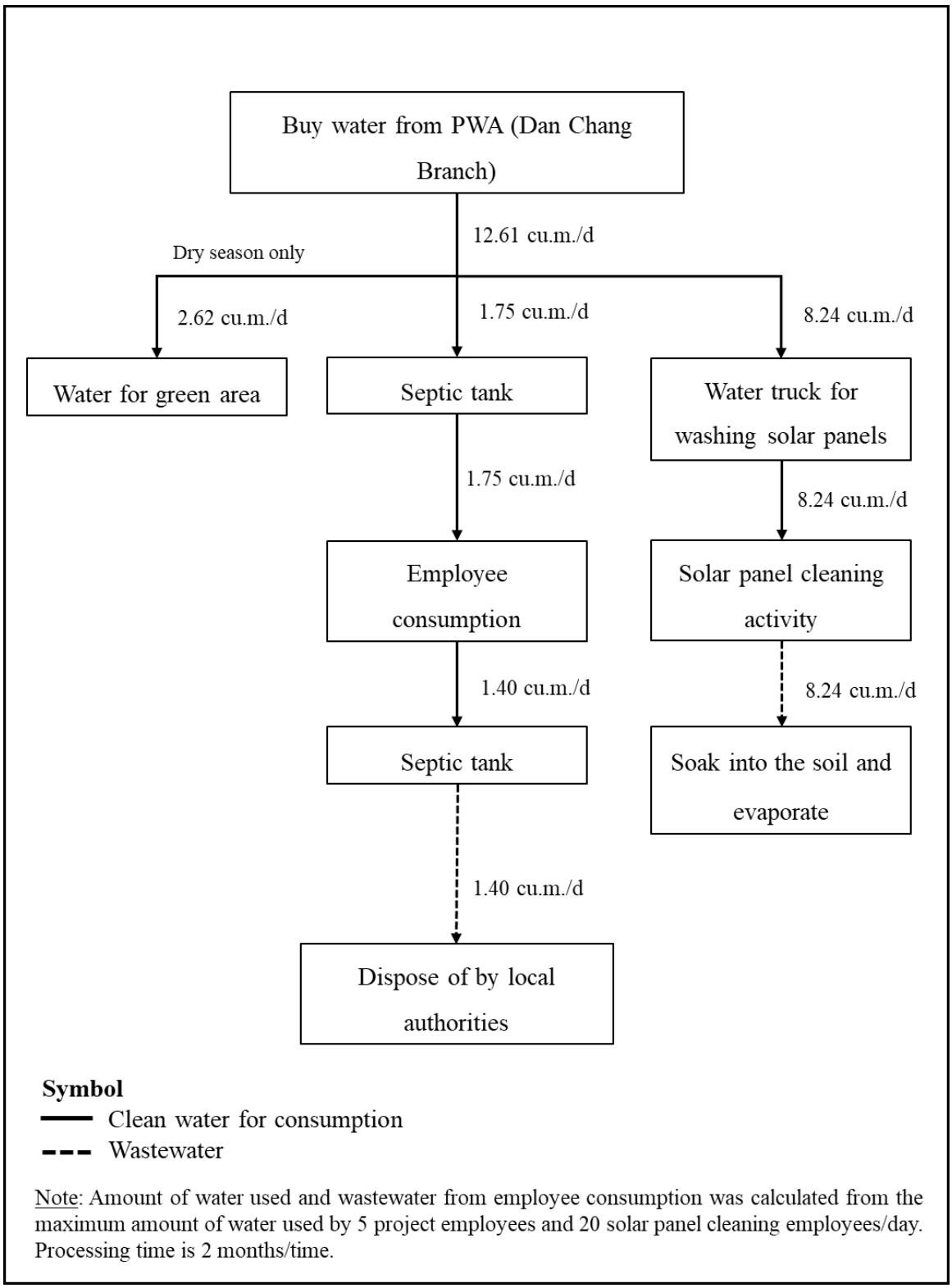


Figure 4.2.4.4-2 Water Balance for Operation Phase

4.2.4.5 Water Drainage

(1) Construction Phase

During the construction phase, the Project shall undertake site preparation based on site conditions such as flood studies and equipment foundation requirements, design to minimize changes to ground level and water flow. The project only involves little concrete paving in some area, including the power station, control building, and material storage building, where changes to the ground surface occur due to concrete paving. These paved areas cover an approximate area of 6,735 square meters. This may affect the rate of water infiltration and flow direction in these areas. To mitigate this impact, the project has prepared retention pond with a capacity of 100 cubic meters in the vicinity of the buildings to accommodate excess rainwater. These retention pond can handle rainfall that occurs within a 3-hour period adequately. Therefore, the project does not incorporate a comprehensive rainwater drainage system within the project area.

However, during the construction phase, temporary offices will be established within the construction area. These offices are required to be at least 30 meters away from water sources to prevent water contamination from activities within the field offices. Temporary drainage channels and silt traps will be installed to control the discharge of construction-related runoff and prevent adverse effects on the surrounding area. Consequently, the anticipated impact during this phase is expected to be low.

(2) Operation Phase

In the operation phase, the Project exclusively generates electricity from solar panels. This means that rainwater falling within the Project area has no chance of being contaminated by hazardous substances from Project activities. The only potential impact during this phase is the presence of minimal dust particles collected on the solar panels' surface, which does not involve any chemical contamination.

However, for the power station, control building, and material storage building areas that have undergone concrete paving during the construction phase, there is a possibility of rainwater mixing with oil in the initial 30-minute period. To address this, the project has installed dikes with a capacity of approximately 3.2 cubic meters to capture and separate water and oil before it is sent to the oil sump for proper disposal. This design ensures the adequate handling of rainfall in case of oil contamination. Additionally, the project is in contact with authorized agencies to receive and dispose of this water and oil mixture appropriately. Overall, the impact from water drainage does not different from the construction phase so, the impact is considered low.

4.2.5 Major Hazard

4.2.5.1 Risk and Hazard Assessment Methodology

The study employs a risk and hazard assessment methodology based on the criteria outlined in the Regulation of Department of Industrial Works Re: Hazard Identification Criteria, Risk Assessment, and Risk Management Plan B.E. 2543 (2000). This methodology begins with a study and analysis of the Project's activities to identify potential risks. Subsequently, hazard identification is conducted to determine events that may lead to serious harm and its consequences. Then, the probability of such events occurring is assessed, along with the severity of their impact on individuals, communities, the environment, and assets. The obtained values are used to classify the level of risk, which forms the basis for developing risk management and mitigation plans. The techniques employed for assessing risks and hazards arising from project activities consist of three main components:

(1) Location Classification Technique for Potential Hazards

This involves a study to classify locations with the potential or risk of causing serious harm. An analysis is conducted, starting from the production process, production control, and electricity supply processes, considering international standards that emphasize the likelihood of errors leading to serious harm.

(2) Hazard Identification Technique

Once locations with potential risks of causing serious harm are identified, a study is conducted to analyze the sequence of events leading to such harm using a checklist method. This method is one of the tools specified in the Regulation of Department of Industrial Works Re: Hazard Identification Criteria, Risk Assessment, and Risk Management Plan B.E. 2543 (2000). It is used to analyze the causes and consequences of abnormalities in activities, assuming that damage to equipment and tools (Equipment Fault/Failure), deviations in regulations and control methods (Regulation-Fault/Error), and the actions of relevant personnel (Human Error) may occur. Subsequently, risk assessment is performed for each relevant issue.

(3) Risk Assessment Technique

The risk assessment process involves evaluating the probability of a hazard occurring (Hazard Probability) and assessing the severity of the consequences of a serious harm event (Severity of Consequences). A qualitative descriptive approach (Quality Analysis) is employed to predict the severity of expected impacts. The results of both assessments are then used to classify the level of risk for further actions.

4.2.5.2 Hazard Identification

The guidelines used to consider and classify positions that may pose a serious danger depend on various factors, especially the availability of project-specific data. The decision-making method used to consider which parts/production units may have the potential for serious harm is critical before prioritizing areas that require special consideration. After studying the project details, it was found that electricity generation from solar cells involves a less complex production process compared to other types of power plants. The potential hazards that may occur include:

(1) Fire Hazard

This can occur due to the installation of non-standard equipment or the absence of short-circuit protection devices. Equipment that may pose a risk includes;

- PV modules
- Inverters with control devices for circuit interruption in direct current, and alternating current electrical control devices
- Battery Energy Storage System: BESS
- Other electrical components, such as wires, conduits, and junction boxes.

(2) Electrical Shock

This may occur due to the lack of electrical insulation, improper grounding, overloading circuits, and the presence of personnel/equipment in wet conditions, which can conduct electricity. Electrical equipment and various electrical wires are at risk of causing electrical shocks.

(3) Electric Arc

Electric arcs occur when electrical discharge passes through gas or air, typically caused by overvoltage or when the surrounding air has a high temperature. This can happen when a large electrical current flows through electrical components or when there is physical separation or electrical contact at the final contact point while electricity is flowing. Electric arcs generate high heat, potentially causing burns and fatalities. Equipment at risk in this category includes various electrical components, especially voltage transformers.

From the consideration of locations that may pose a serious danger, it is evident that areas with a risk of severe harm are where electrical equipment is installed. The causes of potential serious harm can arise from equipment defects and various operational errors. To identify potential hazards of severe consequences, a checklist method is used, which is compared to various relevant standards. This allows for a detailed analysis of the hazards, as shown in **Table 4.2.5.2-1**.

Table 4.2.5.2-1
Potential Hazards Identification by Checklist Method

Area: Electricity production from solar energy using ground-mounted photovoltaic technology
Machinery: The project's electricity generation area, including solar panels, inverters, battery energy storage systems, and associated materials

Checklist Items		Results of Inspection			Notes
		Yes	No	N/A	
1.	**Inspection of Electrical Equipment Standards Installed in the Project**				
1.1	**Solar Panels (Monocrystalline Silicon Type) and Supporting Structures**				
1.1.1	Have the following equipment been inspected and certified according to the standards below: - TIS.1843 or IEC 61215 Standard (Crystalline Silicon Terrestrial Photovoltaic (PV) Modules-Design Qualification and Type Approval) - TIS.2580 or IEC 61730 Standard (Photovoltaic (PV) Module Safety Qualification)	☑	□	□	
1.1.2	Is the material used for the supporting structure hot-dip galvanized steel as per ASTM standards or corrosion-resistant metal?	☑	□	□	
1.1.3	Is the supporting structure capable of securely installing solar panels and being structurally sound?	☑	□	□	
1.1.4	Are the components of the structure removable and easily assembled?	☑	□	□	
1.1.5	Are the materials for attaching solar panels to the structure and the materials for fastening the structural components suitable and made of stainless steel or corrosion-resistant metal?	☑	□	□	
1.1.6	Can the structure withstand a wind load and resist wind forces of at least 30 meters per second?	☑	□	□	
1.2	**Inverter**				
1.2.1	Have the following equipment been inspected according to the standards below: - IEC 61727 Standard (Photovoltaic (PV) System- Characteristics of the Utility Interface) - IEC 62116 Standard (Test Procedure of Islanding Prevention Measures for Utility-interconnected Photovoltaic Inverters) - IEC 62109 Standard (Safety of Power Converters for use in Photovoltaic Power Systems)	☑	□	□	
1.2.2	Is there a surge protection device installed to protect against lightning and voltage spikes?	☑	□	□	
1.2.3	Is there a DC overvoltage protection device?	☑	□	□	
1.2.4	Is there a DC short-circuit protection device?	☑	□	□	
1.2.5	Is there an insulation monitoring system?	□	☑	□	
1.2.6	Is there an AC overvoltage protection device?	☑	□	□	Preventive and maintenance have been prepared

Checklist Items		Results of Inspection			Notes
		Yes	No	N/A	
1.2.7	Is there a ground monitoring system to detect system grounding failures?	□	☑	□	Preventive and maintenance have been prepared
1.2.8	Is there an over-temperature protection system in place?	☑	□	□	
1.3	**Battery Energy Storage System**				
1.3.1	Is there equipment for charge control?	☑	□	□	
1.3.2	Are the battery types clearly identified for proper maintenance?	☑	□	□	
1.4	**Equipment and Components**				
1.4.1	**Electrical Wires**				
1.4.1.1	Is the electrical wire of Photovoltaic Wire type capable of withstanding temperatures of at least 80 degrees Celsius, or is it of type 0.6/1 KV CV according to IEC 60502 standards or any other wire type with better properties?	☑	□	□	
1.4.1.2	For DC electrical current, does it have a size that can withstand a maximum current of not less than 1.25 times the short-circuit current (ISC) of the solar panel set at STC conditions?	☑	□	□	
1.4.1.3	For AC electrical current, does it have a size that can withstand a maximum current of not less than 1.25 times the output current at the rated power of the electrical equipment with Unity Power Factor?	☑	□	□	
1.4.2	**Electrical Conduit**				
1.4.2.1	In the case of Polyethylene conduit, is it of high-density (HDPE) and of quality class PN8 or better, and a product certified by TIS.982?	☑	□	□	
1.4.2.2	In the case of metal conduit, is it of Electrical Metallic Tubing (EMT) type or better?	☑	□	□	
1.4.3	**DC Junction Box**				
1.4.3.1	Is it a solid metal or plastic junction box designed for outdoor use?	☑	□	□	Use XLPO cable that can withstand temperatures up to 120 degrees Celsius
1.4.3.2	Does it provide protection against external interference at an Ingress Protection (IP) level of at least IP45 or better?	☑	□	□	
1.4.3.3	Are the electrical wire connections inside the junction box correctly and securely installed according to the relevant standards, robust, and safe?	☑	□	□	
2.	**Inspection of Design and Equipment Installation**				

Checklist Items		Results of Inspection			Notes
		Yes	No	N/A	
2.1	Detailed system design and installation must be carried out and certified for correctness by licensed engineers from the Engineering Control Council.	☑	□	□	
2.2	The solar panel array circuitry must comply with engineering standards and include safety measures, referencing either TIS.2572 (Electrical Installation - Solar Photovoltaic Power Supply System) or IEC 60364-7-712 (Requirements for Special Installations or Locations – Solar Photovoltaic (PV) Power Supply System), or installation guidelines provided by the manufacturer (if available).	☑	□	□	
2.3	Electrical wires connecting the solar panels should use wires that come pre-installed with the panel's terminal box and circuit connections should be accurate, robust, or use Photovoltaic Wire type or CV 0.6/1 KV electrical wires or better, with secure connections using PV Connectors or equivalent.	☑	□	□	
2.4	Solar panel sets and system equipment with metal structures and/or equipment designated for grounding should be appropriately grounded, following engineering standards or referring to the Thai National Electrical Installation Standard (Revised Edition 2008) of the Engineering Institute of Thailand.	☑	□	□	
2.5	The wire size must be designed to withstand an electrical current not less than 1.25 times the maximum current through the circuit.	☑	□	□	
2.6	The cable routing should conform to the relevant requirements of the electrical utility company, following their approved standards and engineering guidelines as per the Thai National Electrical Installation Standard (Revised Edition 2008) of the Engineering Institute of Thailand, or regulations that the electrical utility company agrees to.	☑	□	□	
2.7	After installation is complete, a licensed engineer from the Engineering Control Council should conduct inspections to ensure that the system is installed correctly and safely.	☑	□	□	
2.8	Regular performance monitoring of power generation and protective equipment should be conducted, with a yearly maintenance plan (Preventive Maintenance: PM) in place for various equipment components.	☑	□	□	
3.	**Inspection of Employee Understanding and Provision of Personal Protective Equipment (PPE)**				
3.1	Employees are trained to understand potential dangers arising from electricity generation.	☑	□	□	
3.2	Training is provided to system operators and related personnel to ensure they understand the operation of the system/equipment.	☑	□	□	
3.3	Appropriate Personal Protective Equipment (PPE) is provided, tailored to the nature of the work, to ensure safe operations.	☑	□	□	
3.4	Adequate fire-fighting equipment is provided in various areas prone to fire hazards, and employees are trained to respond effectively to fire incidents.	☑	□	□	

4.2.5.3 Risk Assessment of Hazard Occurrence

(1) Analysis of Hazard Probability

Based on a checklist method (details in **Table 4.2.5.2-1**), it was found that the Project installs electrical insulation along with a plan to inspect the operation of equipment, an overvoltage protection system, a grounding system with plans to inspect equipment operation, and an over-temperature protection system. Therefore, it helps reduce the risk of electrical shock and electrical arc occurrences. However, there may still be a risk of serious hazards due to human error, such as electrical shock incidents when employees or equipment are wet.

Additionally, based on the review of accident data in factories related to solar power generation, from B.E. 2559-2565 (2016-2022), no accidents were reported. Regarding electrical safety compliance statistics for facilities under the Department of Industrial Works' jurisdiction, from B.E. 2556-2564 (2013-2021) (9 years), no non-compliance reports were found, except for B.E. 2562 (2020) when non-compliance reports related to electrical safety were received. Comparing this to the risk level based on hazard indicators, risk assessment, and risk management plan development, as per the Regulation of Department of Industrial Works Re: Hazard Identification Criteria, Risk Assessment, and Risk Management Plan B.E. 2543 (2000) (**Table 4.2.5.3-1**), it was determined that the Project operation falls in **Level 2**; low risk level, which means a frequency of less than one incident occurring within 5-10 years.

Table 4.2.5.3-1

Risk Level Classification for Various Incidents

Level	Description
1	Low probability of occurrence, such as no occurrences in a period of 10 years or more.
2	Low probability of occurrence, with a frequency of 1 occurrence in a period of 5 - 10 years.
3	Moderate probability of occurrence, with a frequency of 1 occurrence in a period of 1 - 5 years.
4	High probability of occurrence, with a frequency of more than 1 occurrence in 1 year.

Source: Department of Industrial Works' regulations on hazard identification, risk assessment, and risk management plan, B.E. 2543 (2000).

2) Analysis of the Severity of Consequences

In assessing the severity of consequences resulting from employees or equipment being in a wet condition, it is necessary to consider the criteria for classifying the severity of consequences for individuals, communities, the environment, and property, as outlined in the Regulation of Department of Industrial Works Re: Hazard Identification Criteria, Risk Assessment, and Risk Management Plan, B.E. 2543 (2000) (**Table 4.2.5.3-2**).

Table 4.2.5.3-2

Severity of Consequences for Individuals, Communities, Environment, and Property

Level	Consequences			
	Individuals	**Communities**	**Environment**	**Property**
1 (Slightly)	Minor injuries that can be treated by basic first aid	No impact on the community around the facility	Minor impact that can be easily controlled or resolved	Minimal to no property damage
2 (Moderate)	Injuries that require medical treatment	Some impact on the community around the facility that can be addressed in a short time	Moderate impact, property damage that can be managed	Moderate property damage, production can continue
3 (High)	Severe injuries or illnesses	Significant impact on the community around the facility, requiring time to address	Considerable property damage, requiring time to address	Severe property damage, leading to partial production shutdown
4 (Very High)	Severe injuries, disabilities, or fatalities	Widespread and serious impact requiring government intervention and resources	Extremely severe, requiring resources and time to address	Extremely severe property damage, leading to a complete production shutdown

Source: Regulation of the Department of Industrial Works Re: Hazard Identification Criteria, Risk Assessment, and Risk Management Plan, B.E. 2543 (2000)

Based on the assessment, the electrical shock incidents involving project employees falls into **Level 4**, which means they may result in injury or even fatalities. However, it's important to note that employees are not typically in close proximity to the solar panel array, except for those involved in panel cleaning. To mitigate the risks associated with these incidents, the Project follows specific steps and procedures:

- Selection of a time or day for panel cleaning when temperatures are not excessively high to prevent glass breakage due to rapid temperature changes during cleaning.

- Shutdown of electrical supply before commencing cleaning to ensure safety during the cleaning process, and prohibition of any contact with the rear of the panels to reduce the risk of electrical short circuits or electrical shock.
- Use of plain water for cleaning, along with the use of soft or foam-tipped tools to prevent scratching the glass and to minimize chemical residues from cleaning.
- Mandating personal protective equipment (PPE) for employees and adherence to the established procedures.

Regarding the impact on the community, it falls into **Level 1**, meaning there is no significant impact. This is because general people are not permitted to access the Project's electricity production equipment, and anyone who does must follow specific procedures. The environmental impact is also categorized as **Level 1**, signifying minimal to no impact. However, the impact on property is classified as **Level 3**, indicating significant damage that may require partial production shutdown.

For incidents involving electrical short circuits leading to electrical hazards, the impact on project employees is classified as **Level 2**, resulting in injuries requiring medical treatment. Nevertheless, Project employees do not typically work closely with electrical equipment that poses risks, such as solar panels, electrical current converters, transformers, and electrical wires. For the community, the impact falls into **Level 1**, indicating no significant impact on the surrounding community since the Project is not located within residential areas. The environmental impact is classified as **Level 2**, signifying moderate impact that can be rectified in a short time, while the impact on property is **Level 3**, indicating significant damage that may necessitate partial production shutdown.

(3) Risk Level Classification

The results obtained from the assessment of the hazards probability and the severity of consequences for individuals, communities, environment, and property in the aforementioned topics can be used to determine the risk level by the following formula:

Risk Level = Probability Level x Consequence Level_____(1)

(For individuals, communities, environment, and property)

If the risk levels for individuals, communities, environment, or property differ, choose the highest risk level. Then, compare the result with **Table 4.2.5.3-3**.

Table 4.2.5.3-3

Risk Level Classification

Level	Result	Description
1	1 - 2	Low risk
2	3 - 6	Acceptable risk: There must be a review of control measures.
3	8 - 9	High risk: Actions must be taken to reduce the risk.
4	12 - 16	Unacceptable risk: Operations must be stopped and immediate corrective actions taken to reduce the risk.

Source: Regulation of Department of Industrial Works Re: Hazard Identification Criteria, Risk Assessment, and Risk Management Plan B.E. 2543 (2000)

In the case where employees/equipment are wet and come into contact with electrical equipment, based on the previous assessment, it is found that the probability of such an event is at **Level 2**, and the highest severity level for personnel is at **Level 4**. Therefore, the result of the consideration is equal to 2 x 4 = 8. When compared to the levels of risk in the **Table 4.2.5.3-4**, it is found that the risk of a serious incident occurring due to electric shock from employees/equipment being wet is at **Level 3**, which is a high risk, and actions must be taken to reduce this risk.

For the case of electrical equipment causing a short circuit and creating a dangerous situation, based on the previous assessment, it is found that the probability of such an event is at **Level 2**, and the highest severity level for property is at **Level 3**. Therefore, the result of the consideration is equal to 2 x 3 = 6. When compared to the levels of risk in the **Table 4.2.5.3-4**, it is found that the risk of a serious incident occurring due to electrical equipment causing a short circuit and creating a dangerous situation is at **Level 2**, which is an acceptable risk, and a review of control measures must be conducted.

Table 4.2.5.3-4

The Results of the Study, Analysis and Review of the Project Implementation for Hazard Identification and Risk Assessment by the Checklist Method

Area/Machinery Electricity generation area/ solar panels/ Inverter/ battery energy storage system and auxiliary equipment/ Solar electricity generation from ground-mounted photovoltaic technology

Results from Checklist method	Hazard or consequences	Preventive and controlling measures	Suggestion	Risk assessment			
				Probability	Severity	Results	Risk level
Personnel/equipment being in wet conditions contacts with electrical equipment (Human Error)	The staff, especially solar panels cleaner have electric shock.	– Arrange appropriate solar panels washing plan and encourage the staff to strictly follow the prescribed procedures. – Personal Protective Equipment, e.g., helmets, safety gloves, safety shoes, etc., must always be used in the operation and must always be kept in ready to use condition. – Establish clear operational procedure for panels washing to ensure that the electricity is turned off before panel washing.	-	2	4	2x 4 =8	3 High risk. Mitigation measures are required.

Area/Machinery Electricity generation area/ solar panels/ Inverter/ battery energy storage system and auxiliary equipment/ Solar electricity generation from ground-mounted photovoltaic technology

Results from Checklist method	Hazard or consequences	Preventive and controlling measures	Suggestion	Risk assessment			
				Probability	Severity	Results	Risk level
In the case of electrical short circuit equipment	Electrical hazards can occur in the vicinity of electrical equipment, including: – Solar panels – Electrical current transformers – Battery energy storage system – Electrical transformers – Electrical wires	– Use equipment that meets international standards. – Install a short-circuit protection system. – Install fire suppression equipment in accordance with specified standards. – Establish a regular maintenance and inspection plan for fire suppression equipment to ensure readiness for use. – Provide basic fire safety training to workers to ensure they have the knowledge and understanding to respond effectively and promptly.	-	2	3	2 x 3 =6	2 The acceptable level of risk requires a review of control measures.

4.2.5.4 The Safety Management System

Due to the installation of dielectric and equipment inspection plan, the overvoltage system, ground connection and equipment inspection plan and over temperature protection. These systems will minimize the electrical shock and electrical arc. However, the project implementation can cause the hazard due to the human error, such as electrical shock because of the wet condition of the employees and equipment. The risk of electrical shock because of the wet condition of the employees and equipment is acceptable but the measures of control must be taken into consideration. Therefore, to prevent and minimize the impact, the project should prepare the measures to control, prevent and reduce the impact, prepare the management system and risk management during the operation and annually inspect the safety of the operation to ensure the safety for the personnel, communities and environment. Details are displayed in **Table 4.2.5.4-1.**

Additionally, the project has installed the standard equipment, namely, the lightning and surge protection device and DC short-circuit protection. Therefore, the risk of fire is minimized. The measures to prevent and minimize the impact for the safety of personnel, communities and environment are taking into consideration, such as, apply international standard equipment, prepare the maintenance plan and regularly test of the fire equipment, and hold the basic fire drill for the operators in case of emergency incidents. Details are displayed in **Table 4.2.5.4-1.**

Table 4.2.5.4-1

Safety Management Plan (Risk Mitigation Plan)

Project Solar power plants with photovoltaic technology or solar cells ground mounted type

Objective To mitigate the risk from electricity generation from solar cells

Applied area Electricity generation area of the project

No.	Risk mitigation measures / activities / operations	Responsible by	Implementing period	Monitored by	Remarks
1	**Operational safety**				
1.1	Personal Protective Equipment, e.g., helmets, safety gloves, safety shoes, etc., must always be used in the operation and must always be kept in ready-to-use condition.	Project staff	Throughout operation phase	Project's safety officer	-
1.2	Establish clear operational procedure for modules washing to ensure that the electricity is turned off before modules washing.	Assigned staff	Throughout operation phase	Project's safety officer	-
1.3	Organize a monitoring system for efficiency of electricity generation equipment and machinery as stated in the manufacturer's manual.	Assigned staff	Throughout operation phase	Engineer	-
1.4	Inspect performance and the availability of equipment used in both direct current and alternating current circuit breakers and the grounding system of various devices to ensure that the equipment is always be in good condition.	Assigned staff	Throughout operation phase	Engineer	-
1.5	Prepare a maintenance plan for equipment and machinery for safety operation throughout the period according to the manufacturer's specifications which are aligned with technical engineering and safety standards.	Assigned staff	Throughout operation phase	Engineer	-

Project Solar power plants with photovoltaic technology or solar cells ground mounted type
Objective To mitigate the risk from electricity generation from solar cells
Applied area Electricity generation area of the project

No.	Risk mitigation measures / activities / operations	Responsible by	Implementing period	Monitored by	Remarks
1.6	Organize training about safety and the environment including safety and the environment practices for relevant staff as follows. - Safety system in workplace - Electrical and thermal hazard protection - Personal Protective Equipment utilizing - Safety procedure for each operational task	Project's safety officer	Throughout operation phase	Project's safety officer	-
1.7	Keep the workplace to be in safe environment by removing the obstructions and organize the workplace orderly to reduce the probability of critical hazards.	Assigned staff	Throughout operation phase	Project's safety officer	-
1.8	Organize activities to promote understanding in occupational health and safety.	Project's safety officer	Throughout operation phase	Project's safety officer	-
1.9	Investigate the root causes of the accident. Record the accident and root cause for further prevention and correction.	Assigned staff	Throughout operation phase	Project's safety officer	-
2	**Fire prevention measures**				
2.1	Inspect the availability of fire suppression equipment regularly. The equipment must always be in a ready-to-use condition.	Assigned staff	Throughout operation phase	Project's safety officer	-
2.2	Organize a fire drill so that staff can act appropriately in the case of an incident.	Assigned staff	Throughout operation phase	Project's safety officer	-

4.2.6 Climate Change

(1) Overview of Climate Change and Related Risks

Climate change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (*Article 1, UNFCCC*). It is directly related to Greenhouse gas (GHG). GHG are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wave-lengths within the spectrum of thermal infrared radiation emitted by the earth surface, the atmosphere itself, and by clouds causing greenhouse effect. The six main GHG emissions are Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Hydro fluorocarbons (HFCs), Per fluorocarbons (PFCs), and Sulphur hexafluoride (SF6). According to the GHG Protocol Corporate Standard, a company's greenhouse gas emissions are classified into three scopes are;

Scope 1: Direct GHG Emissions are direct emissions from owned or controlled sources.

Scope 2: Indirect GHG Emissions are indirect emissions from the generation of purchased energy.

Scope 3: Other indirect GHG Emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

The overview of scope and emission across a value chain are shown in **Figure 4.2.6-1.**

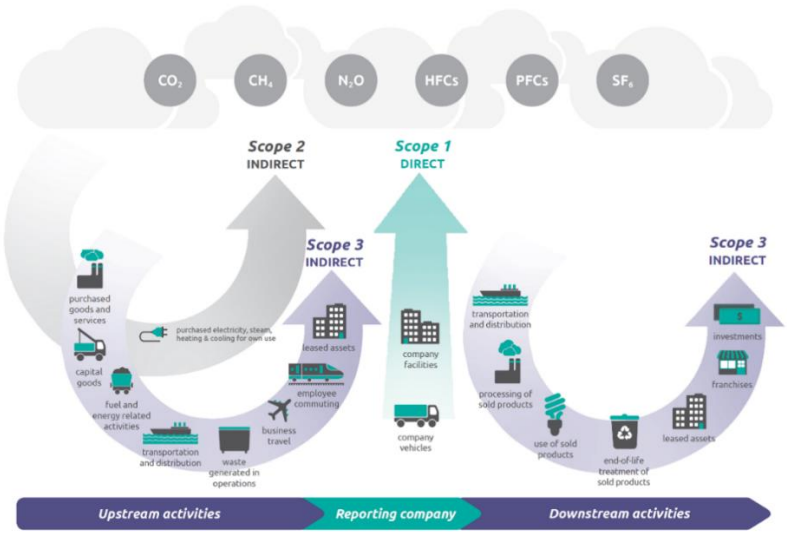


Figure 4.2.6-1 Overview of Scope and Emissions Across Value Chain

(2) Greenhouse Gas Emissions Calculation

In this study, the GHG (Greenhouse Gas) emissions in Scope 1 and Scope 2 for the Project will be calculated. Scope 1 GHG emissions typically include direct emissions from activities that are owned or controlled by the Project include; emission from water consumption, wastewater treatment, and transportation. Scope 2 emissions are indirect GHG emissions associated with the electricity consumption.

1) Construction Phase

(a) The Fossil Fuel Combustion for Construction Equipment/Machine

The operation of diesel combustion engine of construction equipment/machine such as backhoe, vibrator roller, grader, tractor, and, etc. covering 21 months during construction phase would be emitted GHG emission including carbon dioxide (CO_2) and methane (CH_4). The quantities of GHGs emissions could be estimated from information on the number, diesel consumption rate, their operation hours, and Emission Factor by using the equation as follows;

GHG = E x C (1)

Where; GHG = GHGs Emissions (kg CO_2e/year)

E = Emission factor (kg CO_2e/litre)

= 2.9793 kg CO_2e/litre (Off-road (Emission Factor for Mobile Combustion (Off road) from TGO (IPCC Vol.2 Table 3.3. 1, DEDE)

C = Fuel consumption rate (litre/year)

The construction equipment/machines used in the construction activities and their number, operation hour, fuel type, fuel consumption rate, and amount of fuel consumed are summarized in **Table 4.2.6-1.**

Using **Equation (1)** and amount of fuel consumed in **Table 4.2.6-1**, the GHG emissions from the diesel combustion of construction equipment/machine in construction phase is approximately 936,592 kg CO_2e /year or 9,365.92 tonne CO_2e /year.

Table 4.2.6-1

Details of Construction Equipment/Machine Used in the Construction Phase

List of equipment/machine	HP	Fuel consumption rate	Loading factor	Working hour	Number of construction equipment (unit) Year 1												Total working hout	Fuel consumed
		(L/hp/hr)	(%)	(hr/day)	1	2	3	4	5	6	7	8	9	10	11	12	(hr.)	(litre)
Truck & Crane 5 T	240	0.1814	0.50	8	2	4	4	4	4	4	4	4	3	3	3	2	2,112	45,974
Rough terrain Crane 25 T	250	0.1814	0.50	8	1	1	1	1	1	1	1	1	1	1	1	1	2,112	47,890
Rough terrain Crane 60 T.	350	0.1814	0.50	8	0	0	0	0	1	1	1	0	0	0	0	0	528	16,761
Rough terrain Crane 200 T.	450	0.1814	0.50	8	0	0	0	0	0	0	1	0	0	0	0	0	176	7,183
Fork Lift 2.5-3 T.	100	0.1814	0.50	8	0	0	0	0	4	4	4	2	2	0	0	0	880	7,982
Excavator PC 20-60	28	0.1814	0.70	8	2	6	2	2	6	6	6	3	3	2	2	2	2,112	7,509
Excavator PC 100-120	90	0.1814	0.70	8	2	2	1	1	2	2	2	1	1	0	0	0	1,584	18,102
Excavator PC 200	158	0.1814	0.70	8	4	4	4	4	2	2	2	2	2	0	0	0	1,584	31,780
Back Hoc Louder	92	0.1814	0.70	8	1	1	1	1	1	1	1	1	1	1	1	0	1,936	22,617
Vibrator Roller 10 T.	112	0.1814	0.70	8	4	4	2	2	3	3	3	0	0	0	0	0	1,232	17,521
Grader	230	0.1814	0.70	8	2	2	1	1	2	2	2	0	0	0	0	0	1,232	35,981
Tractor (D2)	100	0.1814	0.70	8	2	2	2	2	0	0	0	0	0	0	0	0	704	8,939
Farm Tractor	90	0.1814	0.70	8	1	1	1	1	0	0	0	0	0	0	0	0	704	8,045
Pile Driving Machine	284	0.1814	0.70	8	0	7	7	7	7	7	7	0	0	0	0	0	1,056	38,082
Total Fuel consumption	(litre)																	**314,366**
Fuel consumption rate	(litre/year)																	**314,366**
Emission factor	(kg CO2e/litre)																	**2.9793**
GHGs Emissions	(kg CO2e/year)																	**936,592**
Remark: assume 22 working days/month																		

(b) The Fossil Fuel Combustion for Vehicle Transportation

Transportation activities during the construction phase mainly are transportation of construction material, water, and construction workers. The number of transportations during this phase are summarized in **Table 4.2.6-2**. The quantities of GHGs emissions could be estimated by using the **Equation (2)** and **Equation (3)** as follows;

GHG = E x TKM (2)

Where; GHG = GHGs Emissions (kg CO_2e/year)
E = Emission factor (kg CO_ze/TKM)
TKM = Tonne-kilometer in transport

GHG = E x km (3)

Where; GHG = GHGs Emissions (kg CO_ze/year)
E = Emission factor (kg CO_ze/km)
km = kilometer in transport for empty vehicle

Using **Equation (2)** and **Equation (3)**, the GHG emissions from the diesel combustion of transportation vehicle during construction phase is approximately 38,788.41 kg CO_2e/year or 38.79 tonne CO_2e/year. Details are shown in **Table 4.2.6-2**.

(c) Electricity Consumption

Electricity consumption during the construction phase is approximately 112,320 kWh/ year which supplied from the Provincial Electricity Authority, Doem Bang Nang Buat District Branch, Suphanburi. Therefore, the GHG emissions from the electric consumption in construction site and worker campsite could be calculated by using Equation (4) as follow;

GHG = E x C (4)

Where; GHG = GHG emissions (kg CO_2elyear)
E = Emission factor (kg CO_2e/kWh)
= 0.4999 kg CO_2e/kWh (Emission factor for electricity generation of grid mix from Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018)
C = Electricity consumption (kWh/year)
Therefore; GHG = 0.4999 kg CO_2e/kWh x 112,320 kWh/year
= 56,149 kg CO_2e/year
= 56.15 tonne CO_2e/year

Table 4.2.6-2

GHG Emissions from Diesel Combustion of Transportation Vehicle

Vehicles	Weight	Distance	TKM at	Emission factor kgCO2e/km		Month												GHG emitted
	(tonne)	(km/day)	100% load	100% load truck	Empty truck	1	2	3	4	5	6	7	8	9	10	11	12	(kg CO2/year)
Medium truck (6 wheels)	15	10	150	0.0653	0.4069	1	3	4	4	4	4	4	4	4	3	2	1	526.83
Light truck (4 wheels)	9.5	10	95	0.2706	0.2415	0	0	0	1	1	1	1	0	0	0	0	0	112.49
Full trailer	50	196	9800	0.0459	1.0206	2	2	2	2	2	2	2	2	2	2	2	2	15,596.58
Medium truck (6 wheels)	15	196	2940	0.0653	0.4069	1	1	1	1	1	1	1	1	1	1	1	1	3,260.81
Light truck (4 wheels)	9.5	196	1862	0.2706	0.2415	3	3	3	3	3	3	3	3	3	3	3	2	19,291.69
Total																		**38,788.41**

(d) Wastewater Treatment System

The wastewater generated from the consumption of construction workers (Maximum at 1,596 workers) during this phase is 111.72 m'/ day. The Project will treat wastewater using a septic tank provided by the contractor.

The related GHG emission from the septic tank are CO_2 and CH_4. However, CO_2, a biogenic origin which is not considered in the IPCC Guidelines, therefore, the GHG emission relevant to domestic wastewater is only CH_4.

The calculation of CH_4 emission could be adopted *Equation 6.1* to *Equation 6.3* in the IPCC 2006 Guidelines as follows;

$$CH_4 = [\sum ij (Ui \times Tij \times EFj)] \times (TOW - S) - R \quad (5)$$

Where;
- CH_4 = CH_4 emissions in inventory year, kg CH_4 year
- TOW = Total organics in wastewater removed in inventory year, kg BOD/year
- S = Organic component removed as sludge in inventory year, kg BOD/year
  - = 0 (No removed)
- EFj = Emission factor, kg CH_4/kg BOD
- R = Amount of CH4 recovered in inventory year, kg CH_4/year
  - = 0 (No recovered)

However, above equation is employed for country or national context, and considered in fraction of population in income group (Ui) and degree of utilization of treatment/discharge pathway or system (Tij). For this Project, the temporary wastewater treatment system will provide for treat wastewater from worker consumption and canteen. Therefore, Ui and Tij equal to 100% or 1.

$$EFj = B_0 \times MCFj \quad (6)$$

Where;
- EF = Emission factor, kg CH_4/kg BOD
- B_0 = maximum CH_4 producing capacity, kg CH_4/kg BOD
  - = 0.60 CH_4/kg BOD or 0.25 kg CH_4/kg COD

MCFj = Methane correction factor (fraction)
= 0.50
Therefore; EFj = 0.60 CH_4/kg BOD x 0.50
= 0.30 CH_4/kg BOD

TOW = P x BOD x 0.001 x I x 264 (7)

Where; TOW = Total organics in wastewater in inventory year, kg BOD/year
P^3 = Country population in inventory year, (person)
P = 1,596 persons (Construction phase)
BOD = Country-specific per capita BOD in inventory year, g/person/day, See Table 6.4 in IPCC 2006.
= 40 g/person/day
0.001 = Conversion from grams BOD to kg BOD Correction factor for additional industrial BOD discharged into sewers (for collected the default is 1.25, for uncollected the default is 1.00.)
Therefore, TOW = 1,596 persons x 40 g/person/day x 0.001 x 1.00 x 264
= 16,853.76 kg BOD/year

Using **Equation (4)**, the CH_4 emissions in inventory year is

$CH4 = [\sum ij\ (lxlx0.30)]\ x\ (16{,}853.76 - 0) - 0$
= 0.30 x 16,853.76
= 5,056.13 kg CH_4/year

According to the IPCC Fifth Assessment Report (AR6), the 100-year Global Warming Potential (GWP) of metbane gas from non-fossil origin is 27.2. Therefore, the CH_4 emissions from the wastewater treatment system could be report in CO_2 equivalent (CO_2-eq) term as 137,526.74 kg CO_2-eq /year or 137.53 tonne CO_2-eg /year.

2) Operation Phase

(a) The Fossil Fuel Combustion

During operation phase, 5 full-time employees are anticipated, with an additional 20 individuals engaged in cleaning of PV modules. Few numbers of vehicles involve in this phase. Consequently, the greenhouse gas emissions resulting from the combustion of fossil fuels in these transportation vehicles are expected to be limited and negligible.

(b) Electricity Consumption

Electricity consumption during the operation phase is approximately 816,000 kWh/year which supplied from the Provincial Electricity Authority, Doem Bang Nang Buat District Branch, Suphanburi. The GHG emissions from the electric consumption in construction site and worker campsite could be calculated by using **Equation (4)** as follow;

GHG = 0.4999 kg CO_2e/kWh x 816,000 kWh year
= 407,918 kg CO_2elyear
= 407.92 tonne CO_2e/year

(c) Wastewater Treatment System

The wastewater generated from the consumption of staff (5 persons) and cleaning workers (20 persons during PV module cleaning, two cycle per year, 30 days per cycle) during this phase is 8.59 m^3/ day. The Project will treat wastewater using a septic tank. The calculation of CH_4 emission could be adopted **Equation (5)** to **Equation (7)** similar to construction phase. Therefore;

TOW_1 = 5 persons x 40 g/person/day x 0.001 x 1.00 x 365
= 73 kg BOD/year
TOW_2 = 20 persons x 40 g/person/day x 0.001 x 1.00 x 60
= 48 kg BOD/year
S = Organic component removed as sludge in inventory year, kg BOD/year
= 0 (No removed)
EFj = Emission factor, kg CH_4/kg BOD
R = Amount of CH4 recovered in inventory year, kg CH_4/year
= 0 (No recovered)

Using **Equation (4)**, the CH_4 emissions in inventory year is

$CH_4 = [\sum ij\ (lxlx0.30)]\ x\ (73+48-0)-0$

= 0.30 x 121

= 36.30 kg CH_4/year

GHG = 36.30 kg CH_4/year x 27.2

= 987.36 kg CO_2-eq/year

= 0.99 tonne CO_2-eq/year

(d) Avoided GHG Emissions

The Project is a non-combustion power plant that generates electric power from a ground mounting solar farm with BESS. It generates electricity from the renewable energy sources that will substitute the electricity generated from the fossil fuel combustion. The installed capacity is 199.456 MW with an average annual energy output of 334.904 GWh or 334.904 x 10^6 kWh. All generated electricity is expected to sell to EGAT. Under 25 year-agreement. The total avoided GHG emission could be calculated by using **Equation (8)** as follows;

GHG = E x C **(5)**

Where;	GHG	=	GHG emissions (kg CO_2e/year)
	E	=	Emission factor (kg CO_2e/kWh)
		=	0.5986 kg CO_2e/kWh (Emission factor for electricity generation of grid mix from Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018)
	C	=	Electricity consumption (kWh/year)
		=	334.904 x 10^6 kWh
Therefore;	GHG	=	0.5986 kg CO_2e/kWh x 334.904 x 10^6 kWh/year
		=	200,473,534 kg CO_2e/year
		=	200,473.53 tonne CO_2e/year

Table 4.2.6-3

Net GHG Emissions of the Project

Year	Fossil fuel combustion		Electricity Consumption	Wastewater Treatment	Avoided GHG Emissions	Total
	Construction Equipment	Transportation Vehicle				
Construction phase						
1	936.59	38.79	56.15	137.53	0.00	1,169.06
Operation phase						
1	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
2	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
3	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
4	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
5	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
6	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
7	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
8	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
9	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
10	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
11	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
12	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
13	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
14	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
15	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
16	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
17	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
18	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
19	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
20	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
21	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
22	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
23	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
24	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
25	0.00	0.00	407.92	0.99	200,473.53	-200,064.62
Total	**936.59**	**38.79**	**10254.15**	**162.28**	**5,011,838.25**	**-5000446.4**

(3) Climate Change Risk

1) Methodology of Climate Change Risk Assessment

The Climate Change Risk Assessment (CCRA) is the assessment of the probability or likelihood the climate change risks and their potential consequences or impacts with aims to prioritize the appropriate climate action and adaptation for the proposed project or development.

As stated in the Guidance Note on Climate Change Risk Assessment, May 2023, the Client should align the CCRA with Climate Physical Risk and Climate Transition Risk categories of the TCFD as part of the ESIA or other Assessment.

The implementation of the Project is categorized as "Category B" (A proposed project is classified as category B if its potential adverse environmental impacts).

According to Equator Principles 4, Principle 2, it is expected to include assessments of climate change risks that align with Climate Physical Risk and Climate Transition Risk categories of the Recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD Recommendations).

TCFD divides climate-related risks into two overarching categories;

- Physical Climate Change Risk: For all Category A and, as appropriate, Category B Projects, and will include consideration of relevant physical risks.
- Transition Climate Change Risk: For all Projects, in all locations, when combined Scope 1 and Scope 2 emissions are expected to be more than 100,000 tonnes of CO_2 equivalent annually (100 ktpa CO_2-eq). Consideration must be given to relevant Climate Transition Risks (as defined by the TCFD) and an alternatives analysis completed which evaluates lower GHG intensive alternative.

The Climate Change Risk Assessment matrix has been adopted from the *AZ 5334 – 2013: Climate Change Adaptation for Settlements and Infrastructure – A Risk Bases Approach*, which followed the *ISO 31000: 2009, Risk Management Principle and Guideline.* The 5×5 Risk Analysis Matrix has been used to estimate the level of the identified climate change risk, where the x-axis is the consequences impact and y-axis is the likelihood (**Table 4.2.6-4**).

The description of likelihood and consequences impacts are shown in **Table 4.2.6-5** and **Table 4.2.6-6** respectively.

Table 4.2.6-4

Climate Change Risk Assessment Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	L	M	H	E	E
Likely	L	M	M	H	E
Moderate	L	L	H	H	E
Unlikely	L	L	M	M	H
Very Unlikely	L	L	L	M	M

Risk Consequence Ranking:

E = Extreme Risk, requiring immediate action.
H = High risk, requiring detailed research and planning at senior management level.
M = Moderate risk, requiring change to design standards and maintenance of assets.
L = Low risk, requiring action through routine maintenance of assets.

Source: Adopted from AS5334:2013 Climate change adaptation for settlements and infrastructure

Table 4.2.6-5

The Description of Likelihood of Occurences on Recurrent and Frequency

Likelihood of Occurrences	Description	Recurrent or Event Risks	Long Term Risks
Almost Certain	Could occur several times per year	Has happened several times in the past year and in each of the previous 5 years; or could occur several times per year	Has a greater than 90% chance of occurring in the identified time period if the risk is not mitigated
Likely	May arise about once per year	Has happened at least once in the past year and in each of the previous 5 years, or may arise about once per year	Has a 60 – 90% chance of occurring in the identified time period if the risk is not mitigated
Moderate	Maybe a couple of times in a generation	Has happened during the past 5 years but not in every year, or May arise once in 25 years	Has a 40 – 60% chance of occurring in the identified time period if the risk is not mitigated
Unlikely	Maybe once in a generation	May have occurred once in the last 5 years, or may arise once in 25 to 50 years	Has a 10 – 30% chance of occurring in the future if the risk is not mitigated
Rare	Maybe once in a lifetime	Has not occurred in the past 5 years; or unlikely during the next 50 years	May occur in exceptional circumstances, i.e. less than 10% chance of occurring in the identified time period if the risk is not mitigated

Source: Adopted from AS5334:2013 Climate change adaptation for settlements and infrastructure

Table 4.2.6-6

The Description of Level of Consequences on Concerned Sectors

Level Consequence	Infrastructure, Service	Social / Cultural	Environmental
Insignificant	- No infrastructure damage, no change to service.	- No adverse human health effects.	- No adverse effects on natural environment
Minor	- Localized infrastructure service disruption. - No permanent damage. Some minor restoration work required. - Early renewal of infra-structure by 10 - 20%. - Need for new/modified ancillary equipment.	- Short-term disruption to employees, customers or neighbors. - Slight adverse human health effects or general amenity issues.	- Minimal effects on the natural environment.
Moderate	- Limited infrastructure damage and loss of service. - Damage recoverable by maintenance and minor repair. - Early renewal of infrastructure by 20 - 50%.	- Frequent disruptions to employees, customers, or neighbors. - Adverse human health effects.	- Some damage to the environment, including local ecosystems. - Some remedial action may be required.

Major	- Extensive infrastructure damage requiring major repair. - Major loss of infrastructure service. - Early renewal of infrastructure by 50 - 90%.	- Permanent physical injuries and fatalities may occur. Severe disruptions to employees, customers or neighbors.	- Significant effect on the environment and local ecosystems. Remedial action likely to be required.
Catastrophic	- Significant permanent damage and/or complete loss of the infrastructure and the infrastructure service. - Loss of infrastructure support and translocation of service to other sites. - Early renewal of infrastructure by 90%.	- Severe adverse human health effects, leading to multiple events of total disability or fatalities. - Total disruption to employees, customers or neighbors. - Emergency response at a major level.	- Very significant loss to the environment. - May include localized loss of species, habitats or ecosystems. - Extensive remedial action essential to prevent further degradation. - Restoration likely to be required.

Source: Adopted from AS5334:2013 Climate change adaptation for settlements and infrastructure

2) Projected Climate Change Data

The Project located in Suphanburi Province, Thailand. The Project implementation may encounter several physical climate risks, which are associated with the region's climate patterns and extreme weather events. Some potential physical climate risks that the Project may envisage for example (Climate Risk Country Profile: Thailand, Asian Development Bank 2021);

(a) Extreme Temperatures

The Intergovernmental Panel on Climate Change (IPCC) has developed four Representative Concentration Pathways (RCP) (i.e. RCP2.6, RCP4.5, RCP6.0, and RCP8.5) used for climate modeling and research for the IPCC Fifth Assessment Report (AR5) in 2014. The pathways describe the different future climate depending on the volume of GHG emitted in the coming year. The results from IPCC modelled show that under all emissions scenarios, annual average of monthly maximum and monthly minimum temperatures are projected to increase considerably greater than projected increases in the average temperature.

In this report, RCP2.6 and RCP8.5, the extremes of low and high emissions pathways, are the primary focus RCP2.6 represents a very strong mitigation scenario, whereas RCP8.5 assumes business-as-usual scenario. The projected temperature under RCP 2.6 and RCP 8.5 are shown in **Table 4.2.6-7** to **Table 4.2.6-8**.

Table 4.2.6-7
Projected Anomaly for Daily Temperatures in Thailand
During 2040-2059 and 2080-2099 for RCP2.6 and RCP8.5

Unit: °C

Scenario	Average Daily Maximum Temperature		Average Daily Temperature		Average Daily Minimum Temperature	
	2040-2059	2080-2099	2040-2059	2080-2099	2040-2059	2080-2099
RCP2.6 (Atmospheric concentration of CO_2 projected at approx. 420 ppm by 2100)	1.0 (-0.6-2.9)	1.1 (-0.6-3.0)	1.0 (-0.3-2.4)	1.1 (-0.2-2.5)	1.0 (-0.1-2.2)	1.1 (-0.2-2.4)
RCP8.5 (Atmospheric concentration of CO_2 projected at approx. 940 ppm by 2100 and continuing to increase.)	1.7 (0.0-3.6)	3.6 (1.6-6.1)	1.8 (0.4-3.2)	3.8 (2.0-5.8)	1.9 (0.5-3.2)	3.9 (2.2-5.9)

Source: Climate Risk Country Profile: Thailand (Asian Development Bank, 2021)

Table 4.2.6-8
Projected Anomaly for Monthly Temperatures in Thailand
During 2040-2059 and 2080-2099 for RCP2.6 and RCP8.5

Unit: °C

Scenario	2040–2059		2080–2099	
	Jun-Aug	Dec-Feb	Jun-Aug	Dec-Feb
RCP2.6 (Atmospheric concentration of CO_2 projected at approx. 420 ppm by 2100)	1.0 (0.2-2.0)	1.0 (-0.6-2.6)	1.0 (0.1-2.0)	1.1 (-0.4-2.6)
RCP8.5 (Atmospheric concentration of CO_2 projected at approx. 940 ppm by 2100 and continuing to increase.)	1.6 (0.6-2.8)	1.9 (0.1-3.4)	3.5 (2.4-5.4)	3.8 (1.4-6.1)

Source: Climate Risk Country Profile: Thailand (Asian Development Bank, 2021)

(b) Cyclones and Storm Surge

According to the report, Thailand's Second National Communication to the UNFCC expects an increase in typhoons reaching Thailand between 2013 and 2043, while the number of monsoon storms are projected to stay relatively stable during the same time-period. Higher sea levels and wetter pre-monsoon conditions increase the risk of large-scale flooding, as experienced in 2011.

(c) Flood

Paltan et al. (2018) demonstrate that even under lower emissions pathways coherent with the Paris Climate Agreement almost all Asian countries face an increase in the frequency of extreme river flows. What would historically have been a 1 in 100-year flow, could become a 1 in 50-year or 1 in 25-year event in most of South, Southeast, and East Asia.

3) Results of Climate Change Risk Assessment

The results of physical climate risk assessment are shown in **Table 4.2.6-9**.

Table 4.2.6-9

Result of Climate Change Risk Assessment

NO.	Potential Risk/ Potential Causes	Risk Evaluation		
		Likelihood	Severity	Risk
1	Storm and Heavy Rain – Climate change expected to enhance the cyclone, and possible to increasing wind speed and rainfall or precipitation intensity. Moreover, the extreme rainfall events are likely to more frequent – The typhoons reaching Thailand in between 2013-2043 are expected to be increased, but the number of monsoon storms are projected to stay relatively stable. – The structure of PV Solar structure is design in accordance with DPT. 1311-50 standard, and could be tolerate for wind speed at 30 m/s or 108 km/hr. (the wind speed of storm is range from 89-102 km/hr.)	Unlikely	Minor	Low
2	Flood – Under lower emissions pathways coherent with the Paris Climate Agreement almost all Asian countries face an increase in the frequency of extreme river flows. What would historically have been a 1 in 100-year flow, could become a 1 in 50-year or 1 in 25-year event in most of South, Southeast, and East Asia. (Paltan et al. (2018)) – Based on the secondary data collection from the Natural Disaster Prevention and Agricultural Risk Group, Land Use Policy and Planning Department, Department of Land Development (2013), the Project area locate in low flooding risk area (Less than 3 time in 10-year period).	Unlikely	Minor	Low

4.2.7 Human Rights

Inherent human right risk assessment specifies the Human Rights risks to which the project is connected based on severity and likelihood, noting where risks intersect or are interrelated, and emphasizing which vulnerable people/groups may be at risk (e.g., Indigenous Peoples; women; national persons with disabilities; and migrant workers and their families). The methods used to conduct the human rights impact assessment (HRIA) are set out in **Appendix 4-1**. The result of the assessment of inherent right risk is shown in **Table 4.2.7-1**.

There is a possibility of human rights implications arising from the development of the project, particularly during the construction phase. The workers have direct association with risk issue such as occupational health and safety, discrimination, wages and working hours. Residual risk assessment evaluates the potential risks with mitigation measures that project have in place. The result of assessment of residual risk is shown in **Table 4.2.7-2**.

As a summary or conclusion of the HRIA, the project includes both inherent and residual human rights impacts, which are assessed as low and medium in nature after mitigation. The key risk area is related to community and worker safety such as transportation, pollution, health impact, and conflict with local people, which is addressed comprehensively as part of the mitigation plans in this IEE (see **Chapter 5**).

Table 4.2.7-1

Project Inherent Human Rights Risk Assessment

Effectors	Human Right Risk	Severity Scores				Likelihood Scores	Risk Scores *	Risk Level	Receptors	
		Scale	Scope	Remediability	Absolute scores				Employees	Local community
- Developer - Contractors	1. Occupational Health and Safety	3	2	2	3	2	6	High	✓	
	2. Discrimination	1	2	1	2	2	4	Medium	✓	
	3. Working Hours	2	2	1	2	2	4	Medium	✓	
- Developer	4. Community Safety & Standard of Living	3	2	2	3	2	6	High		✓

Remark: Risk Scores = Severity Scores x Likelihood Scores

Table 4.2.7-2

Residual Risks

Project Activity	Effectors	Human Right Risk	Description of Impact	Mitigation/ Control	Severity Scores				Likelihood Scores	Risk Scores (Severity Scores X Likelihood Scores)	Risk Level	Receptors	
					Scale	Scope	Remediability	Absolute scores				Employees	Local community
Construction phase													
Employment of staff and workers (full time and part time)	• Project Developer • Contractors	(1) Occupational health and safety	• Risk that workers will face occupational accident during the project construction and operation period.	• Occupational safety management shall be arranged in a systematical and efficient manner in conformity with the requirements of occupational safety, health and environment law relating to construction. • Warning signs indicating the perimeter of the project construction zones shall be installed in clearly visible and easily recognizable places. • The construction site shall be proportionally divided into construction zone, daytime rest zone, machinery and equipment storage zone, and unused material and equipment storage zone • First aid kits including an ambulance or contact number of nearby medical facilities having an ambulance for emergency shall be provided .In addition, first aiders shall be routinely provided at the construction site and ready for transporting an injured person to nearby hospitals at all time; and • Assign employees who are exposed to occupational hazards. The company may consider granting them time off as necessary, without affecting their leave entitlement.	**1**	**2**	**1**	**2**	**1**	**2**	Low	✓	

Table 4.2.7-2 (Cont'd)

Project Activity	Effectors	Human Right Risk	Description of Impact	Mitigation/ Control	Severity Scores				Likelihood Scores	Risk Scores (Severity Scores X Likelihood Scores)	Risk Level	Receptors	
					Scale	Scope	Remediability	Absolute scores				Employees	Local community
Employment of staff and workers (full time and part time) (Cont'd)		(2) Discrimination	• Risk that workers may be treated unfairly	• The Company has established a process for monitoring and assessing human rights impacts. These human rights due diligence process engages with stakeholders to identify, assess, manage, and prevent or mitigate human rights risks and related issues. The process covers three main areas: within the Company, within the Company's projects, and within local communities in the areas where the Company operates. • The Company will treat all stakeholders equally and fairly, respecting diversity and emphasizing non-discrimination based on gender, age, race, ethnicity, nationality, or other • attributes unrelated to work ability. • The Company will communicate its commitment and expectations regarding human rights to stakeholders through relevant and appropriate channels. • The Company provides reporting and whistleblowing channels, including a mechanism for receiving conflicting complaints, which establishes equitable and fair solutions as necessary and appropriate. • The company supports gender equality and women's rights, including the promotion of equal pay for equal work through the use of a fair and non-discriminatory valuation system.	1	2	1	2	1	2	Low	✓	

Table 4.2.7-2 (Cont'd)

Project Activity	Effectors	Human Right Risk	Description of Impact	Mitigation/ Control	Severity Scores				Likelihood Scores	Risk Scores (Severity Scores X Likelihood Scores)	Risk Level	Receptors	
					Scale	Scope	Remediability	Absolute scores				Employees	Local community
Employment of staff and workers (full time and part time) (Cont'd)		(3) Working Hours	• Mandating unreasonable working hours for employees that are inconsistent with ILO standards	• Regular employees are required to work from Monday to Friday, with working hours from 8:00 a.m. to 5:00 p.m. Shift employees are required to work no more than 12 hours per day or a maximum of 48 hours per week. • There should be a minimum of 13 traditional holidays per year. • The company respects labor rights and adheres to labor laws, including compliance with regulations regarding working hours and proper working conditions. It also acknowledges related freedoms and collective rights as appropriate, while supporting the determination of employee welfare and compensation that exceeds the minimum required by law.	1	2	1	2	1	2	Low	✓	
Construction activity	• Project Developer	(4) Community Safety & Standard of Living	• Risk that project transportation incurs road accident; • Impact of pollution that is affected by the project construction, such as noise and vibration, and waste; • The conflict between migrant workers and the local people; • Utilization of public infrastructures affected by migrant workers are inadequate to the local people.	• Transportation mitigation measures • Noise, waste management measures. • The local labor will be given first priority to be chosen for employment. • Rules shall be established to control and supervise migrant workers ' behavior to prevent creating disturbance/problems to communities. • The provision of worker camp site, sufficient basic infrastructure for workers living in the camp site, • The Company shall support a	1	2	1	2	2	4	Medium		✓

Table 4.2.7-2 (Cont'd)

Project Activity	Effectors	Human Right Risk	Description of Impact	Mitigation/ Control	Severity Scores				Likelihood Scores	Risk Scores (Severity Scores X Likelihood Scores)	Risk Level	Receptors	
					Scale	Scope	Remediability	Absolute scores				Employees	Local community
Construction activity (Cont'd)				• Human rights due diligence process to engage with its stakeholders to identify, assess, manage, and, where applicable, prevent or mitigate human rights risks and related issues in key areas including within the company, in its projects, and within the local communities where the company operates. • The Company shall support corporate social responsibility programs and initiatives that promote human rights, with a focus on education, health, work and environmental protection, for children, local communities and the general society.									
Operation activity	Project Developer	(5) Community Safety & Standard of Living	• Risk that project transportation incurs road accident; • Contamination to the environment • Infestation of disease carriers	• The local labor will be given first priority to be chosen for employment. • Human rights due diligence process to engage with its stakeholders to identify, assess, manage, and, where applicable, prevent or mitigate human rights risks and related issues in key areas including within the company, in its projects, and within the local communities where the company operates. • The Company shall support corporate social responsibility programs and initiatives that promote human rights, with a focus on education, health, work and environmental protection, for children, local communities and the general society.	**1**	**1**	**1**	**1**	**1**	**1**	Low		✓

4.3 IMPACT ASSESSMENT FOR TRANSMISSION LINE

PEA has the authority to set standards for its electrical equipment and fuel, to maintain technical and economic efficiency, and to control electricity generation within its facilities, according to the Provincial Electricity jurisdiction Act (Version 4) B.E. 2542 (1999). The implications of the installation and operation of these power lines are also managed by the PEA. As a result, Breeze and Shine Power Plant Project is not permitted to intervene in PEA's operations.

The Project and COT obtained information about the construction and operation processes of power transmission lines for potential impact assessment from PEA documents published on their website, as well as interviews with PEA officials and other relevant agencies. The following is an assessment of the primary impacts of power transmission lines, both during construction and operation:

(1) Construction Phase

Impact sources during the construction phase are the pole installation activities which will take 5-7 days for each pole construction by not over 10 workers. The potential impacts from the construction include:

1) Air quality: the excavation for pole foundation and pole installation can release dust and exhaust gases into the air; however, these activities will last only a few days. The impact on air quality will be localized and short-term; hence, the level is considered low.

2) Noise: noise will be generated by construction machinery and equipment such as cranes and backhoes. Given the proximity to communities, this could be disruptive. However, the construction will take place over a short period of time, and the impact will be limited to a close proximity. As a result, the impact will be low.

3) Vibration: the use of heavy machinery for digging and compacting soil can cause vibrations that may be felt by nearby residents and can affect structures in close proximity to the construction site. Given the size of the operation, vibrations are likely to be minimal and localized.

4) Biodiversity: the project's construction will cause noise and vibration, which may disturb the wildlife. Since the construction of transmission line will take place within the right-of-way of public roads where the land use is agricultural land, communities, and establishments, the wildlife that inhabits it has evolved to live in disturbed agricultural environments as a consequence of human activity. As a result, the construction will mainly cause noise-sensitive species to relocate away from the source of the disturbance. Nonetheless, the disruption time will be short, so the impact will be low.

5) Occupational Health and Safety / Community Health and Safety: PEA choose the contractor from an approved list of PEA and will include relevant laws regarding environmental, occupational health, and safety regulations in contract terms to ensure the compliance with requirements in those regulations. In addition, in cases where damage is caused by a tortious act of PEA or arises from the performance of duties by its employees or workers, the following procedures should be undertaken:

- In the event that an external party's property is damaged, consideration should be given to deducting depreciation according to the condition of the property or using the market price at the time of the incident as part of the assessment before proposing to the authorized person to approve the payment of damages.
- In cases where an external party is deceased and the heirs make a claim for damages from PEA, the authorized person should provisionally approve an initial payment of damages to the heirs of the deceased not exceeding 50,000 baht. Subsequently, a fact-finding committee shall consider determining the damages, taking into account the status and actual damages incurred by the individual concerned.
- In cases where an external party sustains injuries or disabilities, or loses their capacity, a fact-finding committee shall consider determining the damages by comparing guidelines for considering compensation payments as specified in the annex of these regulations. However, this does not include medical expenses and other damages such as loss of earnings or loss of support.
- In addition, communities can complain about impacts from PEA’s operations can be made through the following channels:
    - Hotline 1129
    - Complaints via electricity billing officers or local electricity offices
    - The website of the Provincial Electricity Authority

  When the PEA receives a complaint, they will respond within 30 days, and the complainant can track the progress of the complaint resolution on the PEA's website.

6) Land Use: although PEA's power transmission line construction is inside the Right-of-Way (RoW) of public roadways, an inspection of land use along the power transmission lines indicated agricultural operations such as rice, sugarcane, cassava, and rubber tree production. If power transmission poles are built in agricultural areas, that land will be converted into pole construction sites, which require approximately 5 square meters apiece. Furthermore, the PEA has a policy that allows farmers to harvest crops in areas where power transmission poles will be built as early as possible in accordance with the building timetable. As a result, the influence on land use for farmers constructing areas is regarded as low.

In addition, approximately 23 transmission poles may be installed in areas where public establishments have utilized the right-of-way (see **Figure 1.1.3-2**). However, if the construction method for the transmission line is required to clear encroaching structures inside the right-of-way or causes problems with neighboring residents, PEA will alter the design of the construction approach. If the removal of the encroaching structures is unavoidable, PEA will request that the land-owning agencies, such as the Department of Highways negotiate with the trespassers to remove their encroaching structures. However, encroachments that need to be removed, no compensation will be provided as encroachment is illegal. As a result, some of encroaching structures could be moved without being destroyed. The impact is considered low.

7) Transportation: partial or full lane closures may be necessary to provide space for construction activities. This could disrupt normal traffic flow. However, the regular PEA practices will be followed, including as providing adequate signage to inform drivers of construction work ahead or lane closures and keeping local communities informed about construction schedules. Hence, the impact on traffic will be low.

(2) Operation Phase

During the operation phase, the only activity is to deliver electricity to the substation via power transmission lines. The following are the potential consequences that may be arisen from this operation:

1) Electromagnetic field: design and construction of transmission line will be in accordance with EGAT Operation Code for Transmission Line System. There is requirement of electric field and magnetic field of international commission on non-ionizing radiation protection (ICNIRP) on electromagnetic radiation (**Table 4.3-2**). To check the compliance with the requirement, EGAT has designed the value of electric field, magnetic field, radio interference, audible noise and short circuit current density by

selecting type and clearance of transmission line. The expected results of impact are as shown in **Table 4.3-3** that calculated by BVCORONA program. All quantities are not exceeded the standard. It can be assured that the construction of transmission line by EGAT will not pose impact of electric field and magnetic field to people living near the line.

Table 4.3-2

Requirement of Electric Field and Magnetic Field of International Commission on Non-Ionizing Radiation Protection (ICNIRP) on Electromagnetic Radiation

Exposure	Electric Field (kV/m)	Magnetic Field (mG)
Working related to magnetic field		
- All day exposure	10	5000
- Short time exposure	30	50000
- Only arms and legs exposing to magnetic field	-	250000
People		
- 24 hrs/day	5	1000
- 2 - 3 hrs/day	10	10000

Remark: Summation of electric field should not exceed 80 kV/m for all day work.

Table 4.3-3

Results Calculated by BVCORONA Program

Quantity	Unit	Quantity at the boundary of R.O.W.	
		Standard	Calculated value
Electric Field	kV/m	2	1.125
Magnetic Field	mG	200	112.68
Radio Interference	dB	40	28.8
Audible Noise	dBA	55	35.8

Source: Electricity Generating Authority of Thailand**,** 2012

2) Biodiversity: During the project's operation phase, the transmission line may have an impact on birds due to collisions during migration. The project's 115-kv transmission lines will be built on 22-meter-high concrete poles, similar to the electrical poles seen throughout Thailand, and will run alongside a public road right-of-way. The transmission lines are not located in areas that serve as food sources for birds, wetlands, forests, or large agriculture fields, like large transmission lines (500-kv). Also, the right-of-way along public roads do not constitute the primary landing areas for birds. Additionally, from the second field survey during the migratory season, six migratory species were observed; *Halcyon pileate, Ficedula albicilla, Acrocephalus orientalis, Acrocephalus bistrigiceps, Saxicola stejnegeri,* and *Lanius cristatus,* all are classified as least concern (LC).

In addition, people residing along the Project's transmission line reported that commonly encountered bird species include the Little Egret and Asian Openbill typically found in rice paddy areas, and small-sized birds like the Common Tailorbird and Zebra Dove are often seen perching on power lines. Residents reported not observing bird carcasses along existing PEA transmission lines in the area in the past. Based on this data, it is possible to conclude that the project's location, the species of migratory birds present in the area, and the size of the migratory groups, which are common causes of collisions with transmission lines, present a low risk of collision. As a result, the potential impact of the TL on migrating birds is considered low.

3) Transportation: regular maintenance can disturb traffic flow as partial or full lane closures for maintenance activities. However, the regular PEA practices will be followed, including as providing adequate signage to inform drivers of construction work ahead or lane closures and keeping local communities informed about construction schedules. Hence, the impact on traffic will be low.

4.4 SUMMARY AND DISCUSSION

Overview of project implementation and impact assessment in relation to the ADB's Safeguard Requirement, ADB's Social Protection, and IFC Performance Standards as illustrated in **Table 4.4-1**.

Table 4.4-1

Overview of Project Execution and Impact Assessment in Relation to the ADB and IFC Performance Standards

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
ADB's Safeguard Requirement 1: Environment Assessment and Environmental Planning and Management These requirements include assessing impacts, planning and managing impact mitigations, preparing environmental assessment reports, disclosing information and undertaking consultation, establishing a grievance mechanism, and monitoring and reporting. The document also includes particular environmental safeguard requirements pertaining to biodiversity conservation and sustainable management of natural resources, pollution prevention and abatement, occupational and community health and safety, and conservation of physical cultural resources. The applicability of particular requirements is established through the environmental assessment process and compliance with the requirements is achieved through implementation of environmental management plans agreed to by ADB and the borrower/client. The borrower/client will prepare an environmental management plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment. The EMP will include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational	**PS 1: Assessment and Management of Environmental and Social Risk and Impact** The Project shall conduct a process of environmental and social assessment, and establish an Environmental and Social Assessment and Management System (ESMS) which will incorporate the following elements: 1) Policy: Defining the environmental and social objectives and principles that guide the project to achieve environmental and social performance. 2) Identification of risks and impacts: Environmental and social risks and impacts will be identified in the context of the project's area of influence. 3) Management programs: Describe the mitigation and performance improvement measures and actions that address the identified ES risks and impacts. 4) Organizational capacity and competency: Establish, maintain, and strengthen as necessary an organizational structure that defines roles, responsibilities, and authority to implement the ESMS. 5) Emergency preparedness and response 6) Monitoring and review: Establish procedures to monitor and measure the effectiveness of the management program, as well as compliance	GULF Energy Development (GED) has established its own Environmental and Social Management System (ESMS) in alignment with various international policies, standards, and management practices to which GED is committed. It is the responsibility of every individual within GED to achieve the objectives of the ESMS. Since Breeze and Shine Power Company Limited is a subsidiary of GED, it also bears the responsibility of adhering to GED's system and policies. Furthermore, Breeze and Shine Power Company Limited has developed its own ESMS tailored to the specific characteristics of its project. This includes: - ESMS Program (as discussed in Chapter 1 of this report) - Identification of risks and impacts (as discussed in Chapter 4 of this report), - Management program, Emergency preparedness and response, Monitoring and review (as discussed in Chapter 5 of this report), - Stakeholder engagement (as discussed in Chapter 6 of this report), and

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.	with any related legal and/or contractual obligations and regulatory requirements. 7) Stakeholder engagement 8) External communications and grievance mechanisms: 9) Ongoing reporting to affected communities: Provide periodic reports to the affected communities that describe progress with implementation of the project action plans.	- External communications and grievance mechanisms (as discussed in Chapter 7 of this report).
ADB's Safeguard Requirement 1: **Biodiversity Conservation and Sustainable Natural Resource Management** The borrower/client will assess the significance of project impacts and risks on biodiversity and natural resources as an integral part of the environmental assessment process. The assessment will focus on the major threats to biodiversity, which include destruction of habitat and introduction of invasive alien species, and on the use of natural resources in an unsustainable manner. The borrower/client will need to identify measures to avoid, minimize, or mitigate potentially adverse impacts and risks and, as a last resort, propose compensatory measures, such as biodiversity offsets, to achieve no net loss or a net gain of the affected biodiversity. The focus on Modified Habitats, Natural Habitats, Critical Habitats and Legally Protected Areas.	**PS 4: Community health, safety and security** 3) Ecosystem services: The project shall identify risks and potential impacts on priority ecosystem services that may be exacerbated by climate change. Adverse impacts should be avoided, and if these impacts are unavoidable, the client will implement mitigation measures. **PS 6: Biodiversity conservation and sustainable management of living natural resources** The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System (ESMS), the elements of which are outlined in Performance Standard 1.	The Project is not located in the protected area. Phu Toei National Park is the nearest protected area which is located approximated 30 kilometers from the Project location. And two key biodiversity area, however, there were concentrated irrigation system developments in this area, and it is now primarily dedicated to intensive rice cultivation, with only small remaining portions of wetland ecosystems and extensive agricultural activities. Based on the forest resources survey data, there are one endangered species (*Pterocarpus macrocarpus*) and one critically endangered species (*Dalbergia cochinchinensis*). When considering the relevant laws, it is found that these protected tree species are present within the project area, which is land with ownership or possession rights under land laws. However, all tree species that growing on land with ownership or possession rights under land laws, are not consider protected trees.

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
		For wildlife resources, COT identified 6 candidate species namely Asian Elephant (*Elephas maximus*), Greater Adjutant (*Leptoptilos dubius*), Green Peafowl (*Pavo muticus*), Southeast Asian Box Turtle (*Cuora amboinensis*), Steppe Eagle (*Aquila nipalensis*) and Milky Stork (*Mycteria cinerea*). The results from both surveys did not find any of them. There will be a gradual opening of the area for construction activities. The process of the construction will impact the food sources and habitats of small wildlife. The project will systematically open different parts of the area, avoiding the simultaneous opening of the entire space at once. This approach aims to minimize the impact on small wildlife, allowing them to move out of the area gradually. If construction contractors encounter wildlife during the construction process, they are required to relocate the wildlife to a nearby ecosystem. Moreover, land use characteristic (prior to the Project) was agricultural land and not having a natural forest characteristic, therefore, no adverse effect to ecosystem services from the Project implementation.
ADB's Safeguard Requirement 1: **Pollution Prevention and Abatement** During the design, construction, and operation of the project the borrower/client will apply pollution	**PS 3: Resource efficiency and pollution preventive** <u>Resource Efficiency</u>	The Project utilizes photovoltaic (PV) solar panel technology in line with the policy to promote electricity production from alternative and renewable energy sources. This form of power generation is

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/ client will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in this document. <u>Pollution Prevention, Resource Conservation, and Energy Efficiency</u> The borrower/client will avoid, or where avoidance is impossible, will minimize or control the intensity or load of pollutant emission and discharge. In addition, the borrower/client will incorporate in its operations resource conservation and energy efficiency measures consistent with the principles of cleaner production. When the project has the potential to constitute a significant source of emissions in an already degraded area, strategies that help improve ambient conditions, such as evaluating alternative project locations and considering emissions offsets, will be introduced. <u>Wastes</u>	1) Greenhouse gases: Consider alternatives and implement technically and financially feasible and cost-effective options to reduce project-related GHG emissions during the design and operation of the project. 2) Water consumption: The project shall adopt measures that avoid or reduce water usage. <u>Pollution Prevention</u> 1) Wastes: The project shall reduce the generation of waste, and recover and reuse waste or treat, destroy, or dispose of it in an environmentally sound manner. 2) Hazardous waste: The project shall adopt GIIP alternatives, adhere to the limitations applicable to its trans-boundary movement, use contractors that are reputable and licensed, develop their own recovery or disposal facilities at the project site. 3) Hazardous materials management: The project shall avoid or, when avoidance is not possible, minimize and control the release of hazardous materials. 4) Pesticide use and management **PS 4: Community health, safety and security** <u>Community Health and Safety</u> 2) Hazardous materials management and safety: The project shall avoid or minimize the potential for community exposure to hazardous materials	considered one of the cleanest energy sources developed in recent years. During the construction phase of the Project, some pollutants may arise, including air pollution from site preparation. This can be mitigated by regularly watering the construction area to prevent dust dispersion. Wastewater generated from worker consumption will be managed through the provision of toilets with septic tanks by the contractor. Solid waste and construction waste will be systematically collected within the construction area and then handed over to authorized agencies for proper disposal. In the operation phase, pollutants generated will be from worker consumption, specifically wastewater and solid waste. Wastewater from cleaning solar panels may occur occasionally to maintain production efficiency by preventing dust accumulation. However, it's important to note that this cleaning process will exclusively use water without any added chemical substances. Therefore, it can be assumed that the solar panel cleaning process will not produce any harmful pollutants. Environmental and social prevention and mitigation measures of the Project for both construction phase and operation phase are as shown in Chapter 5 of this report.

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
The borrower/client will avoid, or where avoidance is not possible, will minimize or control the generation of hazardous and nonhazardous wastes and the release of hazardous materials resulting from project activities. Where waste cannot be recovered or reused, it will be treated, destroyed, and disposed of in an environmentally sound manner. If the generated waste is considered hazardous, the client will explore reasonable alternatives for its environmentally sound disposal considering the limitations applicable to its transboundary movement. When waste disposal is conducted by third parties, the borrower/client will use contractors that are reputable and legitimate enterprises licensed by the relevant regulatory agencies. Hazardous Materials The borrower/client will avoid the manufacture, trade, and use of hazardous substances and materials subject to international bans or phaseouts because of their high toxicity to living organisms, environmental persistence, potential for bioaccumulation, or potential for depletion of the ozone layer and will consider the use of less hazardous substitutes for such chemicals and materials. Greenhouse Gas Emissions The borrower/client will promote the reduction of project-related anthropogenic greenhouse gas emissions in a manner appropriate to the nature and scale of project operations and impacts. During the development or operation of projects that are expected	and substances that may be released by the project.	For waste management, the project is required to follow the guidelines set forth in the Ministry of Industry's announcement regarding the management of pollutants and unused materials in B.E. 2566 (2023). Authorized agencies are responsible for the proper disposal of these materials. The Project should establish procedures for the safe separation and disposal of hazardous waste and provide training to relevant personnel to ensure they understand the importance of not discharging waste into drainage systems, gutters, waterways, or water sources in proximity to the construction site. As well as the management of defective solar panels. This includes following the guidelines: - In case of export of waste for management in other countries, the export shall be carried out in accordance with the law governing hazardous substances and international requirements. When the operation is completed, the ERC shall be informed within 30 days after the waste export for management in other countries. - In case of waste management in the country, hazardous waste shall be disposed in secure landfills or by incineration in a hazardous waste incinerator. The Project is a non-combustion power plant that generates electric power from solar energy using

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
to or currently produce significant quantities of greenhouse gases, the borrower/client will quantify direct emissions from the facilities within the physical project boundary and indirect emissions associated with the off-site production of power used by the project. The borrower/client will conduct quantification and monitoring of greenhouse gas emissions annually in accordance with internationally recognized methodologies. In addition, the borrower/ client will evaluate technically and financially feasible and cost-effective options to reduce or offset project-related greenhouse gas emissions during project design and operation, and pursue appropriate options.		photovoltaic technology or solar cells installed on the ground with an energy storage system. It generates electricity from the renewable energy sources that will substitute the electricity generated from the fossil fuel combustion. Net annual GHG emissions during construction is estimated at 9,365.92 tonne CO2-eq/year, while the avoided GHG is estimated at -200,473.53 tonne CO2-eq/year throughout the operation phase. Therefore, the project caused the positive impact to climate change.
ADB's Safeguard Requirement 1: **Health and Safety** Occupational Health and Safety The borrower/client will provide workers with a safe and healthy working environment, taking into account risks inherent to the particular sector and specific classes of hazards in the borrower's/client's work areas, including physical, chemical, biological, and radiological hazards. The borrower/client will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and	**PS 2: Labor and Working Conditions** Working Conditions and Management of Worker Relationship 1) Human resources policies and procedures: Implement human resources policies and procedures consistent with the requirements of this performance standard and national law. 2) Working conditions and terms of employment: Provide reasonable working conditions and terms of employment. 3) Workers' organizations: Comply with national law recognizes workers' rights to form and to join workers' organizations. 4) Non-discrimination and equal opportunity: Base the employment relationship on the principle of equal opportunity and fair treatment, and will not	Breeze and Shine Power Company Limited is obligated to fully comply with the national laws and regulations pertaining to working conditions and management of worker relationship. Furthermore, the Project shall exercise strict oversight over all contractors within its supply chain who are involved in the Project's development, including the supervision of subcontractors. The Project also establishes policies and frameworks related to non-discrimination, grievance mechanisms, and occupational health and safety that are specifically tailored to the Project's implementation. As of necessary welfare to employees, the Project shall adhere to Ministerial Regulation Concerning

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place. Community Health and Safety The borrower/client will identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the project, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts. These measures will favor the prevention or avoidance of risks and impacts over their minimization and reduction. Consideration will be given to potential exposure to both accidental and natural hazards, especially where the structural elements of the project are accessible to members of the affected community or where their failure could result in injury to the community. The borrower/client will avoid or minimize the exacerbation of impacts caused by natural hazards, such as landslides or floods, that could result from land use changes due to project activities **ADB's Social Protection Strategy** Aims to contribute to poverty reduction, social inclusion, and sustainable development by	discriminate to any aspects of the employment relationship. 5) Retrenchment: Carry out an analysis of alternatives to retrenchment or retrenchment plan will be developed and implemented to reduce the adverse impacts of retrenchment on workers. 6) Grievance mechanism: Provide a grievance mechanism for workers to raise workplace concerns. Protecting the Work Force 1) Child labor: The project will not employ children in any manner that is economically exploitative. 2) Forced labor: The project will not employ forced labor. Occupational Health and Safety The client will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, as far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice. **PS 4: Community health, safety and security** Community Health and Safety 1) Infrastructure and equipment design and safety: The project shall design, construct, operate, and decommission the structural elements or components of the project in accordance with good international industry practice (GIIP).	Labour Welfare Provision in an Establishment B.E. 2548 (2005) such as drinking water not less than one station for not exceeding forty employees, bathrooms and toilets with the layout and number, maintenance of cleanliness and hygiene, and provision of necessary kits for first aid and medical service in an adequate quantity for employees in the workplace. As for workforce protection, the Project shall strictly adhere to national law. Regarding child labor, the project shall strictly comply with the Thai Labor Protection Act B.E. 2541 (1998), Chapter 4, Employment of Young Workers, section 44, including but not limited to the following: - Prohibiting the employment of children under 15 as employees. - Prohibiting the use of child employees under the age of 18 to work between 22:00 and 06:00 hours unless permitted. - Prohibiting the use of child employees under the age of 18 for overtime work. Forced labor is strictly prohibited, and the project shall adhere to the Thai Anti-Trafficking in Persons Act B.E. 2551 (2008), Section 6 and Section 7, which address the use of forced labor or services by compelling employees to work or provide services under the threat of injury to life, body, reputation, or property, including but not limited to the following measures:

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
strengthening social protection systems in its member countries.	4) Community exposure to disease: The project shall avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable diseases that could result from project activities. 5) Emergency preparedness and response: The project shall assist and collaborate with the affected communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations. <u>Security Personnel</u> - Assess risk posed by its security arrangements to those within and outside the project site.	- Ensuring that workers have the freedom to terminate their employment at any time. - Ensuring that workers receive fair wages. - Ensuring that workers retain control over their personal documents. In addition, the Project shall also strictly comply with International Labor Organization (ILO) Convention No. 138 that is to establish a minimum age for admission to employment or work. Specifically, it aims to set the minimum age at which young people can legally be employed, taking into consideration the need for their physical and psychological development. Under Convention No. 138, the minimum age for admission to employment or work should not be less than the age of completion of compulsory schooling and, in any case, not less than 15 years old. However, it does allow for some exceptions in certain circumstances. To prevent diseases that may arise due to the influx of workers, especially during the construction phase, the Project is obligated to adhere to the measures outlined by the Ministry of Public Health and other relevant laws pertaining to stringent epidemic control.

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
		For emergency preparedness and response, the Project is required to practice emergency response plans within the project area, dividing the plans into three levels according to the severity of emergencies. Establish communication channels for seeking assistance from external organizations. Plans must outline clear steps and responsibilities and comply with legal training frequency requirements.
ADB's Safeguard Requirement 1: **Physical Cultural Resources** The borrower/client is responsible for siting and designing the project to avoid significant damage to physical cultural resources. Such resources likely to be affected by the project will be identified, and qualified and experienced experts will assess the project's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process.	**PS 8: Cultural Heritage** The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System (ESMS), the elements of which are outlined in Performance Standard 1. During the project life-cycle, the client will consider potential project impacts to cultural heritage and will apply the provisions of this Performance Standard.	Within a radius of 3 kilometers from the Project boundary, there are no registered archaeological sites or historical sites as stipulated by relevant legislation, pertaining to archaeological sites, antiquities, cultural artifacts, and national heritage sites.
ADB's Safeguard Requirement 2: **Involuntary resettlement.** The objectives are to avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups. Compliance with Safeguard Requirement 2 involves conducting a Resettlement Plan and implementing measures to provide adequate	**PS 5: Land Acquisition and Involuntary Resettlement** 1) Land rights or land use rights acquired through expropriation or other compulsory procedures in accordance with the legal system of the host country, 2) Land rights or land use rights acquired through negotiated settlements with property owners or those with legal rights to the land if failure to reach settlement would have resulted in expropriation or other compulsory procedures,	Regarding involuntary resettlement, the Project secured land tenure through agreements and land purchases from private landowners. Based on SCA report, it can be concluded that landowners were involved in the land acquisition process from the start since they were informed of the objective of the acquisition. They also have the option of accept or reject the offer. Previous land use was agriculture area and in the land sale agreement specified that the lands were sold without any buildings; therefore, there was no physical replacement.

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
compensation, assistance, and livelihood restoration for affected individuals or communities. The goal is to minimize adverse impacts on displaced persons and support their socio-economic well-being.	3) Project situations where involuntary restrictions on land use and access to natural resources cause a community or groups within a community to lose access to resource usage where they have traditional or recognizable usage rights, 4) Certain project situations requiring evictions of people occupying land without formal, traditional, or recognizable usage rights, or 5) Restriction on access to land or use of other resources including communal property and natural resources such as marine and aquatic resources, timber and non-timber forest products, freshwater, medicinal plants, hunting and gathering grounds and grazing and cropping areas. Nevertheless, this performance standard does not apply to resettlement resulting from voluntary land transactions. It also does not apply to impacts on livelihoods where the project is not changing the land use of the affected groups or communities.	The fair price was established during the price negotiation process during land purchase. Furthermore, a land sale agreement signed in the presence of Suphanburi Provincial Land Office officials stated that the seller agreed to sell the land at the purchase price. There are no grievances regarding the payment made to the landowners. Even though there were land users after the lands were acquired, they were notified of the Project's construction schedule so that he could harvest his crop before the Project begin construction. As of December, B.E. 2566 (2023), all users have vacated the area. According to the SCA, the land acquisition had no impact on the landowners' well-being and even improved their livelihood. All landowners indicated that since selling their land, they have a better living so, land purchase did not lead to physical and economic displacement.
ADB's Safeguard Requirement 3: **Indigenous Peoples.** The objective is to design and implement projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, livelihood systems, and cultural uniqueness as defined by the Indigenous Peoples themselves so that they (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them.	**PS 7: Indigenous peoples** The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System, the elements of which are outlined in Performance Standard 1. However, there is no universally accepted definition of "Indigenous Peoples." The client may be required to seek inputs from competent professionals to	From the ethnic group database of the Princess Maha Chakri Sirindhorn Anthropology Centre (Public Organization), it was found that Suphanburi Province has a total of 26 indigenous communities. However, it was not reported that any indigenous ethnic group communities were established in the area of Dham Bang Nang Buat District. COT also asked the village headman in the Project area regarding to the indigenous peoples who may

Table 4.4-1 (Cont'd)

ADB's Requirements	IFC's Requirements	Project Implementation
Compliance with Safeguard Requirement 3 entails conducting a Free, Prior, and Informed Consent (FPIC) process, involving meaningful consultations with Indigenous Peoples to obtain their consent before implementing projects that may impact them. The aim is to promote the active participation of Indigenous Peoples in project decision-making and protect their rights throughout the project lifecycle.	ascertain whether a particular group is considered as Indigenous Peoples.	live in Nong Krathum Sub-district and other sub-districts in the study area. All of the village headmen explained that there are no indigenous peoples or other ethnic minority in the area, thus confirming the desk review information. As such, COT considers that ADB SP3 is not applicable for this project.

Source: Consultants of Technology Company Limited, B.E. 2567 (2024)

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CHAPTER 5

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND SYSTEM

CHAPTER 5
ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND SYSTEM

5.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Based on the environmental and social impact assessment, the project development has some impacts during construction and operation phases. Breeze and Shine Power Co., Ltd. will be responsible for implementation of corresponding mitigation measures and monitoring programs in order to ensure that the project development during both phases will have impacts within an acceptable level.

The proposed measures and plans comprise the following;

(1) General measures, which are the mandatory measures established by lenders to ensure that the Project implementation will comply with the proposed measure and be reported to the relevant authorities; as well as the mitigation measures and monitoring programs will be as a condition in a contract to be implemented by a contractor, are presented in **Table 5.1-1**.

(2) Environmental and social prevention and mitigation measures for the construction phase and operation phase as presented in **Table 5.1-2** to **Table 5.1-3**. The measures proposed cover the following environmental and social aspect:

- Air quality
- Noise
- Water quality and drainage
- Reflection and heat
- Biodiversity
- Socio-economics and public participation
- Gender-based violence and harassment
- Public health and safety
- Occupational health and safety
- Transportation
- Solid waste management
- Major hazard and emergency
- Land access/maintenance
- Green area and aesthetics

(3) Environmental and social monitoring measures for the construction phase and operation phase as presented in **Table 5.1-4** to **Table 5.1-5**. The following are aspects that need to be monitored, namely:

- Air quality
- Noise level
- Water use and effluent quality
- Socio-economics and public participation
- Occupational health and safety
- Transportation
- Solid waste management

Table 5.1-1
General Environmental and Social Measures

General Measures	Location	Duration	Responsibility
(1) Breeze and Shine Power shall stringently comply with the environmental and social prevention and mitigation measures and the environmental and social monitoring measures outlined in the IEE report.	Project area and nearby communities	Throughout project operation	Breeze and Shine Power Co., Ltd.
(2) The measures in this IEE report shall be incorporated as the minimum requirements into the contractor contract and strictly implemented to ensure operational effectiveness.	Project area	Throughout project operation	Breeze and Shine Power Co., Ltd.
(3) In case the results of environmental impact monitoring identify potential problems including community complaints due to the project implementation, the project shall report to lenders.	Project area and nearby communities	Throughout project operation	Breeze and Shine Power Co., Ltd.
(4) In case of any change in the project details resulting in changes to the measures, a request for changes shall be submitted prior to making any changes by submitting an addendum report presenting the details of specific parts which are relevant or impacted by such changes including justifications, a summary of the overall project implementation at present in comparison with the implementation after change, and a summary of the measure implementation in the past 3 years at the minimum (if any) for overall understanding and supporting the report consideration.	Project area	Throughout project operation	Breeze and Shine Power Co., Ltd.

Table 5.1-2
Environmental and Social Prevention and Mitigation Measures (Construction Phase)

Aspect	Measures	Location	Duration	Responsibility
1. Air quality	1. Water shall be sprayed over the construction area where topsoil is excavated, piles of construction materials, and access road to the construction site, at least twice a day (morning-afternoon) or as deemed appropriate for the weather conditions to maintain the ground surface moisture in order to prevent dust diffusion and reduce impacts on nearby communities.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. Construction materials and equipment shall be orderly stored and any part which may cause dust diffusion shall be covered.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	3. Regular inspection and maintenance shall be carried out for machinery and equipment used in the project to be in good condition and to reduce air pollution emissions.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. Truck and wheels shall be washed and cleaned before the trucks leave the construction site so as to remove stone/gravel, mud or sand which may cause hazards and dirtiness on the road.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	5. Limit vehicle speed on site to 30 km/h to assist reduce dust emissions caused by vehicle movement.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	6. Waste burning on construction sites should be strictly prohibited.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
2. Noise	1. The construction plan with activities which may be noisy shall be publicized to inform communities at least 2 weeks prior to construction.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	2. Construction activities that may create noise impacts on the communities and living things in the surrounding area shall be only carried out during daytime, except those requiring continuous operations to complete. The community leaders in the area shall be informed at least 7 days prior to undertaking such activities.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	3. A noise barrier composed of steel with a thickness of 0.64 mm or more and a height of 2 meters, or other materials with equal efficacy, shall be installed along the fence line of a construction site near Ban Nong Hin School, 160 meters and Farm Dwelling, 300 meters, as close to the noise source as practicable.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. Low-noise construction equipment and machines shall be used and maintained to always be in good working condition.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	5. Reducing noise levels at the source by using pile cushion on the top of steel piles during pile driving to reduce noise.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	6. Hearing protection equipment shall be provided for workers working in noisy areas and the general noise level shall be controlled to be within the standard value.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
3. Water quality and drainage	1. A temporary site office and workers' camp, bathrooms and sanitary toilets shall be adequately provided for construction workers and shall be located at least 30 meters away from water bodies in order to prevent contamination by wastewater from activities in the temporary site office and workers' camp flowing into nearby water bodies.	Construction area and workers' camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. Package onsite wastewater treatment system shall be installed for treating wastewater to meet the effluent standard prescribed by the authority before being discharged to the outside area. Discharge of untreated waste into receiving water bodies shall be prohibited and such wastewater or waste shall be pumped out for disposal or treatment in accordance with the government agency.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	3. The wastewater treatment system should be capable of treating wastewater to meet the quality standards according to the announcement of the Ministry of Natural Resources and Environment regarding the standards for controlling the discharge of wastewater from certain types and sizes of buildings, B.E. 2548 (2005) before discharge to environment.	Construction area and workers' camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. If the contractor discharges treated waste or sewage outside into natural water sources or private areas, the contractor must obtain permission from relevant government agencies or landowner to ensuring that the discharged sewage will not have adverse environmental impacts in the future. In addition, the contractor shall provide a retention pond at worker's camp and conduct water quality monitoring once a month to ascertain the water quality before discharging.	Construction area and workers' camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	5. Temporary drain ditches and a settling pond shall be constructed and completed within the first month of construction period so as to control wastewater discharge from construction activities and prevent impacts on the surrounding areas. The efficiency of temporary drain ditches shall be regularly inspected. If any damage is found, it shall be quickly repaired to be in good working condition.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	6. Rainwater drainage channels must surround the worker accommodation area to prevent overflow into surrounding areas and they must be able to accommodate the volume of runoff.	Construction area and workers' camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	7. The direction of the rainwater drainage channels must flow towards a rainwater retention pit before being discharged into public water sources and should not flow into adjacent areas.	Construction area and workers' camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	8. Dumping of garbage or construction debris into drain pipes or public water sources shall be strictly prohibited.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
4. Reflection and heat	1. Use anti-reflective coating on solar panels to reduce glare and minimize heat reflection	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. Implement ground-mounted solar panels at angles that minimize direct reflection towards neighboring communities or aviation paths.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
5. Biodiversity	1. Prevent construction workers from harming the nests, eggs, and larvae of the protected species under the Wildlife Preservation and Protection Act, B.E. 2562 (2019), which are species with a conservation status of Vulnerable (VU) and Near Threatened (NT) according to ONEP (2020) and IUCN (2022-2)	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
6. Socio-economic and public participation	1. Information relating to the construction plan shall be publicized and disseminated by installing publicity boards in the project site or other appropriate models in order to inform all the public and stakeholders at least 7 days prior to construction.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. The project staff shall periodically visit nearby communities throughout the construction phase to inquire and listen to opinions about environmental impacts from the project construction activities so as to determine a guideline for mitigating impacts which may arise.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	3. A coordination center shall be set up to receive recommendations and complaints about disturbances from the project construction.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. In case of complaints by people about impacts from the project construction activities, the project shall immediately investigate and take remedial action.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	5. An environmental audit committee shall be set up so that communities can participate in the project implementation and community and environmental development in joint cooperation with the project. The committee membership shall, at least, comprise representatives of people, local government agencies, local educational institutes or academics, and the project owner. The number of committee members from the people sector shall be, at least, more than half of the total number of the committee members. Full description of the committee as per section 2.9 of the IEE report. Moreover, the committee's work will be linked to the project management. The committee's power and duties include, for example, receipt of complaints and consideration of compliance with the project's measures, etc. In addition, the committee may carry on its duties in the operation phase. The appointment of the committee shall be completed prior to commencing the project construction. If there is any constraint to the establishment of the committee in cooperation with communities and the committee cannot be set up according to the specified proportion, the project shall notify the OERC and set out measures to build good understanding and communicate the results of project implementation to the communities and the project's stakeholders in the surrounding area via various public relations media such as documents, printed matter, personal media or information system, etc., and records of the project implementation throughout the project construction phase.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	6. Qualified local people shall be given first priority to be hired by posting job recruitment in front of the project area and camp site and coordinating with local leaders and village headman to publicize job positions.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	7. Establish Stakeholder Engagement Plan before the construction begins. The SEPs shall cover all stakeholder groups (e.g., project affected persons: stakeholders living within site, along right-of-way, construction campsite) and their expectations (e.g., energy fund, local labor employment). The SEP shall include general guidance for communicating and managing communities' expectations.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	8. Collaborate with communities to establish a Corporate Social Responsibility (CSR) plan to initiate and support community activities to be implemented during the construction phase, including: - An environmental conservation plan, - A social, child, and youth development plan, - A health plan, and - A cultural and tradition plan	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
7. Gender-based violence and harassment (GBVH)	1. Establish policies on GBVH to safeguard workers and nearby community of the Project.	Construction area, worker's camp, and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. Ensure gender-sensitive policies are in place, promoting equal opportunities for employment, training, and advancement.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	3. Make a project-specific commitment to provide employment and supply chain opportunities for local women. For example, in service cleaning contracts, no gender specific within local content requirements to ensure the inclusion and participation of women in these opportunities.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. Establish Corporate social responsibility (CSR) activities to ensure that all gender can be involved.	Construction area and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	5. Ensure that all facilities (restrooms, changing rooms) are safe, accessible, and respectful of privacy for all genders.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	6. Conduct gender sensitivity training for all project work teams, managers, and contractors. This training aims to increase awareness of gender issues, promote inclusivity, and enhance understanding of the importance of gender equality in project implementation.	Construction area, worker's camp, and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
8. Public health and safety	1. Contractor shall prepare Construction Labor Management Plan (to cover labor related requirements for contractors, influx management and community impacts, labor camps conditions and management).	Construction area, worker's camp, and nearby communities	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. Establish measures on community health as follows: - Require contractors to comply with the measures of the Ministry of Public Health and other laws related to strict epidemic control. - Supervise and control contractors to strictly adhere to agreements, including monitoring camps, residences, random drug testing, waste separation in the worker's camp, and closely controlling the behavior of construction workers to prevent nuisances in neighboring communities. - Inform the number of construction workers as information in the preparation of public health facilities in the area before starting work and in case of illness or accident. - Coordinate with local health agencies to provide personal hygiene education, information on communicable diseases, and personal care for construction workers of all levels. - Conduct training in regulations, health, and infectious disease prevention. - Establish a routine for keeping the area clean and hygienic, involving daily cleaning by the staff and regular check-ups by company personnel.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	3. Life and asset safety measures shall be established as follows: - The Project shall provide strictly supervise the entrance and exit to the construction site. - The boundaries of the construction workers' camp and construction site shall be clearly demarcated. - Use strict security system in the construction workers' camp.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	- In the event that the construction workers' camp is close to a community, workers' behavior shall be closely supervised to prevent disturbance and annoyance. - A register of migrant labor and foreign labor shall be established.			
	4. Contractor shall manage the workers' camp environment to have the following facilities. - Clearly display signs indicating residential areas. - Equip sturdy and secure fences around the residential areas. - Ensure sufficient lighting along roads or general areas for safety in residential areas. - Provide adequate parking spaces for the number of residents. - Provide security systems and closed-circuit television.	Worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	5. Provide clean and sufficient water for worker consumption.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	6. Drinking water for workers must be clean. - If bottled water is provided, the manufacturing company must meet the quality standards for drinking water as required by the law or international standards. - If water filtration systems are installed, the quality of the drinking water must meet the standards set by the Ministry of Public Health, and regular inspections must be conducted every three months.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	7. Containers for storing drinking water must be tightly sealed and regular cleaning must be carried out consistently.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
9. Occupational health and safety	1. Occupational safety management shall be arranged in a systematical and efficient manner in conformity with the requirements of occupational safety, health and environment law relating to construction.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. Warning signs indicating the perimeter of the project construction zones shall be installed in clearly visible and easily recognizable places.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	3. The construction site shall be proportionally divided into construction zone, daytime rest zone, machinery and equipment storage zone, and unused material and equipment storage zone.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. First aid kits including an ambulance or contact number of nearby medical facilities having an ambulance for emergency shall be provided. In addition, first aiders shall be routinely provided at the construction site and construction workers' camp, and ready for transporting an injured person to nearby hospitals at all times.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	5. Ensure that personnel capable of providing first aid are stationed in the area at all times to facilitate the prompt transfer of injured individuals to nearby medical facilities.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	6. Contractors are required to prepare Construction Health and Safety Plan before the commencement of construction.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
10. Transportation	1. Contractor shall prepare traffic management plant before the construction begins.	Construction area,	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. Warning signs or signals shall be put in place and clearly visible during daytime and nighttime at least 100 meters before reaching the construction site.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	3. Drivers relating to all types of construction shall be trained and supervised to stringently comply with traffic rules.	Construction area and transportation route	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. If construction activities cause any damage to signboard, traffic light or road surface, repair shall be urgently conducted.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
11. Solid waste management	1. Waste bins must be categorized, such as organic waste, general waste, recyclable waste, and hazardous waste, and they must have tightly sealed lids and be sufficient in size for the amount of waste.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	2. Designate a location for waste storage prior to disposal.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	3. Workforce training in waste management, which includes handling, sorting, storing, and disposing of various sorts of waste.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. Waste receptacles shall be sufficiently provided for waste generated by workers at various places in the construction site and worker camp and coordination shall be made with the relevant local agency for waste disposal.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	5. In case the construction activities have hazardous waste having the characteristics and properties as prescribed in the Notification of Ministry of Industry on Disposal of Waste or Unusable Materials B.E. 2566 (2023), the agency permitted by the Department of Industrial Works shall collect hazardous waste for proper disposal. Operating procedure for segregation of hazardous waste shall be established and training provided for relevant workers to inform them of the prohibition against waste dumping in drain ditches, drain pipes and water bodies near the construction site.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.
12. Major hazard	1. Contractor shall prepare Emergency Preparedness and Response Plan before the beginning of the construction.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	2. Conduct regular drills for fire evacuation and firefighting plans within 1 year of occupancy and annually thereafter following the initial drill.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	3. Provide fire extinguishers in accordance with government regulations and standards for managing occupational health, safety, and environmental conditions related to fire prevention and control, as per the Occupational Safety, Health, and Environment Management in the Workplace to Prevent and Control Hazardous Incidents Act, B.E. 2555 (2012).	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
	4. Implement an alarm system capable of signaling emergencies to cover the entire area.	Construction area and worker's camp	Throughout construction phase	Breeze and Shine Power Co., Ltd.
13. Land Maintenance	1. Develop Site Maintenance to manage legacy cropping and vacating site, and avoidance of new encroached activities (such as grazing) and mechanism to handle possible future claims by former users or others.	Construction area	Throughout construction phase	Breeze and Shine Power Co., Ltd.

Table 5.1-3
Environmental and Social Prevention and Mitigation Measures (Operation Phase)

Aspect	Measures	Location	Duration	Responsibility
1. Water quality	**1. Water Use** In case groundwater is used, the agency's permit conditions shall be strictly adhered to, by specifying actual volume of water pumped in comparison with the permitted volume (Expressed in cubic meter per month).	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	2. Stormwater Drainage 2.1 Stormwater discharge rate from the retention pond or the project area shall be controlled not to exceed the runoff rate in the area before the project development. 2.2 Plant grass or ground cover to reduce soil erosion.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	3. Maintenance of Wastewater Treatment System Wastewater treatment system shall be maintained to have sufficient capacity for treatment of the project's total wastewater volume including sludge to be in compliance with the standard prior to being discharged to the outside of the project or reused within the project area.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
2. Socio-economic and public participation	1. Opportunities for project visits should be given to the communities so as to ease concerns.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	2. A complaint receiving plan shall be put in place, specifying channels for complaints, steps and duration of problem solving including responsible persons together with a chart clearly showing the procedure. In case remedial actions have not yet been completed, the complainant shall be notified of the progress every 7 days.	Project area and nearby communities	Throughout operation phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	3. A person shall be assigned to be responsible for the project's public relations and shall participate in public relations activities undertaken with communities including follow-up of complaints, disturbances and annoyances arising due to the project.	Project area and nearby communities	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	4. Information shall be disseminated and publicized regarding the project details and compliance with the Code of Practice so as to inform the local communities and the joint committee. Opportunities shall be offered for the communities to participate in the project monitoring throughout the project operation period;	Project area and nearby communities	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	5. Community relation activities shall be supported and promotion of community activities shall be undertaken to build good relation with the local communities;	Project area and nearby communities	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	6. An environmental audit committee shall be set up so that communities can participate in the project implementation and community and environmental development in joint cooperation with the project. The committee membership shall, at least, comprise representatives of people, local government agencies, local educational institutes or academics, and the project owner. The number of committee members from the people sector shall be, at least, more than half of the total number of the committee members. Full description of the committee as per section 2.9 of the IEE report. Moreover, the committee's work will be linked to the project management. The committee's power and duties include, for example, receipt of complaints and consideration of compliance with the project's measures, etc. In addition, the committee may carry on its duties in the operation phase.	Project area and nearby communities	Throughout operation phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	The appointment of the committee shall be completed prior to commencing the project construction. If there is any constraint to the establishment of the committee in cooperation with communities and the committee cannot be set up according to the specified proportion, the project shall notify the OERC and set out measures to build good understanding and communicate the results of project implementation to the communities and the project's stakeholders in the surrounding area via various public relations media such as documents, printed matter, personal media or information system, etc., and records of the project implementation throughout the project operation phase.			
	7. If it is proven that damage has resulted from the project operation, the appointed joint committee shall have power and duty to consider compensation for the damage.	Project area and nearby communities	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	8. Collaborate with communities to establish a Corporate Social Responsibility (CSR) plan to initiate and support community activities to be implemented during the operation phase, including: - An environmental conservation plan, - A social, child, and youth development plan, - A health plan, and - A cultural and tradition plan	Project area and nearby communities	Throughout operation phase	Breeze and Shine Power Co., Ltd.
3. Occupational health and safety	1. EHS division shall implement and maintain site ESMS.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	2. The work plan established for the project's risk areas shall be followed and a guideline shall be defined for risk prevention and mitigation in each area.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	3. The relevant laws, occupational health and safety requirements or other relevant and current labor laws shall be complied with.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	4. Training in occupational health and safety shall be adequately provided and suitable for the nature of work such as: - Fire drills and proper use of firefighting equipment; - Rules and regulations on working in danger areas; - Inspection of workplace safety; - Training in use of personal protective equipment; - Prevention of danger from machinery, heat and electricity; and - Working at heights of 2 meters or higher	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	5. Regular inspection of warning systems shall be conducted every year.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	6. Establish and implement project emergency action plan. Emergency action plan exercises shall be carried out within the project area. The plan may be divided into 3 levels based on the severity of emergency. There must be channels for coordination to request assistance from external agencies. The plan shall have operational procedures and responsible persons clearly designated as well as frequency of drills and exercises as prescribed by law.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	7. Regular inspection of the working condition shall be carried out for equipment, machinery and electrical system.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
	8. The operation of electrical system in the plant shall be in compliance with technical principles or recognized standards.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	9. Regular inspection and safety certification shall be carried out for electrical system in the plant every year in accordance with the criteria prescribed by law.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
4. Solid waste management	1. Collection and transport of damaged or expired equipment for disposal shall be carried out in accordance with the Notification of the Ministry of Industry on Disposal of Waste or Unusable Materials B.E. 2566 (2023) or the latest law in force and shall comply with the following guidelines.	Store waste at the project area before arranging proper disposal	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	- In case of export of waste for management in other countries, the export shall be carried out in accordance with the law governing hazardous substances and international requirements. When the operation is completed, the ERC shall be informed within 30 days after the waste export for management in other countries.	Store waste at the project area before arranging proper disposal	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	- In case of waste management in the country, hazardous waste shall be disposed in secure landfills or by incineration in a hazardous waste incinerator.	Store waste at the project area before arranging proper disposal	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	2. Regular inspection of waste storage shall be carried out to prevent any impact which may arise from waste contamination or dispersion.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	3. Damaged PV panels shall be gathered in waste storage facility before the disposal. Their disposal method shall be in accordance with the Announcement of Ministry of Industry regarding the Management of Waste and Unused Materials, B.E. 2566 (2023).	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.

Aspect	Measures	Location	Duration	Responsibility
5. Major hazard	1. The Project shall prepare Emergency Preparedness and Response Plan before the beginning of the operation.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	2. Conduct regular drills for fire evacuation and firefighting plans within 1 year of occupancy and annually thereafter following the initial drill.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	3. Provide fire extinguishers in accordance with government regulations and standards for managing occupational health, safety, and environmental conditions related to fire prevention and control, as per the Occupational Safety, Health, and Environment Management in the Workplace to Prevent and Control Hazardous Incidents Act, B.E. 2555 (2012).	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	4. Implement an alarm system capable of signaling emergencies to cover the entire area.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
6. Green area and aesthetics	1. The environmental impact prevention and correction measures shall be followed. Green areas shall be maintained and when dead plants are found, they shall be replaced with new plants to ensure the sustainability of green areas. Perennial trees shall be mainly considered and planted in the project's green areas as appropriate.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
	2. Herbicide use in the Project area is prohibited.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.
7. Land access	1. Ensure that access to public road for local communities is not restricted for landlocked area.	Project area	Throughout operation phase	Breeze and Shine Power Co., Ltd.

Table 5.1-4
Environmental and Social Monitoring Programs (Construction Phase)

Aspect	Parameters	Measuring Method	Location	Period & Frequency	Responsibility
1. Air quality	- 24-hr average total suspended particles (TSP) - 24-hr average particulate matter smaller than 10 micrometers in diameter (PM-10) - Wind direction and wind speed (at least 1 station)	- TSP and PM-10: Gravimetric-High Volume Method or methods accepted by Pollution Control Department. - Wind direction and speed by using wind speed & direction recording meter.	3 monitoring points A0: Construction site A1: Ban Nong Hin School A2: Nong Krathum Sub-district Health Promoting Hospital	- Twice a year throughout the construction phase - Conduct sampling for 5 consecutive days and cover both working days and weekends	Breeze and Shine Power Co., Ltd.
2. Noise level	- 24-hr equivalent continuous noise level (Leq 24-hr) - Background noise level (L90) - Day-night average noise level (Ldn) - Maximum noise level (Lmax)	- International Organization for Standardization (ISO1996) or the methods specified by Pollution Control Department	3 monitoring points N0: Construction site N1: Ban Nong Hin School N2: Nong Krathum Sub-district Health Promoting Hospital	- Twice a year throughout the construction phase - Conduct sampling for 7 consecutive days and cover both working days and weekends	Breeze and Shine Power Co., Ltd.
3. Effluent quality	- pH - BOD5 - Suspended Solid - Sulfide - Total Dissolved Solid - Settleable Solids - Oil & Grease - TKN - Fecal Coliform Bacteria	- Measurement methods will be in compliance with the Notification of the Ministry of Industry regarding Industrial Effluent Standards B.E. 2560 (2017) and the Notification of Ministry of Natural Resources and Environment regarding Industrial Effluent Standards for Industrial Plants, Industrial Estates and Industrial Zones B.E. 2559 (2016)	Retention pond at worker's camp	- If the contractor discharges treated waste or sewage outside into natural water sources or private area, the Project shall conduct water quality monitoring once a month	Breeze and Shine Power Co., Ltd.

Aspect	Parameters	Measuring Method	Location	Period & Frequency	Responsibility
4. Socio-economic and public participation	- Complaints from the communities about the project with method and duration of remedial action	- Record	Construction area	- Prepare a summary of monthly data - Report the data every year	Breeze and Shine Power Co., Ltd.
	- Joint activities undertaken by the project together with the local communities	- Record	Construction area	- Prepare a summary of monthly data - Report the data every year	Breeze and Shine Power Co., Ltd.
	- The environmental audit committee's performance	- Record	Construction area	- Report the data every year	Breeze and Shine Power Co., Ltd.
5. Occupational health and safety	- Accident statistics specifying causes and nature of accidents, health impact, number of injured or deceased workers including problem-solving methods and recommendations	- Record	Construction area	- Prepare a summary of monthly data - Report the data every year	Breeze and Shine Power Co., Ltd.
6. Transportation	- Daily record the number of types of vehicles and time to enter the project construction area - Record the number of truck transporting material and equipment - Statistical record of accidents occurred from transportation including cause, location, time, and preventive measures for every accident.	- Record	Construction area and transportation route	- Everyday throughout construction phase	Breeze and Shine Power Co., Ltd.

Aspect	Parameters	Measuring Method	Location	Period & Frequency	Responsibility
7. Solid waste management	- Record type, volume of waste and disposal method	- Record	Construction area	- Prepare a summary of monthly data - Report the data every year	Breeze and Shine Power Co., Ltd.

Table 5.1-5
Environmental and Social Monitoring Programs (Operation Phase)

Aspect	Parameters	Measuring Method	Location	Period & Frequency	Responsibility
1. Water quality 1.1 Water use	- The water volume used in the project for comparison with the volume permitted by the permitting agency - Problems and obstacles from the project's water use	- Record	Project area	- Every 6 months	Breeze and Shine Power Co., Ltd.
1.2 Effluent discharge	- Water balance chart - The data on wastewater treatment system and effluent discharges	- Record	Project area	- Prepare a summary of monthly data - Report the data every year	Breeze and Shine Power Co., Ltd.
2. Socio-economic and public participation	- Complaints from the communities about the project with method and duration of remedial action	- Record and prepare a report	Project area	- Prepare a summary of monthly data - Report the data every year	Breeze and Shine Power Co., Ltd.
	- Joint activities undertaken by the project together with the local communities	- Record and prepare a report	Project area	- Prepare a summary of monthly data - Report the data every year	Breeze and Shine Power Co., Ltd.
	- The environmental audit committee's performance	- Record and prepare a report	Project area	- Once a year	Breeze and Shine Power Co., Ltd.
3. Occupational health and safety	- Accident statistics specifying causes and nature of accidents, health impact, number of injured or deceased workers as well as remedial actions and recommendations	- Record	Project area	- Prepare a summary of monthly data - Report the data every year	Breeze and Shine Power Co., Ltd.

Aspect	Parameters	Measuring Method	Location	Period & Frequency	Responsibility
	- Inspection results of electrical system in the plant and safety certification for electrical system in the plant	- Record and prepare a report	Project area	- Report the data every year	Breeze and Shine Power Co., Ltd.
	- Results of fire and emergency drills	- Record and prepare a report	Project area	- Report the data every year	Breeze and Shine Power Co., Ltd.
	- Inspection results of warning systems and fire protection and suppression equipment	- Record and prepare a report	Project area	- Report the data every year	Breeze and Shine Power Co., Ltd.
4. Solid waste management	- Record type, volume of waste and disposal method	- Record by using record form of the Department of Industrial Works (Form Sor Kor)	Project area	- Report the data every year	Breeze and Shine Power Co., Ltd.

5.2 EMERGENCY PREPAREDNESS AND RESPONSE PLAN

Emergency Preparedness and Response Plan (ERP) is to be prepared by EPC Contractor for construction phase and submit to the project proponent for concurrence, while ERP for operation phase is to be prepared by Breeze and Shine Power Co., Ltd. ERP shall cover emergency incidents that may occur in the construction sites during the construction of the Project components and in the project area during operation phase. The emergency incidents could have adverse impacts on the environment, and on health and safety of construction workers, project staff, and nearby communities.

5.2.1 ERP for Construction Phase

During the construction phase, emergency situations associated with the project will cover the fire incident. The environmental, health, and safety division shall be responsible for developing a site-specific ERP which shall be placed in the site's emergency response/procedures binder kept in the facility control room.

(1) Construction Incident

The contractor must provide the following welfare amenities in the construction area in compliance with the Ministry of Labor's regulations on the provision of welfare facilities in establishments, B.E. 2548 (2005):

- Medical supplies and basic first-aid equipment.
- A nursing room and a nurse on duty during work hours
- Vehicles ready to transport staff in the event of an emergency.

As a result, if an accident occurs at work, there will be equipment and medical supplies on hand, a technical nurse, as well as workers trained in first aid to address minor injuries. Vehicles are on standby to transfer patients who need to be referred for additional treatment.

(2) Fire Incident

A fire prevention and suppression plan that is to be prepared by EPC Contractor must be complied with the Ministerial Regulation on the Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Fire Prevention and Control B.E. 2555 and the Ministerial Regulation of the Ministry of Labor on the prescribing of Standard for administration and management of occupational safety, health and environment and workplace environments about the fire prevention and prevention (No.2), B.E. 2561; and must be concurred by the project developer. According to the laws, the fire prevention and suppression plan must contain at least the following plans.

State	Details of plan
Before fire incident	Fire prevention campaign plan
	Training plan
	Inspection plan
During fire incident	Fire suppression plan
	Fire evacuation plan
	Relief plan (to be continued after fire incident)
After fire incident	Relief plan (continued from during fire incident state)
	Reform plan

5.2.2 ERP for Operation Phase

During the operation phase, emergency situations associated with the project will cover the fire incident. The environmental, health, and safety division shall be responsible for developing a site-specific ERP which shall be placed in the site's emergency response/procedures binder kept in the facility control room.

5.2.2.1 Fire Incident

(1) Risk Area

1) Solar Panel
2) Transformer
3) Battery room
4) Electrical equipment

(2) Responsibility

1) EHS Division

- Determining the required level of fire prevention and necessary control.
- Tracking the training requirements.
- Organizing and training for all members of Emergency Response Team.
- Inspect all firefighting equipment and maintain as per manufacturer's recommendations.
- Develop the fire response plan.
- Develop the site-specific evacuation plan.

2) Emergency Response Team

- Immediately respond to a small fire preventing a major emergency.
- Perform both offensive and defensive activities with the use of protective equipment as per National Fire Protection Association (NFPA) requirements.

3) All Employees

- Constantly alert for fires hazards.
- Eliminate fires hazards.
- Understanding the locations of fire extinguishers and alarm systems within the project.
- Participate in the evacuation drill at least annually.

(3) Fire Protection Rules

1) Know the location of all the fire extinguishers, fire hoses and other fire protection equipment in working area.
2) Know how to use all the fire protection equipment in working area.
3) Know the location of all fire exits in working area.
4) Report all fired to the control room immediately.
5) Obey "NO SMOKING" signs. Smoking permitted only in designated areas.
6) Fire equipment is for fire use only and must not be disturbed or used for any other purpose.

(4) Fire Response Rules

1) In the event that a fire does start, to ensure prompt and proper operator actions, thereby minimizing the severity of the fire and extent of damage.
2) A formal qualification program for plant operators, maintenance personnel shall be implemented to ensure proper fire prevention, firefighting and reporting techniques.
3) Firefighting will not be done at the risk of injury to the employees involved. At any time, a fire appears to be spreading and the situation can't be controlled, back out and wait for the fire department assistance.
4) Inspection and maintenance of all firefighting equipment and protective clothing shall be performed monthly and the proper documentation maintained.

(5) Fire Response Plan/Fire Prevention Plan shall set forth procedures, step by step, of the actions that each employee is to take in the event of a fire including;

1) Immediate action upon the discovery of a fire

2) Establish who, how and when the in-house and local emergency personnel should be contacted

3) Method of notifying employees, main emergency response team, and response team members of the fire

4) Method of determining mustering location and means of taking attendance for the main emergency response team, response team members, and all other employees

5) Actions to be taken in the event of personnel injury

6) Actions to declare the end of the state of emergency

7) Follow-up actions

5.2.2.2 Evacuation

(1) The Environment, Health & Safety Division shall be responsible for developing site-specific evacuation plan addressing multiple evacuation routes throughout the site.

(2) All employees shall muster at pre-assigned locations and attendance will be taken by the Environment, Health and Safety Division, or if the Environment, Health and Safety Division Personnel is not present, the HR & Admin Division Personnel.

(3) Evacuation Routes shall be posted throughout the site.

(4) Planned evacuation drills shall be conducted at least once per year and documented. All persons in the plant must participate.

5.2.2.3 Emergency Plan Drill

Emergency plan drill is the preparatory drill for an emergency incident for the personnel and equipment. The drill follows the fire prevention plan of each unit. The drill for Emergency Level 1 will be organized at least once a year with an assessment of each drill to continuously improve the efficiency of the emergency plan.

5.3 MONITORING AND REPORTING

Apart from the general measures (as shown in **Table 5.1-1**) which set for ensuring the implementation of the proposed mitigation measures and monitoring program; and reporting. The Project will involve the representative of communities situated within 3-kilometer radius from the Project site, government agencies, and a qualified expert to participate in monitoring activities as Environmental Impact Monitoring Committee. The details of committee member, qualification of the members, terms and roles of the committee, and power and duties of the committee is addressed in **Section 2.9** and **Table 5.1-2** under the economic, social and public participation aspect.

Besides, Breeze and Shine Power Co., Ltd. is a subsidiary of Gulf Energy Development PCL. (GED) which has established Environmental and Social Management System (ESMS) to apply to a project life cycled owned and managed by GED and its subsidiaries starting from feasibility study, project development to operation for the management of environmental, social, health and safety risk and opportunities.

Monitoring and reporting are a part of ESMS framework which requires the staff at appropriate level in the organization to monitor the environmental and social (ES) performance to measure continual improvement and ensure compliance with the measures by taking the following actions.

(1) Site Level

1) Conduct routine inspections to monitor the effectiveness of operating procedures being implemented and compliance

2) Plan and perform ES monitoring program (or hire a third party to perform) regularly as required by the regulations such as air emissions, discharge, ambient noise, etc.).

3) Report the performance against the group ES targets to the Corporate ES function at the frequency of agreed timeline.

4) Conduct an investigation and deploy preventive and corrective actions when non-conformities arise from the inspection, monitoring and target achievements.

(2) Corporate Level

1) Review and analyze the group ES performance and make recommendations for continual improvement (including benchmarking and definition of group ES target).

2) Report ES performance to external stakeholders as required by the obligations.

3) Consider conducting a Group ES data verification program to ensure the completeness, accuracy and reliability of data so that ES performance is transparently disclosed.

5.4 MITIGATION MEASURES REGARDING TRANSMISSION LINE

The project 115 kV TL is being constructed and will be operated and maintained by the PEA who owns the TL. The potential risks and impact from the installation and operation of these power lines are therefore managed by the PEA.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

The Project's Grievance Redress Mechanism is open to all to raise concerns and grievances relating to the Project. Community members, including those along the TL route are aware of the project GRM. Where the Project receive complaints and grievances related to the TL construction activities or the construction contractor, the Project will communicate these to PEA for evaluation and resolution. It is also noted that the PEA have their own GRM (as described in **Section 7.3**) through which communities can raise their issues and concerns relating to the TL to PEA directly. The PEA will be the designated authority to communicate with affected communities to resolve issues relating to TL.

The Project will ensure close coordination with PEA to gather relevant information relating to TL impacts, issues and mitigation measures implemented to the extent possible, which will be included in the Project's reports to lenders on any and all reported grievances.

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CHAPTER 6

STAKEHOLDER ENGAGEMENT

CHAPTER 6
STAKEHOLDER ENGAGEMENT

6.1 INTRODUCTION

Stakeholder engagement is a crucial process whereby residents, government agencies and sensitive receptors in the study area are informed about Project-related information, provide feedback, express concerns of affected parties, and offer suggestions to minimize impacts. This stands as a key factor in an effective impact assessment process. Based on the information and approaches set out in this section of the IEE, a detailed Stakeholder Engagement Plan will be developed for the Project.

Breeze and Shine Power Co., Ltd. has a plan to develop Breeze and Shine Solar Power Plant Project, which incorporates ground-mounted PV technology with a battery energy storage system. The Project recognizes that stakeholder engagement is an important process, through which people in the study area receive information about the Project, express concerns, and offer suggestions. The one-way and two-way communication, initiated from the early stage, will assist the Project owner in incorporating valuable information to refine and tailor the Project details according to community concerns.

For a non-combustion power plant with an installed capacity of 10 megawatts or more, the targeted stakeholder engagement must encompass an area with a radius of at least 3 kilometers from the Project boundary. The designated area for conducting public participation for the Project is illustrated in **Figure 6.1-1**. Stakeholder engagement for the Project also includes the Transmission Line route in the RoW of existing public roads, where the Provincial Electricity Authority (PEA) will be responsible for construction and related impacts and communications.

6.2 STAKEHOLDER ANALYSIS, INFORMATION DISCLOSURE AND CONSULTATION

Stakeholder engagement is the key activity for this project to enable participation from the parties concerned, and in particular to enable effective impact prevention and mitigation. There are 3 steps to be conducted for stakeholder engagement namely stakeholder analysis, stakeholder information disclosure and consultation. A description of each step is elaborated in the following sections.

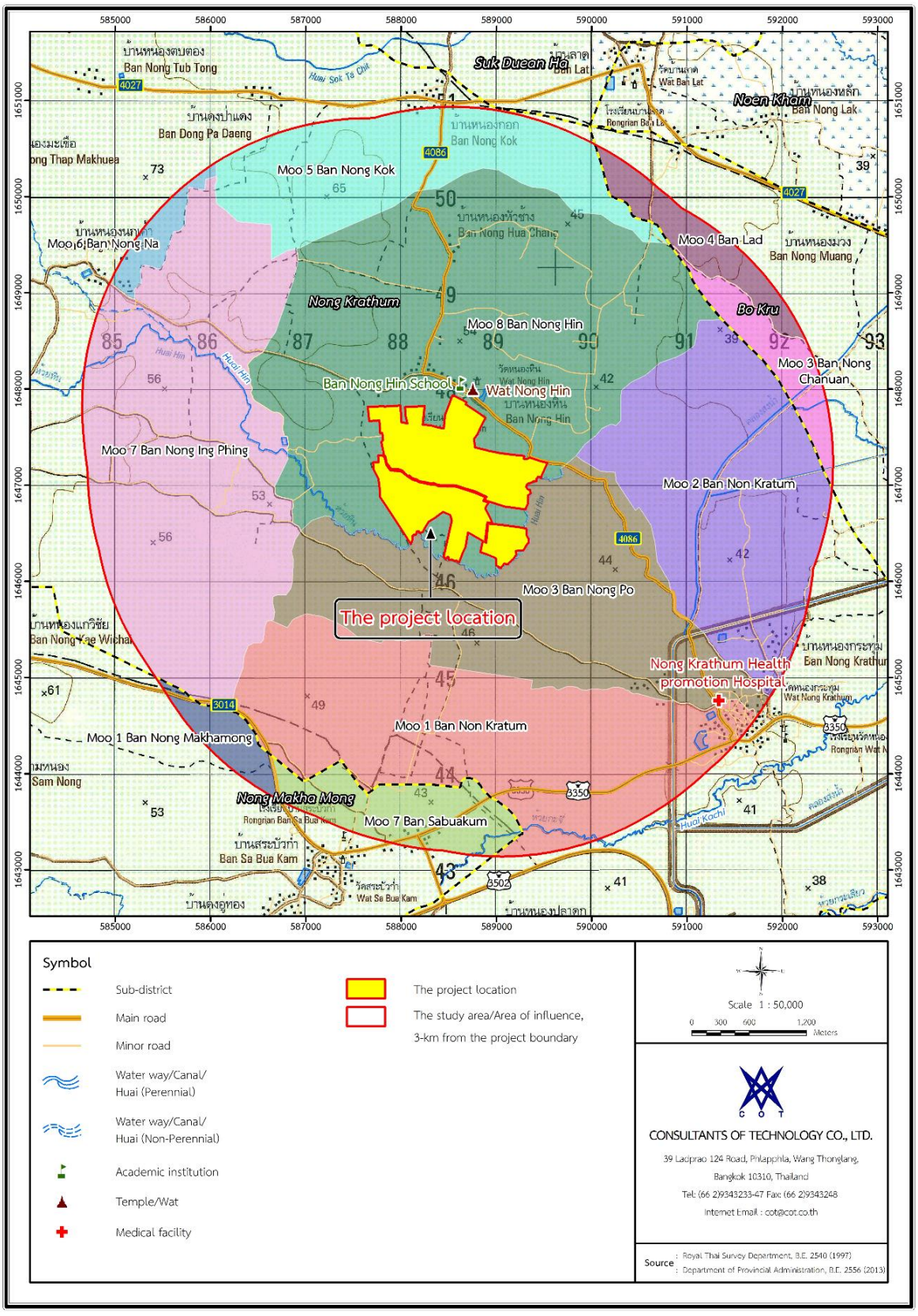


Figure 6.1-1 The Study Area

6.2.1 Stakeholder Analysis

Analysis of stakeholder/community readiness was done as a desktop exercise prior to conducting the information gathering meetings as Project pre-engagement efforts. Next, the Project organized a meeting to gather opinions from the public and stakeholders who are affected or interested in the Project. This was focused on the relation to conduct of environmental studies and preparing a preliminary Project report. The purpose was to provide detailed Project information to relevant government agencies and community leaders in the vicinity areas within a 3-kilometer radius from the Project boundary. At this time, Transmission Line stakeholders were not yet directly involved. Stakeholder engagement activities to date are illustrated in **Figure 6.2.1-1**.

The first stage in engaging stakeholders is to identify the key stakeholders who will be consulted and involved. Based on Safeguard Policy of ADB, IFC Performance Standards, Equator Principles 4, and Public Participation guideline of the Office of Natural Resources and Environmental Policy and Planning (ONEP), the stakeholder categories were developed into the following board stakeholder groups:

(1) Affected Parties: Local communities related communities' leaders within a 3-kilometer radius from the Project boundary, parties using or adjacent to the Transmission Line in the RoW of existing public roads, previous landowners and users, which may include all or some of the following:
   - Community leaders and people in each of the project study communities;
   - Women and vulnerable groups;
   - Key community members, including community elders and spiritual leaders; and
   - Key interest groups including religious leaders.

(2) Authorizing Agencies

(3) Relevant government agencies: These are at different levels such as regional, provincial, district and local agencies, which may be involved in the project implementation or provide services to the people impacted by the Project.

(4) Special or Environmentally Sensitive Areas, which includes temples, hospitals and schools.

(5) Mass Media

(6) General Interest Parties, which may include non-government organizations, academics, or interested individuals, for example.

Implementation Procedure	Implementation Activity
Provide detailed Project information, study results, environmental impact prevention and mitigation measures, and monitoring measures.	Channels for providing information to the public: 1) Directly engage in meetings/forums to promote the Project, solicit opinions, and receive suggestions from community leaders and relevant organizations. 2) Display Project information and an invitation to the public consultation forum on notice boards of government agencies and community centers.
Disseminate Project details to create understanding about the Project, within no less than 15 days.	3) Disseminate a preliminary CoP report at key locations, including: - Project's construction site - Energy Regulatory Commission Office: Regional Office - Provincial Industry Office - District offices and local administrative organization offices within a radius of at least 3-kilometer from the Project boundary - Sub-district administrative offices, community head's offices, and community halls within a radius of at least 3-kilometer from the Project boundary - Schools, religious institutions, community parks, and markets within a radius of at least 3-kilometer from the Project boundary 4) Send letters with documents and invitations to relevant organizations and community leaders. 5) Open pre-registration for interested participants of the public consultation forum.
Organize one opinion-gathering forum to explain Project details and gather opinions from the public and stakeholders who are affected.	Organize a public consultation forum to explain Project details and gather public opinions, and provide channels for receiving opinions, including: 1) During the forum proceedings 2) Comment forms (in case of inability to express opinions directly) 3) Post-meeting evaluation forms
Continuously receive additional comments for no less than 15 days after the opinion-gathering forum is concluded.	Social media, electronic media, internet, postal services, telephone, fax, electronic mail, local newspaper, community radio, and the information system network of the Office of Energy Regulatory Commission (OERC).
Compile and finalize the summary of opinion-gathering results within 30 days from the opinion-gathering forum.	Summary the details as follows: 1) Information about the participants providing opinions 2) Records of opinions from participants 3) Environmental impact prevention and mitigation measures of the Project
Continuously disseminate reports of summarizing opinion-gathering results for a period of no less than 15 days.	Announcement locations include: 1) Project's construction site 2) Energy Regulatory Commission Office, Regional Office 9 (Kanchanaburi) 3) Provincial Industry Office 4) District offices and local administrative organization offices within a radius of at least 3-kilometer from the Project boundary 5) Sub-district administrative offices, community head's offices, and community halls within a radius of at least 3-kilometer from the Project boundary 6) Schools, religious institutions, community parks, and markets within a radius of at least 3-kilometer from the Project boundary
Provide an opportunity for affected parties to express their comments or objections regarding the summary of opinion-gathering results within 30 days from the date of report dissemination.	Social media, electronic media, internet, postal services, telephone, fax, electronic mail, local newspaper, community radio, and the information system network of the Office of Energy Regulatory Commission (OERC).
Office of Energy Regulatory Commission (ERC)	Approach to the consideration process.

Remark: Implementation procedure according to the Energy Regulatory Commission (ERC), regards listening to opinions and creating understanding with the public and stakeholders (B.E. 2565 (2022))

Figure 6.2.1-1 Stakeholder Engagement Implementation Procedure

The specific stakeholders, their roles in the IEE and subsequent implementation process are presented in **Table 6.2.1-1.** This does not yet include stakeholders specific to the Transmission Line area.

Table 6.2.1-1

Project's Stakeholder

Stakeholder group	Sub-group	List
1. Affected Parties (Residents and community leaders within a 3-kilometer radius from the Project boundary)	Doem Bang Nang Buat District, Suphanburi Province (2 Sub-districts, 9 communities)	Nong Krathum Sub-district Municipality - Moo 1 Ban Non Krathum - Moo 2 Ban Non Krathum - Moo 3 Ban Nong Po - Moo 5 Ban Nong Kok - Moo 6 Ban Nong Na - Moo 7 Ban Nong Ing Phing - Moo 8 Ban Nong Hin Bo Kru Sub-district Administrative Organization - Moo 3 Ban Nong Chanuan - Moo 4 Ban Lad
	Dan Chang District, Suphanburi Province (1 Sub-district, 2 communities)	Nong Makhamong Sub-district Administrative Organization - Moo 1 Ban Nong Makhamong - Moo 7 Ban Sabuakum
2. Project owner /Consultant	Project owner	Breeze and Shine Power Company Limited
	Legal agencies with the license for report preparation	Consultants of Technology Company Limited (COT)
3. Authorizing Agencies	Approving/authorizing agencies responsible for reviewing the report	- Office of Energy Regulatory Commission - Office of Energy Regulatory Commission, Regional Office 9 (Kanchanaburi) - Department of Industrial Works
4. Government Agencies	Regional agencies	- Environment and Pollution Control Office 5 (Nakhon Pathom)
	Provincial agencies	- Suphanburi Provincial Office of Natural Resources and Environment - Suphanburi Provincial Industry Office - Suphanburi Provincial Energy Office - Suphanburi Provincial Public Health Office - Suphanburi Office of Public Work and Town & Country Planning - Supahnburi Provincial Disaster Prevention and Mitigation Office - Suphanburi Provincial Electricity Authority - Suphanburi Provincial Public Relations Office
	District agencies	- Doem Bang Nang Buat District Office - Doem Bang Nang Buat District Health Office - Doem Bang Nang Buat Agricultural Extension Office - Doem Bang Nang Buat District Community Development Office - Doem Bang Nang Buat Provincial Electricity Authority - Doem Bang Nang Buat Provincial Waterworks Authority - Doem Bang Nang Buat Police Station - Doem Bang Nang Buat Hospital - Dan Chang District Office - Dan Chang District Health Office - Dan Chang Agricultural Extension Office

Stakeholder group	Sub-group	List
		- Dan Chang District Community Development Office - Dan Chang Provincial Electricity Authority - Dan Chang Provincial Waterworks Authority - Dan Chang Police Station
	Local agencies	- Nong Krathum Sub-district Municipality Office - Bo Kru Sub-district Administrative Organization Office - Nong Makhamong Sub-district Administrative Organization Office - Nong Krathum Sub-district Heath Promoting Hospital - Ban Lad Sub-district Heath Promoting Hospital - Bo Kru Sub-district Heath Promoting Hospital - Nong Makhamong Sub-district Heath Promoting Hospital
5. Private Sector Organizations in Environmental Conservation, Development Organizations, Educational Institutions/Religious Institutions	Educational Institutions	- Nong Hin School - Ban Nong Po Early Childhood Development Center
	Religious Institutions	- Wat Nong Hin
	Women Club	- Nong Krathum Sub-district's women club - Nong Makhamong Sub-district's women club - Bo Kru Sub-district's women club
	Village Health Volunteers	- Nong Krathum Sub-district's Community Health Volunteers - Nong Makhamong Sub-district's Community Health Volunteers - Bo Kru Sub-district's Community Health Volunteers
	Occupation Group	- Ban Nong Krathum Ancient Weaving Group - Mongkol Nimit Incense Sticks
	Vulnerable Group	- Vulnerable Groups (e.g. elderly, persons with disabilities, and ethnic groups, others).
6. Mass Media	Local and central mass media	-
7. General Interest Parties	General public interested in the Project	- General public

6.2.2 Information Disclosure

(1) Information Disclosure Techniques

The Project has several techniques to build relationships with stakeholders, gather information from stakeholders, consult with stakeholders, and disseminate project information to stakeholders. The main approaches consistss of:

1) One-way Communication

- Project brochure: Disclosure of the Project information to disseminate to stakeholders.

- Offline and Online Publishing: Disclosure of the Project information through various channels such as Visiting to send an invitation to attend a meeting, Announcements to display information in public places, Website and Facebook

page of the consultant company and Google Drive documents at the first step of consultation.

- In relation to land acquisition plan and process, Gulf's personnel also carried out direct consultation with individual landowners during B.E. 2564 (2021) - 2565 (2022)

2) Two-way Communication

- Publicize the project: Meeting with stakeholder to publicize the Project information through the community relations officers of the project.
- Pre-engagement meeting: Disclosure of the Project information to a group of stakeholders, allow stakeholders to provide their views on targeted baseline information, build a relationship with communities, and record responses. The audience included the community leaders from Nong Krathum Sub-district, Bo Gru Sub-district, Nong Makhamong Sub-district and the representative from the relevant government agencies. The Project has conducted this meeting on May 23, B.E. 2566 (2023).
- Public meetings: Disclosure of the Project information to a large group of stakeholders, especially the communities including the vulnerable group, the occupation group, the village health volunteers, the women club, etc., and allow the group to provide their views and opinions, build a relationship with the communities, especially those affected, distribute non-technical information, and facilitate meetings with PowerPoint presentations and related documents. The Project has conducted this meeting on June 21, B.E. 2566 (2023).
- Opinion survey: In December B.E. 2566 (2023), the Project used and opinion survey form after the Public Meetings, to gather their opinions and concerns to develop the project. The results of this survey are presented in the sections below.

(2) Stakeholders Consultation

Stakeholders Consultation activities have been arranged based on the guideline developed by the Energy Regulatory Commission (ERC), regards listening to opinions and creating understanding with the public and stakeholders, particularly when considering the issuance of a license to operate electricity generation (B.E. 2565 (2022)). The objective of consultation activities is to listen and understand the opinions of the communities and stakeholders affected within the 3-kilometer radius from the Project area boundary is a process undertaken with the following steps;

1) Complying with the guidelines from Regulation of the Energy Regulatory Commission: Criteria for Preparing Code of Practice Report and Monitoring

Report for the operation of electricity production, B.E. 2565 (2022). This includes summarizing Project details, action plans, and environmental impact prevention and mitigation measures as required by the Energy Regulatory Commission (ERC).

2) Notifying the schedule and location for receiving opinions to the Energy Regulatory Commission (ERC) and relevant parties at least 15 days prior to the opinion-receiving session.

3) Continuously disseminating Project information for a minimum of 15 days before commencing the public participation process. This information must be presented openly and accessible to the public and stakeholders as determined by the Energy Regulatory Commission (ERC).

4) Implementing a registration system to facilitate advanced registration for opinions by the public, stakeholders, and relevant agencies. This process should be convenient and can be conducted through online channels via QR Code as indicated in the meeting invitation documents.

5) Publicizing information to the public and stakeholders using suitable methods, such as social media, local newspaper, community radio, and the information system network of the Energy Regulatory Commission (ERC).

6) Conducting a forum to receive opinions with target groups including residents and affected parties, community leaders, relevant government agencies, educational institutions, and mass media (if available). This should encompass both those residing or working within the Project area and the 3-kilometer radius study area from the Project site. During these sessions, Project information should be presented, and the attendees should be given the opportunity to express opinions, concerns, and adequate suggestions.

7) Ensuring that there are ongoing and additional channels for opinion submission for at least 15 days through various mediums such as social media, electronic media, website, postal service, telephone, fax, electronic mail, local newspaper, community radio, and the information system network of the Energy Regulatory Commission (ERC).

8) Compiling a summary report of the opinions received and completing it within 30 days from the end of the opinion-receiving process.

9) Publicizing the summary report of opinions received by openly presenting it at a location accessible to the public and stakeholders as determined by the Energy Regulatory Commission (ERC). This should occur consistently for a duration of at least 15 days. Furthermore, it provides an opportunity for the public and stakeholders to present their opinions or suggestions regarding the report within 30 days from the day of the summary report is published.

6.3 RESULTS FROM STAKEHOLDER ENGAGEMENT

6.3.1 Pre-engagement Process

A pre-engagement meeting was conducted on May, B.E. 2566 (2023) by COT to gather the information from the public and stakeholders regarding the preparation of an environmental report. This was initiated at the early stage of Project development with the aim of presenting preliminary Project details to gather feedback, concerns, and suggestions from stakeholders regarding the Project. From the pre-engagement activity, no concerns or complaints were raised regarding the land acquisition for the Project. Further details are elaborated below.

6.3.1.1 Notifying the Schedule and Venue before Meeting

The Project sent invitations to participate in the meeting (**Appendix 6-1**), along with the Project brochure, to inform and disseminate detail of Project's information to the relevant stakeholders (**Appendix 6-2**). In addition, the Project has displayed informational signboard and invitations to the meeting venues in public places and community areas. These actions were carried out between May 16-17, B.E. 2566 (2023), as communication channels for receiving feedback and pre-registration for participation were implemented, as shown in **Table 6.3.1.1-1**, **Table 6.3.1.1-2** and **Figure 6.3.1.1-1**.

Project information was disclosed in the stakeholder engagement activities in Thai language (**Appendix 6-3**) including supporting maps. The project information disclosed in the activities cover following contents;

- Project background
- Project features sus as location of site and project type
- Core project facilities
- Project work plan
- Scope of the CoP study
- Stakeholder engagement plan
- Impact assessment and mitigation measures
- Environmental impact prevention and correction measures and the impact monitoring measure

Table 6.3.1.1-1
Communication Channels for Receiving Feedback and Pre-registration for Meeting

Details	Methods	Activities
1. Advance registration	- Sending invitation letters to participate in the information session along with enclosed response forms indicating the intention to participate. This can also include pre-registration through an online Google Form.	Channels for advance registration include: - Phone - Fax - Line Application - Email
2. Dissemination of advance registration documents and community notice boards	- Dissemination of Project information in Project brochure.	Locations for disseminating documents and posting notices will be posted include: 1) District office in the study area. 2) Local administrative organization office in the study area. 3) Sub-district administrative office, community head's office, and community hall in the study area. 4) Schools, religious institutions, community parks, and markets in the study area (such as Wat Nong Hin, Ban Nong Hin School, Ban Nongpo Child Development Center).

Remark: Community parks and Market location was not found in the study area within a 3-kilometer radius of the Project boundary.

Table 6.3.1.1-2
List of Dissemination Locations

1. Doem Bang Nang Buat District Office
2. Dan Chang District Office
3. Nong Krathum Sub-district Municipality
4. Bo Kru Sub-district Administrative Organization Office
4. Nong Makhamong Sub-district Administrative Organization Office
6. Nong Hin School
7. Ban Nong Po Early Childhood Development Center
8. Wat Nong Hin
9. Moo 1 Ban Nong Krathum, Headman's Office
10. Nong Krathum Sub-district, Community Headman's Office (Moo 2 Ban Nong Krathum)
11. Nong Krathum Sub-district's Guardhouse
12. Moo 3 Ban Nong Po, Headman's Office
13. Moo 3 Ban Nong Po, Multipurpose Hall
14. Moo 5 Ban Nong Kok, Headman's Office
15. Moo 5 Ban Nong Kok, Multipurpose Hall
16. Moo 6 Ban Nong Na, Headman's Office
17. Moo 7 Ban Nong Ing Phing, Headman's Office
18. Moo 7 Ban Nong Ing Phing, Multipurpose Hall
19. Moo 8 Ban Nong Hin, Headman's Office
20. Moo 8 Ban Nong Hin, Multipurpose Hall
21. Bo Kru Sub-district, Community Headman's Office
22. Moo 3 Ban Nong Chanuan, Headman's Office
23. Moo 4 Ban Lad, Headman's Office
24. Moo 4 Ban Lad, Multipurpose Hall
25. Nong Makhamong Sub-district, Community Headman's Office
26. Moo 1 Ban Nong Makhamong, Headman's Office
27. Moo 1 Ban Nong Makhamong, Multipurpose Hall
28. Moo 7 Ban Sabuakum, Headman's Office

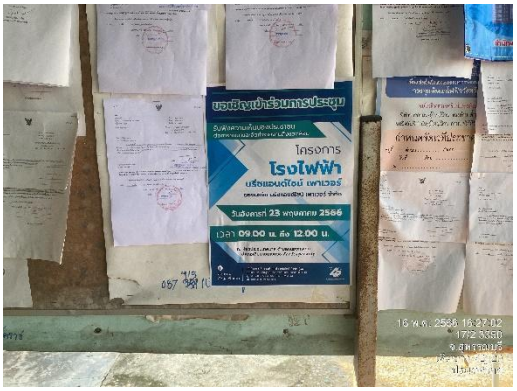
	
Doem Bang Nang Buat District Office	Dan Chang District Office
	
Nong Krathum Sub-district Municipality	Nong Krathum Sub-district, Village Headman's Office
	
Moo 8 Ban Nong Hin, Headman's Office	Moo 7 Ban Nong Ing Phing, Multipurpose Hall

Figure 6.3.1.1-1 Posting Public Invitations for Meeting in Public Places and Community Areas

6.3.1.2 Pre-engagement Meeting

(1) Meeting Schedule

The Project organized a pre-engagement meeting on Tuesday, May 23, B.E. 2566 (2023), from 9 a.m. to 12 p.m., at the meeting room of Nong Krathum Sub-District Municipality, Doem Bang Nang Buat District, Suphanburi Province (**Figure 6.3.1.2-1**). The sequence of the meeting is as follows

09:00 a.m. – 09:20 a.m.: Registration
09:20 a.m. – 09:40 a.m.: Opening the meeting by the Nong Krathum Sub-district Municipality Mayor
09:40 a.m. – 10:30 a.m.: Presentation of project details, scope of study, and project plan by Environmental expert from the consulting company (**Appendix 6-4**)
10:30 a.m. – 12:00 p.m.: Listening to comments, suggestions, concerns, and addressing queries
12:00 p.m.: Meeting conclusion

(2) Summary of Participant Details and Numbers

The meeting was attended by 43 attendees, consisting of Representatives from Government Agencies (48.8%), Community leaders and residents (34.9%), Occupation Group and Community Health Volunteers (4.7% equally) Religious Institutions, Educational Institutions and Women Club (2.3% equally). The details are presented in **Table 6.3.1.2-1**.

Table 6.3.1.2-1
Summary of Participants in the Pre-engagement Meeting on Tuesday, May 23, B.E. 2566 (2023), from 9 a.m. to 12 p.m., at the Meeting Room of Nong Krathum Sub-District Municipality

Detail	Male	Female	Total	Percentage
1. Government Agencies	12	9	21	48.8
2. Community leaders and residents	9	6	15	34.9
3. Religious Institutions	1	0	1	2.3
4. Educational Institutions	1	0	1	2.3
5. Occupation Group	1	1	2	4.7
6. Women Club	0	1	1	2.3
7. Community Health Volunteers	2	0	2	4.7
Total	**26**	**17**	**43**	**100**

	
Register	Opening the meeting by the Mayor of Nong Krathum Sub-district
	
Meeting Atmosphere	Lecturer Presentation
	
Expressing Opinions	Expressing Opinions
Remark: The consulting company has obtained permission to use the images for educational purposes, including dissemination in various Project activities, as has been completed.	

Figure 6.3.1.2-1 Pre-engagement Meeting on Tuesday, May 23, B.E. 2566 (2023)

(3) Summarization of Feedbacks, Clarifications, and Impact Prevention and Mitigation Measures

After the presentation, participants were encouraged to express their opinions and suggestions during the meeting. Three channels were provided for expressing opinions and suggestions:

Channel 1: Expressing opinions verbally during the meeting proceedings.

Channel 2: Providing additional comments in the question form.

Channel 3: Sharing opinions through the post-meeting evaluation form.

In this regard, from the meeting, it was found that there were 8 attendees who verbally expressed their opinions in the meeting room. Additionally, there was 1 attendee who provided further comments using the question form provided by the Project. These comments summarized the questions, explanations, and suggestions for the Project, as shown in **Table 6.3-2**.

Table 6.3.1.2-2

Summary of Questions/Suggestions and Clarifications from Pre-engagement Meeting on Tuesday, May 23, B.E. 2566 (2023), from 9 a.m. to 12 p.m., at the Meeting Room of Nong Krathum Sub-District Municipality

Question/Suggestion	Clarification
(1) Project Implementation	
1. The Project has acquired certain land parcels that are not within the presented Project area. Can the community use these acquired lands for cultivation, and should there be clear notification? (Moo. 8's village headman)	- Community is allowed to utilize land until the end of B.E. 2565 (2022). Because if the project starts to develop the area in the future There may be an impact on agricultural products that have not yet been harvested. However, the project will continue to install signs to clearly show the boundaries of the project area.
2. The Project's construction site was previously agricultural land, which could function for rainwater storage. How can the community be assured that flooding won't become an issue in the area after the Project's establishment? (Suphanburi Provincial Office of Natural Resources and Environment)	- The project has minimal changes to the original land conditions, mainly involving mounting structures with limited alterations to the landscape. Therefore, the project won't significantly affect water drainage in the vicinity.
3. How does the project manage deteriorating solar panels or batteries? (People of Nong Krathum Sub-district)	- If solar panels or batteries deteriorate or malfunction, the project will follow procedure indicated in the Ministry of Industry's announcement on the disposal of hazardous or non-operational materials, B.E. 2548 (2002). Authorized agencies will handle proper disposal.
4. If there are public areas exist in the project, can the community continue to trespass public areas? (People of Nong Krathum Sub-district)	- If there is public areas present in the project area, the community can still utilize area as usual.
5. Can the project consider constructing water storage pond to prevent flooding on neighboring areas? (Deputy Mayor of Nong Krathum Sub-district)	- The Project doesn't alter water drainage within the area. However, the Project will present data and study results in future meetings.

Question/Suggestion	Clarification
6. Can the Project include the design of water storage pond within its area to assist in reducing heat and maintaining solar panel efficiency? (Suphanburi Provincial Energy Office)	- The Project acknowledges this issue and will consider it for future actions.
7. During land surveys, if public areas are discovered, can community leaders notify the local administrative office, Doem Bang Nang Buat District, for awareness? (Deputy District Chief of Doem Bang Nang Buat District)	- The Project acknowledges this concern.
8. There are community areas adjacent to the Project that haven't been purchased. This could pose issues to the project in the future? (Deputy Mayor of Nong Krathum Sub-district)	- The Project acknowledges this concern and will consider it for future actions.
9. If public areas exist in the project area, the project should provide a 6-meter buffer zone from public roads for community benefits? (Deputy Mayor of Nong Krathum Sub-district)	- The Project acknowledges this concern and will consider it for future actions.
(2) Environmental and Health Impact	
1. During the process of cleaning solar panels, how can the community be assured that no chemicals or cleaning agents are used? If there is an impact on the environment impacts, what measures does the project have? (Deputy District Chief of Doem Bang Nang Buat District)	- Cleaning solar panels involve removing dust and particles to ensure their optimal performance. This process is often facilitated by rainfall during the rainy season. Cleaning activities occur approximately twice a year or as per environmental conditions. Only tap water is used for cleaning, without any chemical substances.
2. Because the project size is large, community members might feel concerned about potential impacts, such as increased heat or altered weather patterns. Can the project provide scientifically referenced information to alleviate these concerns? (Suphanburi Provincial Office of Natural Resources and Environment)	- The consulting company will conduct further research and present it at the next meeting.
3. Concerns arise about the effects of reflected light and heat on the south-facing community due to the Project's solar panel placement. Can the Project consider designing the panel layout to minimize potential impacts on the community? (Suphanburi Provincial Energy Office)	- The southern side of the project area is agricultural and doesn't have community areas or residences. Additionally, there will be a distance between the project boundary and the area of solar panel installation. Also, consideration will be given to planting trees alongside the community areas which help addressing potential visual impacts as well.
4. Concerns are raised about impacts during the 21-months construction phase, especially regarding traffic and noise. Can the Project communicate with the community about the potential impacts during this period? (Suphanburi Provincial Energy Office)	- The 21-month timeline starts from the design phase to grid connection. There are about 6 months of equipment transportation and construction-related activities that might generate noise. Nonetheless, the project has a comprehensive environmental measure to address all potential impacts.
5. Even though the Project will not alter the ground beneath the solar panels, could rainwater impact the surrounding area due to water runoff from the panels? (People of Nong Krathum Sub-district)	- The Project has minimal alteration to the ground condition. Rainwater from cleaning the solar panels may flow into the ground, but this occurs only in the limited area where the solar panels are located.
6. Requesting adjustments to the landscape around the Project for aesthetic enhancement and the addition of green spaces to mitigate temperatures within the Project area. (Nong Krathum Sub-district Headman)	- The Project will consider adjusting the landscape in areas that won't affect the solar panel performance.
7. The transportation of construction materials might impact the roadways near the community. (Dan Chang Provincial Waterworks Authority)	- The Project will study this concern and incorporate it into future Project measures.

Question/Suggestion	Clarification
8. Concerns about dust and particulate matter, particularly PM-2.5. (Deputy District Chief of Doem Bang Nang Buat District)	- Dust and particulate matter generated from construction activities are coarse particle which is easily settle to the ground. As for PM-2.5, the project has conducted preliminary studies on local data to assess environmental impacts in the future.
(3) Socio-economic and Public Participation	
1. Request the project gathers opinions from each community in the study area, not limited to community leaders, to ensure a comprehensive reflection of the community's viewpoints toward the Project. (Deputy District Chief of Doem Bang Nang Buat District)	- The project's current meeting is aimed at project awareness and initial feedback. In subsequent stages, the project will provide more opportunities for direct community input through various groups. Community representatives will be invited to participate as well.
2. Besides contributing to the Power Development Fund[1], how will the project support the community? Concerns arise that once operational, it might be challenging to contact project personnel. (Deputy Mayor of Nong Krathum Sub-district)	- The project has community liaison officers in the area. Direct coordination with the community is possible. Additionally, an Environmental Audit Committee will be formed in collaboration with the community, and future community activities will be budgeted accordingly.
3. How much budget will be allocated for community development from the Power Development Fund, and will there be a continuous contribution over time? (People of Nong Krathum Sub-district)	- The Project will contribute to the fund during construction at a rate of 50,000 Baht/MW/year, and during operation at a rate of 1 Satang/unit of production/month. The fund will be allocated for the ongoing development of the community around the Project area, following the regulations of Energy Regulatory Commission.
4. Request the project to establish a process to address community complaints during the construction phase. ()Suphanburi Provincial Energy Office)	- The project has already set up a procedure to address complaints.
5. Concerns that the community's way of life might change due to the Project, as agricultural areas are transformed into solar panel installations. (Nong Krathum Sub-district Headman)	- The Project acknowledges this concern and will consider it in the further planning process.
6. It's suggested that the Project provides complete information to neighboring communities and increases its outreach beyond a 3-kilometer radius. (Deputy District Chief of Doem Bang Nang Buat District)	- The Project will continue its efforts in this direction.

[1] The "Power Development Fund (the Fund)" has been set up under the Office of the Energy Regulatory Commission (ERC) pursuant to the Energy Industry Act, B.E. 2550 (2007). The fund is categorized into three categories based on the amount of money contributed: **Large Fund** with an annual contribution exceeding 50 million Baht., **Medium Fund** with an annual contribution ranging from 3 to 50 million Baht., and **Small Fund** with an annual contribution not exceeding 3 million Baht. Local residents in areas surrounding a power plant can take part in the Fund operation by various means, i.e. (1) apply to be a member of the Community Development Committee (CDC), (2) propose community projects via a public forum at village or sub-district level, (3) participate in the operation of a community project with a budget not exceeding 300,000 Baht, and (4) follow-up community project implementation and receive benefits from such projects in their localities. In addition, they can give their opinions on the improvement of rules and regulations pertaining to the Fund operations, issued by the ERC and the OERC. (Source: ERC Annual Report, 2019)

(4) Recommendations, Concerns, and Mitigation Measures from Post-meeting Evaluation Form

From the post-meeting evaluation forms, there were a total of 39 respondents to the evaluation form (90.7% from 43 attendees). The results can be summarized as follows;

1) General Information of Respondents

The respondents were predominantly male (66.7%) and female (33.3%). In terms of representation, most respondents were government agency representatives (64.1%), followed by community/village representatives (30.8%) and educational institutions representatives (5.1%) respectively.

2) Information Acknowledgment

(a) Information Acknowledgment about the Project

The respondents predominantly received project information for the first time (59.0%) and knew the information before (41.0%). Most of them knew from community leaders (57.1%) and project officer (23.8%) details as shown in **Table 6.3.1.2-3**

Table 6.3.1.2-3

Channels for Receiving Project Information

Detail	Number of respondents	Percentage
- Community leaders	12	57.1
- Project officer	5	23.8
- Government Agency	2	9.5
- Cousin/Neighbors/	1	4.8
- Project Brochure	1	4.8
Total	**21**	**100.0**

Remark: multiple answers allowed

(b) Dissemination of Project Information

The respondents predominantly agreed that additional project information should be publicized (97.4%) and the information was complete and sufficient (2.6%), as shown in **Figure 6.3.1.2-2**.

(c) Additional Information that would like to Acknowledge

The respondents predominantly would like to acknowledge the Project's measures (23.2%), followed by advantages and disadvantages of implementing the project (18.5%), Project detail and knowledge about the solar electricity generation (16.6% equally) details as shown in **Table 6.3.1.2-4**

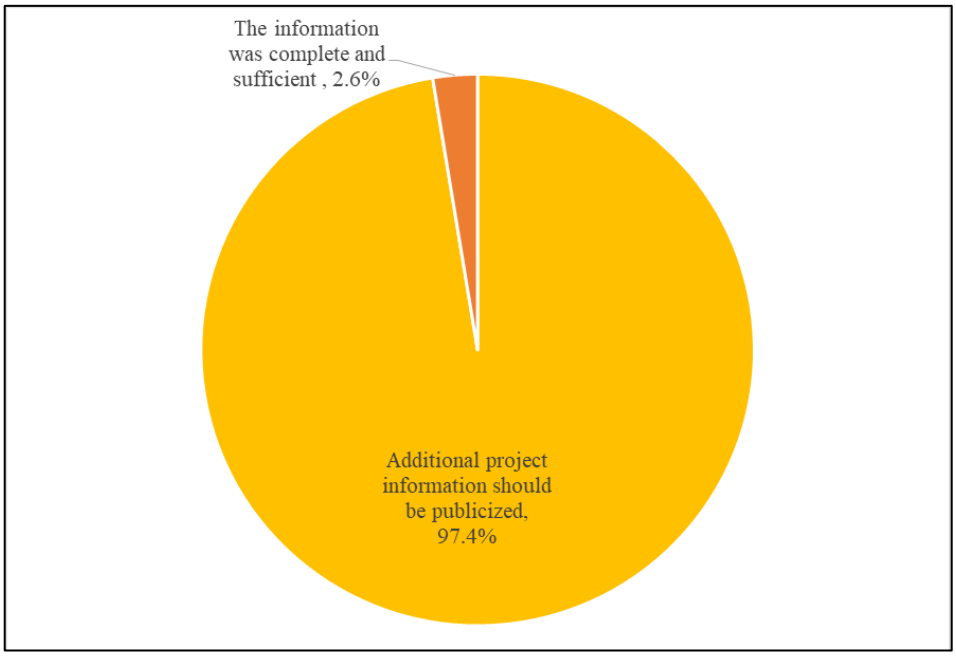


Figure 6.3.1.2-2 Dissemination of project information

Table 6.3.1.2-4
Additional Information that would like to Acknowledge

Detail	Number of respondents	Percentage
- Project's measures	35	23.2
- Advantages and disadvantages of implementing the project	28	18.5
- Project detail	25	16.6
- Knowledge about the solar electricity generation	25	16.6
- Safety	22	14.6
- Project Plan	10	6.5
- Other	6	4.0
Total	**151**	**100.0**

Remark: multiple answers allowed

(d) Format of Project Information Disclosure

The respondents predominantly suggested notifying the project information through community leaders (26.0%), followed by conducting the meeting (24.0%) and through the government agency (19.2%) details as shown in **Table 6.3.1.2-5**

Table 6.3.1.2-5
Format of Project Information Disclosure

Detail	Number of respondents	Percentage
- Through community leaders	27	26.0
- Conducting the meeting	25	24.0
- Through the government agency	20	19.2
- Announcement in the public area	19	18.3
- Directly notified documents	12	11.5
- Other	1	1.0
Total	**151**	**100.0**

Remark: multiple answers allowed

3) Environmental Impact Study

(a) Suitability of Project Location and Technology

Most respondents thought that the project location and technology were appropriate (53.8%), followed by inappropriate (20.5%) unsure (15.4%) and no comments (10.3%) as shown in **Figure 6.3.1.2-3**.

(b) Understanding of the scope of environmental studies

The respondents predominantly understand the scope of environmental studies (77.0%), followed by not quite understand (12.8%) unsure and no comments (5.1% equally) as shown in **Figure 6.3.1.2-4**.

(c) Concerns regarding Project Location, Technology and the Understanding of the scope of environmental studies

The respondents predominantly have a concern (79.5%), followed by unconcern (15.3%) unsure and no comments (2.6% equally) as shown in **Figure 6.3.1.2-5**. The issues that respondents were concerned about were air quality (31.9%), transportation and solid waste (16.7% equally) details as shown in **Table 6.3.1.2-6**

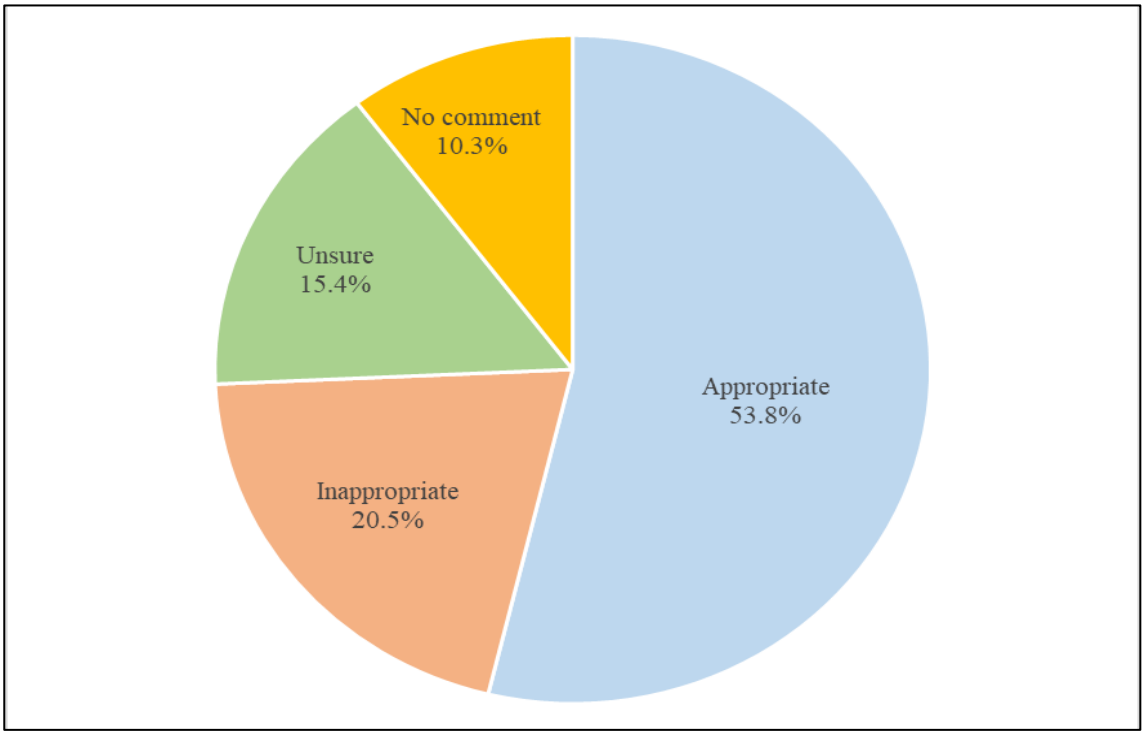


Figure 6.3.1.2-3 Suitability of Project Location and Technology

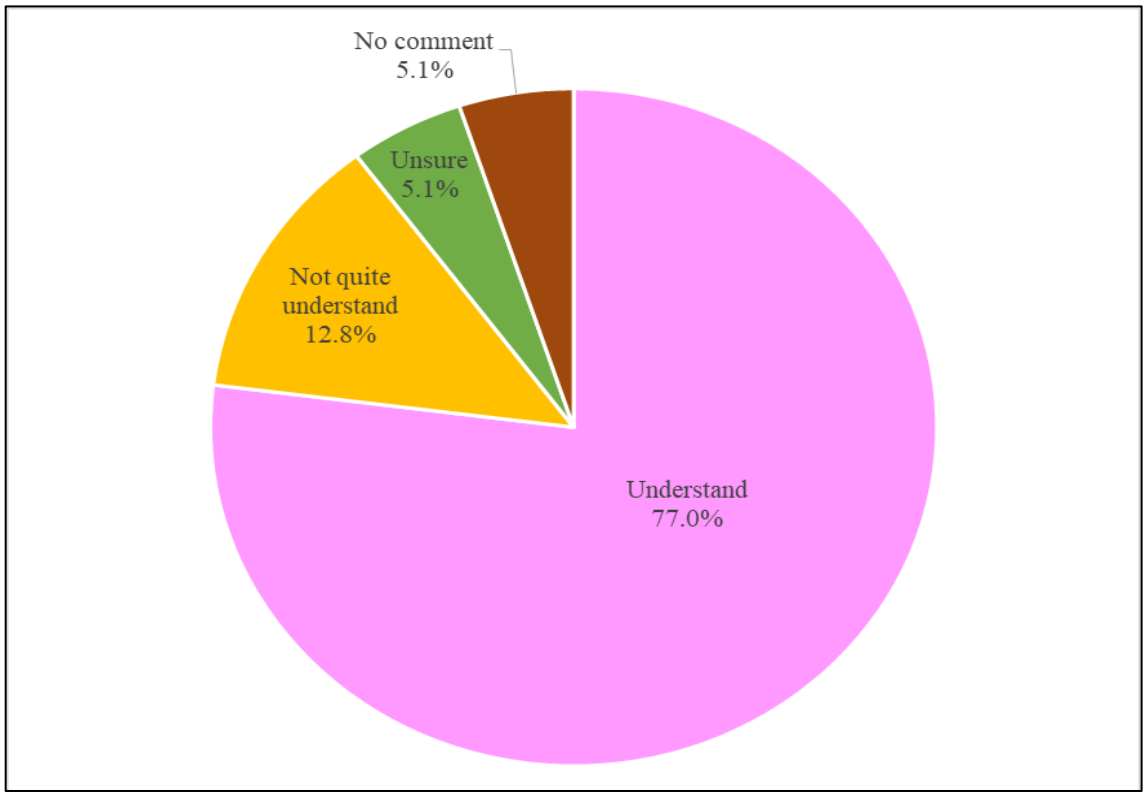


Figure 6.3.1.2-4 Understanding of the Scope of Environmental Studies

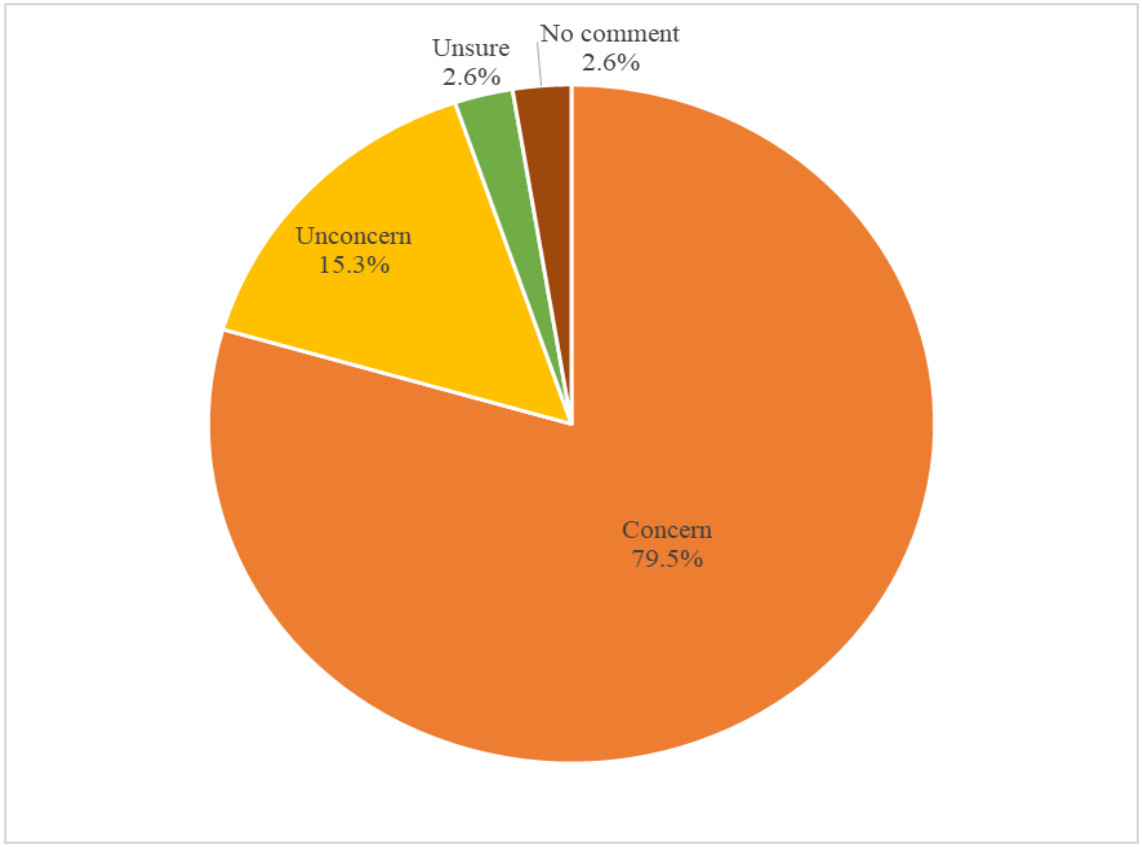


Figure 6.3.1.2-5 The Concerns regarding Project Location, Technology and Understanding of the scope of Environmental Studies

Table 6.3.1.2-6
The Concerns regarding Project Location, Technology and Understanding of the Scope of Environmental Studies

Detail	Number of respondents	Percentage
- Air Quality	23	31.9
- Transportation	12	16.7
- Solid waste	12	16.7
- Water usage	8	11.1
- Wastewater	8	11.1
- Noise	6	8.3
- Other	3	4.2
Total	**72**	**100.0**

Remark: multiple answers allowed

4) Additional suggestions

(a) Environmental Study

- Carry out a survey of soil conditions including water and air quality within a 3 kilometers radius from the project boundary.

(b) Public Participation

- Please strictly follow the proposed measures, especially during the construction period.
- Please provide knowledge to the people about project details and various impacts.
- Please listen to the opinions of the people surrounding the project.
- The project should inform the people or community leaders within the area and nearby areas periodically about the progress of the project.

(c) Project Implementation

- Solutions and impacts on cultivation during construction and operation period.
- The project should provide a plan to deal with future problems.
- The project should plant trees around the project.
- The project should follow up on construction activity to reduce complaints that may occur especially in the areas of transportation and annoyance. Including the preparation of project coordination officers who people can report problems at all times.
- The solid waste management during construction period.

6.3.1.3 Dissemination of Summary Report on Pre-engagement Meeting

The Project has carried out the preparation of a summary report on the pre-engagement meeting and disseminated by sending a letter along with the pre-engagement meeting's summary report to relevant agencies and community leaders within a 3-kilometer radius of the Project boundary (**Appendix 6-5**). Additionally, the summary report was also disseminated at the community board and local government offices in the study area (**Figure 6.3.1.3-1**). This process was conducted between June 2-3, B.E. 2566 (2023).

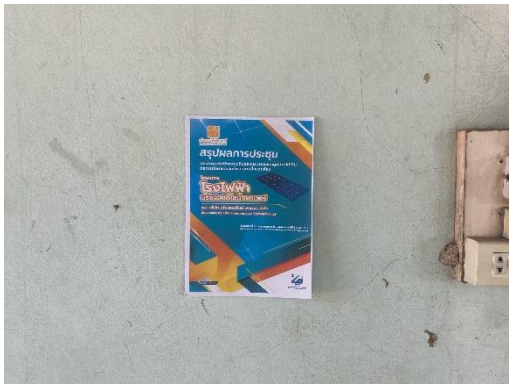
	
Doem Bang Nang Buat District Office	Dan Chang District Office
	
Nong Krathum Sub-district Municipality	Moo 8 Ban Nong Hin, Multipurpose Hall
	
Moo 8 Ban Nong Hin, Headman’s Office	Moo 7 Ban Nong Ing Phing, Multipurpose Hall

Figure 6.3.1.3-1 Dissemination of the Summary Report in Public Places and Community Areas

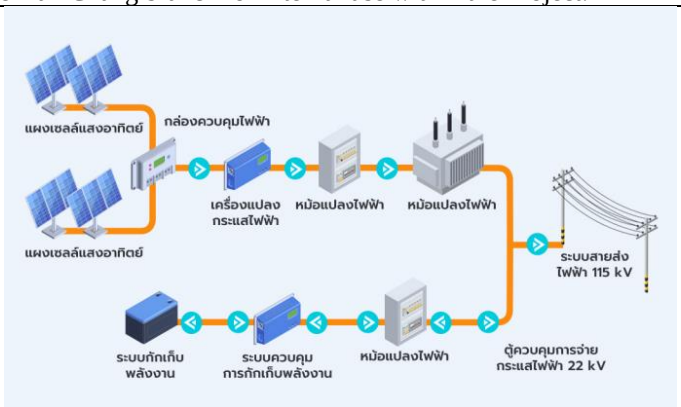
6.3.2 Stakeholder Engagement Process

6.3.2.1 Document Preparation prior to Commencing Public Meeting

The Project has followed Regulation of the Energy Regulatory Commission: Criteria for Preparing Code of Practice Report and Monitoring Report for the operation of electricity production, B.E. 2565 (2022), and Regulation of the Energy Regulatory Commission: Opinion Hearing and Understanding with the Public and Stakeholders for the issuance of a license of electricity production, B.E. 2565 (2022). Detail of the Project's information is as summarized in **Table 6.3.2.1-1**.

Table 6.3.2.1-1
Summary of Project Details for Public Meeting

Topic	Detail
1. Project Description	
1.1 Project Name	- Breeze and Shine Solar Power Plant Project
1.2 Licensee Name	- Breeze and Shine Power Company Limited
1.3 Project Location and the Study Area	- Breeze and Shine Solar Power Plant Project is located in Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province, Thailand (within the jurisdiction of Nong Krathum Sub-district Municipality). The Project area covers approximately 1,051.96 rai. - The Project study area covers a radius of 3 kilometers from the Project boundary, including 1 province, 2 districts, 1 sub-district municipality, 2 sub-district administrative organizations, and 11 communities, as follows: Nong Krathum Sub-district Municipality - Moo 1 Ban Non Krathum - Moo 2 Ban Non Krathum - Moo 3 Ban Nong Po - Moo 5 Ban Nong Kok - Moo 6 Ban Nong Na - Moo 7 Ban Nong Ing Phing - Moo 8 Ban Nong Hin Bo Kru Sub-district Administrative Organization - Moo 3 Ban Nong Chanuan - Moo 4 Ban Lad Nong Makhamong Sub-district Administrative Organization - Moo 1 Ban Nong Makhamong - Moo 7 Ban Sabuakum
2. Reason and Necessity of the Project	- Breeze and Shine Power Co., Ltd. plans to develop the Breeze and Shine Solar Power Plant, a solar power generation Project utilizing photovoltaic (PV) technology or solar panel systems installed on the ground-mounted and combined with battery energy storage systems. The generated electricity will be sold to the government in line with the policy supporting alternative energy sources. Solar energy is a clean and renewable energy source that can be utilized without causing environmental pollution and can contribute to long-term energy stability. The development of the Project is determined under the scope of preparing a Code of Practice (CoP) and an Environmental and Safety Assessment (ESA) report for Project operation permission.
3. Duration of Project construction and operation/ Operating budget	- The overall Project development period is 21 months, including 9 months for preparatory activities such as design, CoP and ESA report preparation, and obtaining relevant agency licenses, followed by around 12 months for construction and testing of the electricity

Topic	Detail
	production and distribution system. The Project's operational phase is estimated to last around 25 years. - The estimated budget for Project implementation is approximately 6.5 billion Baht.
4. Benefit of the Project	The Project benefits include: 1. Environmental benefits in terms of energy security and overall environmental stability through increased electricity production capacity from renewable energy sources, reducing electricity production from fossil fuels that contribute to greenhouse gas emissions, in line with government policies. 2. Contribution to the power development fund as per the Energy Regulatory Commission's regulations. 3. Property and land taxes, as well as signage taxes. 4. Job creation, economic growth, and local economic development. 5. Community development and improved quality of life through social and community activities.
5. Summary of Description	
5.1 Installed Capacity	- The power plant will have an installed capacity of 144.000 MW_{AC} (199.456 MW_P), generating approximately 334.904 gigawatt-hours per year (GWh/year) of electricity.
5.2 Type of Power Plant	- Non-combustion power plant.
5.3 Component and Technology	- 329,680 monocrystalline silicon photovoltaic (PV) modules, 605-Watt model. - 480 units of outdoor string inverter, 300-kW model. - 1 unit of transformer, 90 MVA. - 1 unit of transformer, 3.437 MVA. - 42 units of battery energy storage system (BESS), 2.752 MWh.
5.4 Fuel	- Electricity generation from solar energy, installed on the ground along with battery energy storage systems.
5.5 Source of Water Use	- The Project shall receive water from the regional water supply at the Dan Chang branch for internal use within the Project.
5.6 Electricity Generation Process	 - The process of electricity generation will start with sunlight, which consists of electric magnetic waves, interacting with solar panels made of semiconductors. This interaction creates particles with positive and negative charges that move in opposite directions. The movement of these charged particles generates direct current (DC) electricity. This DC electricity is then sent to an inverter to convert it into alternating current (AC) electricity, which is further transformed into high-voltage electricity by a transformer and then fed into the transmission lines for supply to EGAT. - Additionally, the Project includes a Battery Energy Storage System (BESS), which serves to store excess electricity generated within batteries. During periods of low electricity production, the stored electricity within the batteries is released into the transmission lines for supply to EGAT. This ensures a continuous and stable supply of electricity.

Topic	Detail
5.7 Pollution and Management	
5.7.1 Air Pollution	Construction Phase - Significant air pollution during the construction phase arises from the transportation of construction materials and solar panels. This leads to the dispersion of dust and particles on roads, as well as other air pollutants from the use of machinery and vehicles for material transportation and solar panel installation. To prevent dust dispersion, the Project mandates the regular spraying water onto the construction area and entrance road at least twice a day (morning and afternoon), or as suitable according to weather conditions. Additionally, vehicles leaving the construction area are required to be cleaned to minimize the dispersion of dust, gravel, soil, or sand within and around the Project area. Operation Phase - The Project involves electricity generation from solar panels without combustion, thereby not causing air pollution.
5.7.2 Noise	Construction Phase - Noise levels during different construction activities vary based on the type of machinery and the nature of the work being carried out. Construction activities mainly include the construction of electrical equipment and control buildings, energy storage system buildings, and the assembly and installation of solar panels. The construction activity generating the most noise is the structural erection. However, the noise level can be controlled by scheduling construction activities between 08:00 AM to 05:00 PM. Moreover, the Project employs equipment and machinery with low noise levels and maintains them in efficient working condition. Operation Phase - The Project involves electricity generation from solar panels, which does not produce significant noise, therefore not causing noise pollution.
5.7.3 Wastewater	Construction Phase 1. Wastewater from the consumption and usage of workers, including cleaning activities and wastewater from restrooms. Adequate restroom facilities are provided for workers during peak hours, equipped with a wastewater treatment system. Waste or pollutants resulting from this system will be handed over to local authorities for proper disposal. 2. Wastewater from construction activities, such as cleaning tools and equipment, as well as water mixed with small amounts of concrete. Such wastewater is temporarily collected in the Project's drainage system before being directed to the Project's retention pond. Subsequently, it will be circulated for other beneficial purposes, such as watering plants or dampening construction areas. Operation Phase 1. Wastewater from worker consumption, including wastewater from cleaning activities and restroom usage. This wastewater is treated using a septic tank system and not released into the environment. Waste or pollutants resulting from this system will be handed over to local authorities for proper disposal. 2. Wastewater from cleaning solar panels. This activity is only conducted when necessary and the wastewater generated is neither heavily polluted nor chemically hazardous.
5.7.4 Waste	Construction Phase The waste generated can be classified into 2 types: 1. Solid waste resulting from worker consumption and usage. The Project has provided containers with a capacity of 200 liters and tightly sealed lids for collecting solid waste. These containers are strategically placed throughout the site to accommodate the solid waste generated. The collected waste will be handed over to authorized agencies for proper disposal.

Topic	Detail
	2. Residual materials from construction activities. The Project will collect and recycle these materials or sell them for reuse. Any unsellable materials will be collected and handed over to authorized agencies for proper disposal. Operation Phase Waste can be categorized into 2 types: 1. Solid waste resulting from worker consumption and usage. The Project will manage this waste in accordance with the Public Health Act of 1992. Separate bins with tightly sealed lids will be prepared and placed near office buildings and work areas for employees. The collected waste will be handed over to authorized agencies for proper disposal. 2. Waste from production processes (defective solar panels). Defective solar panels are expected to be of minimal quantity. The Project will collect these panels in designated areas, sorted according to waste type, and labeled clearly. The Project will periodically inspect these storage areas. When a significant quantity of defective panels accumulates, they will be returned to the manufacturer or to authorized disposal companies as per the Ministry of Industry's announcement on waste and material management, B.E. 2566 (2023).
6. The potential impacts that may occur to communities or residents living or working in areas near the Project site, as well as general public areas, along with the preventive, or mitigative measures.	- The primary impacts that may affect the community or nearby areas include air quality, noise, wastewater, and solid waste. Details on how these impacts are managed are provided in Section 5.7, Pollution and Management. - The Project includes measures to prevent and mitigate environmental impacts and monitoring procedures to assess environmental consequences. These measures are in place to address any potential issues arising from the aforementioned impacts.

Source: Consultants of Technology Co., Ltd., B.E. 2566 (2023)

6.3.2.2 Notifying the Schedule and Venue before Conducting Public Meeting

The Project has initiated invitations to participate in the meeting, along with early distribution of preliminary CoP report, summary documents of Project details, and Project brochure (**Appendix 6-6** to **Appendix 6-8**), to inform and disseminate detail of Project's information to the relevant stakeholders at least 15 days prior to the public meeting date. In addition, the Project has displayed informational signboard and invitations to the meeting venues in public places and community areas. These actions were carried out between June 2-3, B.E. 2566 (2023), as communication channels for receiving feedback and pre-registration for participation were implemented, as shown in **Table 6.3.2.2-1**.

This coverage complies with Regulation of the Energy Regulatory Commission: Opinion Hearing and Understanding with the Public and Stakeholders for the issuance of a license of electricity production, B.E. 2565 (2022) with a total of 31 locations (as presented in **Table 6.3.2.2-2**, **Figure 6.3.2.2-1**). Additionally, public meeting notices were displayed at least 15 days in advance, from June 4-20, B.E. 2566 (2023). Images depicting the dissemination of Project details and public meeting announcement notices are provided in **Figure 6.3.2.2-2** to **Figure 6.3.2.2-4**.

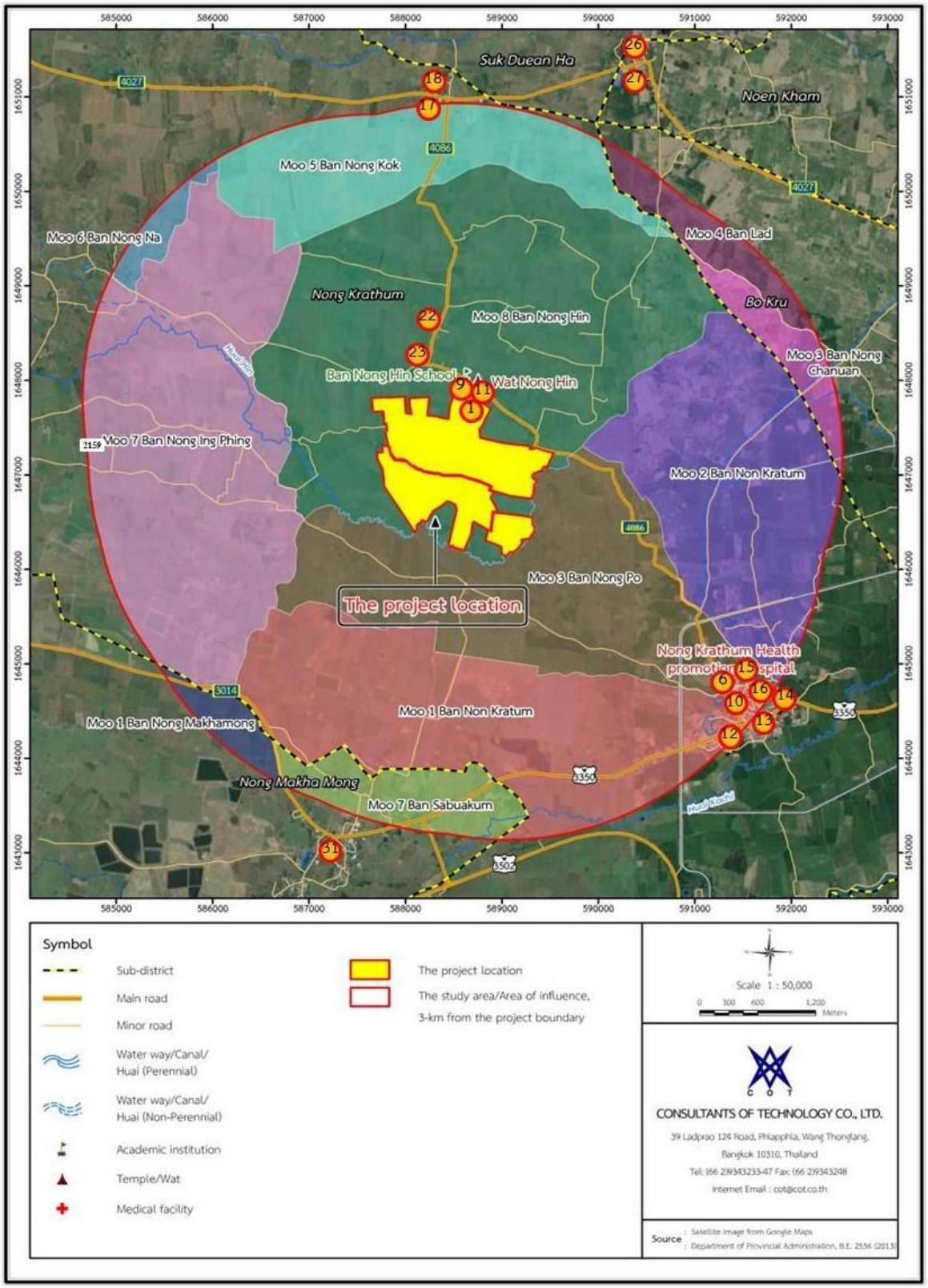
Table 6.3.2.2-1
Communication Channels for Receiving Feedback and Pre-registration for Public Meeting

Details	Methods	Activities
1. Advance registration	- Sending invitation letters to participate in the information session along with enclosed response forms indicating the intention to participate. This can also include pre-registration through an online Google Form.	Channels for advance registration include: - Telephone - Fax - Line Application - Email
2. Dissemination of advance registration documents and community notice boards	Dissemination of Project information materials can include: - Preliminary CoP report. - Summarized Project information document. - Project brochure.	Locations for disseminating documents and posting notices will be posted include: 1) Project's construction site 2) Energy Regulatory Commission, Regional Office 9 (Kanchanaburi) 3) Suphanburi Provincial Industry Office 4) District office in the study area. 5) Local administrative organization office in the study area. 6) Sub-district administrative office, community head's office, and community hall in the study area. 7) Schools, religious institutions, community parks, and markets in the study area (such as Wat Nong Hin, Ban Nong Hin School, Ban Nongpo Child Development Center).

Remark: Community parks and Market location was not found in the study area within a 3-kilometer radius of the Project boundary.

Table 6.3.2.2-2
List of Disseminating Locations

1. Construction area (Breeze and Shine Power Co., Ltd.), Moo 8 Ban Nong Hin, Nong Krathum Sub-district, Doem Bang Nang Buat District, Suphanburi Province
2. Office of Energy Regulatory Commission, Regional Office 9 (Kanchanaburi)
3. Suphanburi Provincial Industry Office
4. Doem Bang Nang Buat District Office
5. Dan Chang District Office
6. Nong Krathum Sub-district Municipality
7. Bo Kru Sub-district Administrative Organization Office
8. Nong Makhamong Sub-district Administrative Organization Office
9. Nong Hin School
10. Ban Nong Po Early Childhood Development Center
11. Wat Nong Hin
12. Moo 1 Ban Nong Krathum, Headman's Office
13. Nong Krathum Sub-district, Community Headman's Office (Moo 2 Ban Nong Krathum)
14. Nong Krathum Sub-district's Guardhouse
15. Moo 3 Ban Nong Po, Headman's Office
16. Moo 3 Ban Nong Po, Multipurpose Hall
17. Moo 5 Ban Nong Kok, Headman's Office
18. Moo 5 Ban Nong Kok, Multipurpose Hall
19. Moo 6 Ban Nong Na, Headman's Office
20. Moo 7 Ban Nong Ing Phing, Headman's Office
21. Moo 7 Ban Nong Ing Phing, Multipurpose Hall
22. Moo 8 Ban Nong Hin, Headman's Office
23. Moo 8 Ban Nong Hin, Multipurpose Hall
24. Bo Kru Sub-district, Community Headman's Office
25. Moo 3 Ban Nong Chanuan, Headman's Office
26. Moo 4 Ban Lad, Headman's Office
27. Moo 4 Ban Lad, Multipurpose Hall
28. Nong Makhamong Sub-district, Community Headman's Office
29. Moo 1 Ban Nong Makhamong, Headman's Office
30. Moo 1 Ban Nong Makhamong, Multipurpose Hall
31. Moo 7 Ban Sabuakum, Headman's Office



Remark: Numbers shown in this figure refer to the locations of disseminating documents as listed in **Table 6.3.2.2-2**.

Figure 6.3.2.2-1 Disseminating Location

	
Construction area	Office of Energy Regulatory Commission, Regional Office 9 (Kanchanaburi)
	
Suphanburi Provincial Industry Office	Doem Bang Nang Buat District Office
	
Dan Chang District Office	Nong Krathum Sub-district Municipality
	
Nong Krathum Sub-district, Village Headman's Office	Moo 3 Ban Nong Po, Headman's Office

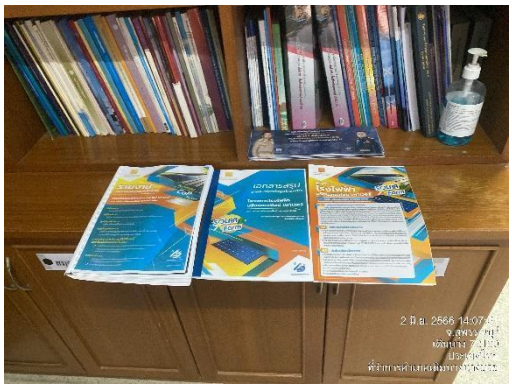
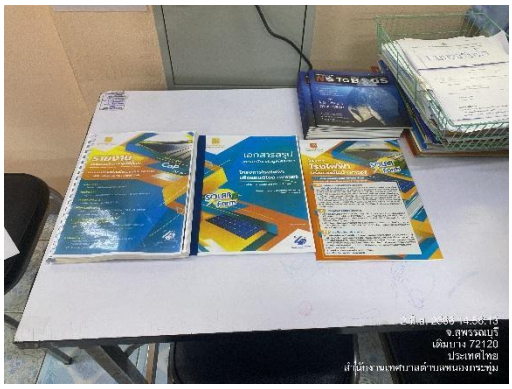
	
Moo 5 Ban Nong Kok, Multipurpose Hall	Moo 7 Ban Nong Ing Phing, Multipurpose Hall
	
Moo 8 Ban Nong Hin, Headman's Office	Nong Makhamong Sub-district, Village Headman's Office

Figure 6.3.2.2-2 Posting Public Invitations for Public Meeting in Public Places and Community Areas





Figure 6.3.2.2-3 Posting Public Invitations for Public Meeting through the Website and a Facebook Page of the Consulting Company

	
Construction area	Office of Energy Regulatory Commission, Regional Office 9 (Kanchanaburi)
	
Suphanburi Provincial Industry Office	Doem Bang Nang Buat District Office
	
Dan Chang District Office	Nong Krathum Sub-district Municipality

<u>Figure 6.3.2.2-4</u> Dissemination of the Project Documents in Public Places and Community Areas

	
Nong Krathum Sub-district, Village Headman's Office	Moo 1 Ban Nong Krathum, Headman's Office
	
Moo 3 Ban Nong Po, Headman's Office	Moo 7 Ban Nong Ing Phing, Headman's Office
	
Moo 7 Ban Nong Ing Phing, Multipurpose Hall	Moo 8 Ban Nong Hin, Headman's Office

Figure 6.3.2.2-4 (Continue) Dissemination of the Project Documents in Public Places and Community Areas

6.3.2.3 Public Meeting/Forum

(1) Meeting Format and Schedule

The Project organized a public meeting and engagement session with the community and stakeholders on Wednesday, June 21, B.E. 2566 (2023), from 08:30 a.m. to 12:00 p.m. at the Multipurpose Building, Nong Krathum Sub-district Municipality, Doem Bang Nang Buat District, Suphanburi Province. The sequence of the meeting is as follows (a snapshot of the meeting can be found in **Figure 6.3.2.3-1**):

08:30 a.m. – 09:30 a.m.:	Registration
09:30 a.m. – 09:40 a.m.:	Opening the meeting by the Nong Krathum Sub-district Municipality Mayor
09:40 a.m. – 11:00 a.m.:	Presentation of project background, project details, study findings, and environmental measures by Environmental Expert from the Consulting Company (**Appendix 6-9**)
10:00 a.m. – 12:00 p.m.:	Suggestions, Concerns, and Addressing Queries
12:00 p.m.:	Meeting Conclusion

(2) Summary of Participant Details and Numbers

From the public meeting and engagement session held at the Multipurpose Building, Nong Krathum Sub-district Municipality, a total of 258 individuals participated (96 males and 162 females). Details are presented in **Table 6.3.2.3-1**.

	
Registration	Opening the meeting by the Mayor of Nong Krathum Sub-district
	
Meeting Atmosphere	Presentation of Project Detail
	
Expressing Opinions	Expressing Opinions
Remark: The consulting company has obtained permission to use the images for educational purposes, including dissemination in various Project activities, as has been completed.	

Figure 6.3.2.3-1 The Public Meeting on Wednesday, June 21st, B.E. 2566 (2023)

Table 6.3.2.3-1
Summary of the Number of Participants

Stakeholder group	Detail	Number of Participants		
		Male	Female	Total
1. Affected Parties (Local residents within a radius of 3 kilometers from the Project boundary)	Nong Krathum Sub-district Municipality			
	- Moo 1 Ban Nong Krathum	7	10	17
	- Moo 2 Ban Nong Krathum	6	13	19
	- Moo 3 Ban Nong Po	5	12	17
	- Moo 5 Ban Nong Kok	7	10	17
	- Moo 6 Ban Nong Na	2	14	16
	- Moo 7 Ban Nong Ing Phing	6	8	14
	- Moo 8 Ban Nong Hin (Project location)	19	44	63
	Bo Kru Sub-district Administrative Organization			
	- Moo 3 Ban Nong Chanuan	4	11	15
	- Moo 4 Ban Lad	1	12	13
	Nong Makhamong Sub-district Administrative Organization			
	- Moo 1 Ban Nong Makhamong	6	8	14
	- Moo 7 Ban Sabuakum	5	12	17
2. Evaluating Agencies	- Office of Energy Regulatory Commission	-	-	-
	- Department of Industrial Works	-	-	-
	- Office of Energy Regulatory Commission, Regional Office 9 (Kanchanaburi)			2
3. Government Agencies	Government Agencies	16	10	26
4. Private Sector Organizations in Environmental Conservation, Development Organizations, Educational Institutions/Religious Institutions	- Educational Institutions	-	-	-
	- Religious Institutions	1	0	1
	- Woman Club	0	1	1
	- Occupation Group	0	1	1
4. Mass Media	Local mass media	-	-	-
5. General Interest Parties	General public	3	3	6
Total		**88**	**169**	**257**
* A total of 257 participants took part in the meeting, there were 88 males and 169 females				
6. Report Preparation Agencies	Breeze and Shine Power Co., Ltd.			6
	Consultants of Technology Co., Ltd.			10

(3) Summarization of Feedbacks, Clarifications, and Impact Prevention and Mitigation Measures

After the presentation, participants were encouraged to express their opinions and suggestions during the meeting. Four channels were provided for expressing opinions and suggestions:

Channel 1: Expressing opinions verbally during the meeting proceedings.

Channel 2: Providing additional comments in the supplementary feedback form.

Channel 3: Sharing opinions through the post-meeting evaluation form.

Channel 4: Receiving further comments within a minimum of 15 days after the meeting, through various channel such as mail, telephone, fax, and email. The Project has extended the opportunity to receive additional feedback from June 22 to July 6, B.E. 2566 (2023).

1) Verbal Expressions during the Public Meeting (Channel 1) and Additional Comments from Supplementary Feedback Forms (Channel 2)

There were 6 individuals providing verbal comments and 4 individuals providing additional written comments, as detailed in **Table 6.3.2.3-2**.

Table 6.3.2.3-2
Summary of Questions/Suggestions, and Clarifications from the Public Meeting on June 21, B.E. 2566 (2023)

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
(1) Project Implementation			
Verbally	1. Has the green space in the Project been designed already? (Nong Krathum Sub-district Headman)	- The Project is currently in the design phase, considering the incorporation of green spaces around control buildings or areas that won't impact the production equipment and electricity generation efficiency of the Project.	General Measures - Display the Project's plant layout by specifying the proportions of space utilization for all areas of the Project (area sizes and percentage proportions), categorized according to their intended uses. Additionally, clearly indicate different types of green areas, such as those designated for environmental purposes, buffer zones, or safety areas.
Verbally	2. Regarding measures with specified construction timelines, how will the Project ensure proper implementation and monitoring? (Suphanburi Provincial Office of Natural Resources and Environment)	- The Project must ensure the adherence to all specified measures, both within the Project itself and by the contracted companies. This includes the establishment of oversight committees that involve the community in monitoring and verifying Project progress.	General Measures - Strictly adhere to the environmental and social prevention and mitigation measures and the environmental and social monitoring measures outlined in the Code of Practice (CoP) of the Project. Socio-economic and Public Participation Measures (Construction Period) - Establish an environmental audit committee involving the community to foster their participation in Project implementation, and community and environmental development. The committee should consist of representatives from local community organizations, educational institutions or academics in the area, and the Project owner company. The committee should have a significant proportion of members from the public sector, totaling at least half of the overall committee members. The structure, composition, number of members, responsibilities, term duration, meeting format, and frequency should be clearly defined. The committee's activities should be integrated into the Project management, with the committee having powers and duties including receiving complaints, and considering the implementation of Project measures. In this regard, the committee can continue to perform duties during the operational period as well.
Feedback form	3. Could we receive information about the solar power plant projects that are currently operational? (Doem Bang Nang Bual Agricultural Extension Office)	- Breeze & Shine Power Co., Ltd. is the company developing the solar power plant project in this area. However, the consortium has prior experience in project development, and environmental impact assessments have been conducted based on data and lessons from previously operational solar power projects, both domestically and internationally.	-

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
(2) Environmental and Social Impact Study			
Verbally	1. Does the Project monitor and inspect air quality and noise during the construction phase? (Suphanburi Provincial Office of Natural Resources and Environment)	- During the construction phase, there will be monitoring and measurement of air quality and noise at two stations: Ban Nong Hin School and Nong Kratum Sub-district Health Promoting Hospital. These measurements will occur twice a year throughout the construction phase. Additionally, continuous measurements will take place for a minimum of 5 consecutive days, covering both working days and weekends. The measurement results will be submitted to the Energy Regulatory Commission.	Monitoring Measures (Construction Period) **Air Quality:** Conduct air quality monitoring in vicinity areas that might be affected by the construction activities, with a minimum of 2 monitoring points (Ban Nong Hin School, and Nong Krathum Sub-district Health Promoting Hospital). Perform monitoring twice a year throughout the construction phase covers two prevailing wind direction of the area. Parameters to be measured include: 1) TSP (Total Suspended Particulate) 2) PM-10 3) PM-2.5 4) Wind direction and wind speed **Noise:** Conduct noise monitoring at 2 monitoring points (Ban Nong Hin School, and Nong Krathum Sub-district Health Promoting Hospital). Perform monitoring twice a year throughout the construction phase. Parameters to be measured include: 1) Leq 24-hr 2) L90 3) Ldn 4) Lmax
Verbally	2. Due to the absence of water in nearby water sources during the dry season, is the ongoing surface water quality monitoring considered sufficient? If not, how will the Project ensure adequacy? Also, how will the Project communicate this information? (Suphanburi Provincial Office of Natural Resources and Environment)	- The ongoing surface water quality monitoring is an additional activity beyond the requirements set by the CoP reporting guidelines, aimed at providing baseline data prior to project initiation. This monitoring is expected to be conducted primarily during the rainy season when there is sufficient surface water for sampling.	
(3) Wastewater Quality and Water Drainage			
Verbally	1. Concerns about the potential impact on agriculture from water runoff. (Doem Bang Nang Buat Deputy District Chief)	- The majority of the project area is designated for solar panel installation, involving mounting structures without concrete paving. Rainwater falling on the solar panels will naturally be allowed to permeate into the soil. The project is not situated in flood-prone areas and does not modify the existing terrain, resulting indifferent in water permeability rates and flow directions. However, some areas that have undergone modifications due to the	

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
		construction of structures and concrete paving, account for a total area of 7,023 square meters, might cause minor changes in water runoff compared to the pre-development conditions. Consequently, the project has implemented a drainage system that collects and channels rainwater to a retention pond with a capacity of 600 cubic meters. This pond is situated near the project's buildings to manage excess rainwater resulting from the modifications.	
Verbally	2. Doem Bang Nang Buat District is not flood-prone area but it is intermittent water accumulation, which lasts for about 1-2 days after rainfall. However, there are still concerns about water runoff in the event of rain. (Doem Bang Nang Buat Deputy District Chief) 3. How is the drainage system within the Project area designed? (Moo. 2 Assisstant Village Headman)	- Currently, the project area is primarily agricultural land with natural water drainage. The installation of solar panels does not alter the area's topography. Consequently, the water drainage direction remains unchanged. For areas with altered conditions due to concrete paving, the project shall provide drainage systems. These systems include the provision of retention ponds capable of handling excess rainwater for at least 3 hours, ensuring that the drainage patterns remain consistent with the original conditions.	<u>General Measures</u> - Design a drainage system within and around the Project area to prevent issues of water obstruction and flooding in nearby areas.
Verbally	4. Is there any water storage during the cleaning of solar panels? (Suphanburi Provincial Office of Natural Resources and Environment)	- The project has a plan to clean the solar panels twice a year, depending on environmental conditions. Approximately 1.5 liters of tap water per panel are used. This tap water does not contain harmful cleaning agents or chemicals. The water used for cleaning the solar panels naturally permeates into the ground as it flows down from the panels. As the cleaning occurs during the dry season, there is no excess water runoff beyond the natural absorption capacity of the soil.	
Verbally	5. According to the Factory Act, the project falls under Factory Type 3. If the factory releases wastewater outside the project area, it would be categorized as wastewater. In such cases, reporting in accordance with Form Tor. Sor. 1 and Form Tor. Sor. 2 are required to the local administrative of Nong Krathum Sub-district, as per the subsequent steps. (Suphanburi Provincial Office of Natural Resources and Environment)	- The Project does not release wastewater from the power generation process. Additionally, water used for solar panel cleaning does not discharge outside the Project area. Therefore, the Project aligns with the regulations stated in the Ministry of Natural Resources and Environment's announcement regarding standards for controlling wastewater discharge from power generation plants, effective from B.E. 2565 (2022). Consequently, there is no requirement to report activities related to wastewater discharge.	

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
(4) Reflection and Heat			
Verbally	1. Impact on visual perception when solar panels are installed within the Project area. (Former Moo. 8 Village Headman)	- Solar panels have a reflection coefficient of less than 0.05, which is lower than the typical reflection coefficient of concrete roads. As a result, the light reflection from the solar panels does not significantly affect visual perception. The Project's solar panel installation surrounds with agricultural land, and the panels face south. This orientation ensures maximum sunlight absorption, with the panels tilted at an angle of approximately 10 degrees to maximize sunlight exposure. The panels are oriented to capture sunlight from the southern direction, where there is no residential area. The Project has maintained a sufficient buffer zone around the installation area to prevent impacts on adjacent areas.	
Feedback form	2. Concern about the impact from thermal radiation on nearby communities. (Dan Chang Provincial Waterworks Authority)	- Solar panel electricity generation does not rely on temperature or heat for operation but utilizes sunlight intensity. Therefore, installing solar panels does not directly influence temperature changes in the surrounding environment. The Project positions the panels in a north-south direction, tilting them at an angle of about 10 degrees from the ground to maximize sunlight absorption. The panels are oriented to capture sunlight from the southern direction, which has no community area. The project shall ensure a suitable distance between the solar panel area and its surroundings to mitigate potential impacts.	<u>Aesthetics Measures (Operation Period)</u> - Implement environmental impact prevention and mitigation measures, including maintenance, care, and replanting in case of tree loss to ensure sustainability of the green space. In doing so, prioritize the planting of perennial trees within the Project's green areas based on suitability and appropriateness.
Verbally	3. Concerns about the impact of heat on agricultural yields. (Doem Bang Nang Buat Deputy District Chief)	- There was a study to assess and compare temperature changes around a solar farm located in rice fields in Lopburi province. The study found that the average air temperature within the solar farm area was higher than the surrounding area by approximately 0.5 degrees Celsius (Source: "Variation of Air Microclimate Around a Solar Farm," Manika Yaemsuk, Wipawee Juikaewphanao, Nongpat Chaichana, and Tiwa Phakokthom, B.E. 2561 (2018)). However, an increase of 0.5 degrees Celsius in average temperature within the solar farm area does not have a perceptible impact on human sensations or agriculture. Therefore, the slightly	

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
		higher average temperature within the solar farm area does not affect human perception or agricultural yields.	
(5) Socio-economic and Public Participation			
Verbally	1. Concerns about the impact on security in the Project area due to its large size and adequacy of security personnel. (Doem Bang Nang Buat Police Station)	- There will be about two individuals of security personnel guarded in the project area. These personnels will investigate security and conduct regular area checks. Additionally, CCTV cameras will be installed around the Project area and tight security fences will encircle the Project.	
Verbally/ Feedback form /Post meeting evaluation form	2. Security personnel prefer individuals from the local community to manage incidents within the community. (Nong Krathum Sub-district Headman) 3. Request for employment of individuals from the local community. (Anonymous) 4. Request for employment of individuals from the local community or coordination through community leaders to prevent various incidents and provide employment opportunities for community members. (Anonymous)	- The project shall take this suggestion into consideration. Currently, it can be assured the project's policy prioritizes hiring individuals from the local community as a primary option if there are suitable positions available and the required qualifications match the positions.	
Feedback form	5. Interested in understanding the long-term benefits and effects of the Project. (Doem Bang Nang Buat Agricultutal Extension Office) 6. How will the community benefit from the power plant construction? (People of Nong Makhamong Sub-district)	- Power Development Fund will be allocated as per the regulations of the Energy Regulatory Commission. During the construction period, a rate of 50,000 Baht/megawatt/year and during operation at a rate of 1 Satang/unit of production/month. This budget will be added to the existing funds in the area, including community support funds as appropriate through community engagement activities. - Long-term impacts of the Project: The Project's power plant has a lifespan of 25 years. During its operational phase, solar power generation does not emit pollutants into the air or noise. There is only wastewater generated from panel cleaning twice a year, with no discharge outside the Project area. The disposal of damaged solar panels is regulated by laws. Consequently, the Project has low environmental impacts throughout its lifespan. Adequate measures have been put in place to mitigate the impacts during partial or complete	<u>Socio-economic and Public Participation Measures (Operation Period)</u> - Assign a community relations representative to participate in various community engagement activities, follow up on complaints, and monitor any concerns related to the Project. - Disseminate Project information, updates, and report the monitoring results to the community and the environmental audit committee. Give opportunities for community involvement in monitoring and evaluating the Project throughout the Project life cycle. - Promote community engagement activities and initiatives to foster positive relationships with the local community.

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
		decommissioning phases, including the end of the power plant's lifespan.	
Verbally/ Post meeting evaluation form	7. How does the Project plan for community engagement, particularly in terms of activities with the surrounding community? (Moo. 2 Assistant Village Headman) 8. In addition to the Project's electricity fund, what long-term measures/ assistance/ solutions will be implemented to address issues arising from the Project? (Anonymous)	- The company is committed to developing its business alongside the community's growth. This includes further enhancing clean energy production to minimize environmental impacts and consistently supporting community activities in the area. The Project is enthusiastic about participating sustainably within the community.	<u>Socio-economic and Public Participation Measures (Construction Period)</u> - Provide a coordination center or coordination channels to receive suggestions and complaints concerning any disturbances arising from the construction activities. - In cases where complaints from the public regarding impacts from the construction activities arise, the Project must promptly investigate and rectify the situation. - Establish an environmental audit committee involving the community to foster their participation in Project implementation, and community and environmental development. The committee should consist of representatives from local community organizations, educational institutions or academics in the area, and the Project owner company. The committee should have a significant proportion of members from the public sector, totaling at least half of the overall committee members. The structure, composition, number of members, responsibilities, term duration, meeting format, and frequency should be clearly defined. The committee's activities should be integrated into the Project management, with the committee having powers and duties including receiving complaints, and considering the implementation of Project measures. In this regard, the committee can continue to perform duties during the operational period as well. <u>Socio-economic and Public Participation Measures (Operation Period)</u> - Establish a complaint receiving plan that outlines the channels for receiving complaints, the steps and timelines for addressing and resolving complaints, responsible parties, and a clear organizational chart. In cases where the resolution is not completed, provide progress updates to the complainant every 7 days.
Feedback form /Post meeting evaluation form	9. If there are impacts from the Project, where can the community raise complaints, and how will these complaints be addressed?	- The Project has a plan and procedures for managing complaints. The community can directly raise complaints to the Project office during both the construction and operation phases, or communicate	<u>Socio-economic and Public Participation Measures (Construction Period)</u>

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
	(Doem Bang Nang Buat Agricultural Extension Office) 10. In case of concerns or complaints from residents in the area, the Project's responsible personnel must actively understand and resolve issues on-site. There should be staff available for continuous communication. (People of Nong Krathum Sub-district)	concerns through the Project's community relations team as indicated in the provided meeting documents. Complaints can also be raised through community leaders to the Project as an additional channel for addressing concerns.	- Provide coordination center or coordination channels to receive suggestions and complaints concerning any disturbances arising from the construction activities. - In cases where complaints from the public regarding impacts from the construction activities arise, the Project must promptly investigate and rectify the situation. - Establish an environmental audit committee involving the community to foster their participation in Project implementation, and community and environmental development. The committee should consist of representatives from local community organizations, educational institutions or academics in the area, and the Project owner company. The committee should have a significant proportion of members from the public sector, totaling at least half of the overall committee members. The structure, composition, number of members, responsibilities, term duration, meeting format, and frequency should be clearly defined. The committee's activities should be integrated into the Project management, with the committee having powers and duties including receiving complaints, and considering the implementation of Project measures. In this regard, the committee can continue to perform duties during the operational period as well. <u>Socio-economic and Public Participation Measures (Operation Period)</u> - Establish a complaint receiving plan that outlines the channels for receiving complaints, the steps and timelines for addressing and resolving complaints, responsible parties, and a clear organizational chart. In cases where the resolution is not completed, provide progress updates to the complainant every 7 days.
Feedback form	11. Is the community involved in monitoring and verifying the Project's progress? (Doem Bang Nang Buat Agricultural Extension Office)	- The community can actively participate in monitoring and verifying the Project's activities. This can be achieved by having representatives from the public sector engage in the Environmental Audit committee. This committee should be established and operational at least one month prior to the Project's commencement. The committee acts as a central point for communication, monitoring, verification,	<u>Socio-economic and Public Participation Measures (Construction Period)</u> - Establish an environmental audit committee involving the community to foster their participation in Project implementation, community and environmental development. The committee should consist of representatives from the local community organizations, educational institutions or academics in the area, and the Project's owner company. The committee should have a

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
		control, and any necessary actions to alleviate concerns and ensure accurate understanding.	significant proportion of members from the public sector, totaling at least half of the overall committee members. The structure, composition, number of members, responsibilities, term duration, meeting format, and frequency should be clearly defined. The committee's activities should be integrated into the Project management, with the committee having powers and duties including receiving complaints, and considering the implementation of Project measures. In this regard, the committee can continue to perform duties during the operational period as well. <u>Socio-economic and Public Participation Measures (Operation Period)</u> - Disseminate Project information, updates, and report the monitoring results to the community and the environmental audit committee. Give opportunities for community involvement in monitoring and evaluating the Project throughout the Project life cycle. - Establish an environmental audit committee involving the community to foster their participation in Project implementation, community and environmental development. The committee should consist of representatives from the local community organizations, educational institutions or academics in the area, and the Project's owner company. The committee should have a significant proportion of members from the public sector, totaling at least half of the overall committee members. The structure, composition, number of members, responsibilities, term duration, meeting format, and frequency should be clearly defined. The committee's activities should be integrated into the Project management, with the committee having powers and duties including receiving complaints, and considering the implementation of Project measures. In this regard, at the beginning of the operation phase, the committee can be the same as the construction phase.
Feedback form /Post meeting evaluation form	12. Representatives from the community and community leaders should be taken to visit other solar energy Projects to understand their impacts on the surrounding areas. (Anonymous)	- The Project requests consideration to proceed.	

Channels	Questions/Suggestions	Clarifications	Mitigation Measures
	13. It is essential to provide information to the community residing near the proposed solar power plant site about the potential impacts on the community and nearby crops due to the construction of the power plant. (People of Nong Makhamong Sub-district) 14. Regular quarterly public relations efforts should be conducted to ensure continuous and comprehensive understanding among the community members. This will facilitate ongoing communication and mutual comprehension. (People of Nong Makhamong Sub-district)		
Verbally	15. Is the budget to be allocated to the Power Development Fund during the operational period approximately 3 million baht per year? Will this budget be combined with the existing fund? (Moo.2 Assistant Village Headman)	- The budget allocated to the Power Development Fund will be at a rate of 50,000 Baht/megawatt/year and during operation at a rate of 1 Satang/unit of production/month. This budget will be combined with the existing fund in the area, which is the Electricity Development Fund of Suphan Buri Province 3.	
(6) Others			
Verbally	1. While having a Project can lead to impacts, it is requested that the impact on the community be minimized to the greatest extent. (Doem Bang Nang Buat Deputy District Chief)	- Measures as outlined will be specified in the Project's permit application, which will serve as stringent operational conditions. This includes adhering to strict reporting requirements to the permitting authority twice annually.	

2) Recommendations, Concerns, and Mitigation Measures from Post-meeting Evaluation Form

Based on post-meeting evaluation forms, a total of 232 respondents (90.0% of the attendees, 258 in total excluding Project owners and consultants) provided responses. The summarized results are as follows:

(a) General Information of Respondents

The respondents were predominantly female (62.9%), male (29.3%), and unspecified (7.8%). Most fell within the age group of 51-60 years (28.9%), followed by ages 41-50 (26.3%) and 31-40 (19.4%). Regarding education levels, the majority had completed primary education (53.4%), followed by high school (13.8%) and a bachelor's degree (10.8%). In terms of representation, most attendees were community/village representatives (88.4%), followed by government agency representatives (9.5%) and private sector representatives (1.3%).

(b) Awareness of Project-related Information of the Project

The majority of respondents (68.5%) indicated prior knowledge of the Project's information, while 31.5% learned about the Project for the first time. Most were informed by community leaders (54.9%), followed by company staff of Breeze and Shine Power Company Limited (14.6%) and local government agencies (13.6%). Details are shown in **Table 6.3.2.3-3** and **Figure 6.3.2.3-1**.

(c) Opinions on Benefits Expected from the Project

The majority of respondents (78.4%) highlighted with local job creation being the most mentioned benefit (21.8%), followed by enhancing power grid stability (21.3%) promoting clean energy use and reducing fuel imports (20.2%). Details can be found in **Table 6.3.2.3-4** and **Figure 6.3.2.3-2**.

Table 6.3.2.3-3
Awareness of Project-related Information of the Project

Informed by	Number of respondents	Percentage
- Community leaders (e.g. Village headman, Headman)	113	54.9
- Project personnels (Breeze and Shine Power Co., Ltd.)	30	14.6
- Government Agencies	28	13.6
- Relatives/Neighbors/Colleagues	27	13.1
- Brochure	4	1.9
- Others (e.g. from the public meeting)	4	1.9
Total	**206**	**100**

Remark: multiple answers allowed

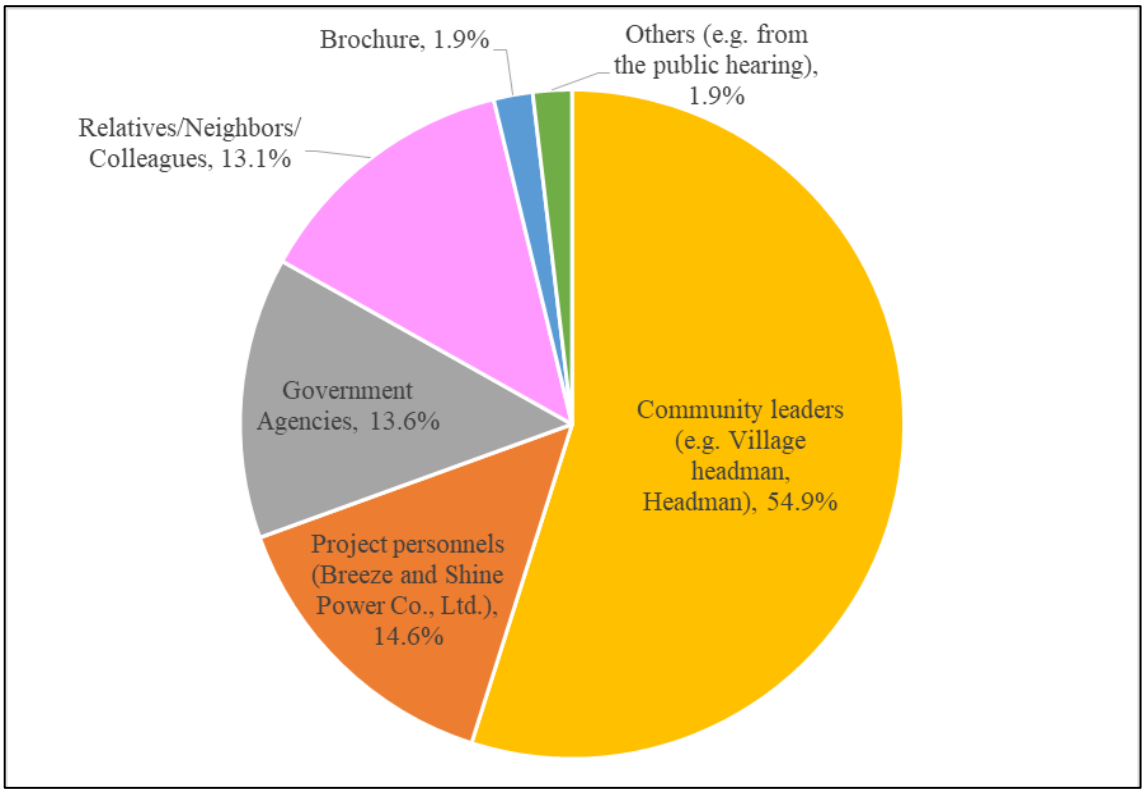


Figure 6.3.2.3-1 Awareness Ratio on Project-related Information from Various Channels

Table 6.3.2.3-4
Opinions on Expected from the Project

Detail	Number of respondents	Percentage
- Increase local employment	81	21.8
- Increase the stability of the electrical system.	79	21.3
- Promote clean energy and reduce fuel imports from foreign countries.	75	20.2
- Surrounding communities' benefit from the Power Development Fund.	53	14.3
- Help reduce global warming	36	9.7
- Being a provincial energy learning source	18	4.9
- Make the overall economy of the area growth	18	4.9
- Promote tourism in the area	11	2.9
Total	**371**	**100**

Remark: multiple answers allowed

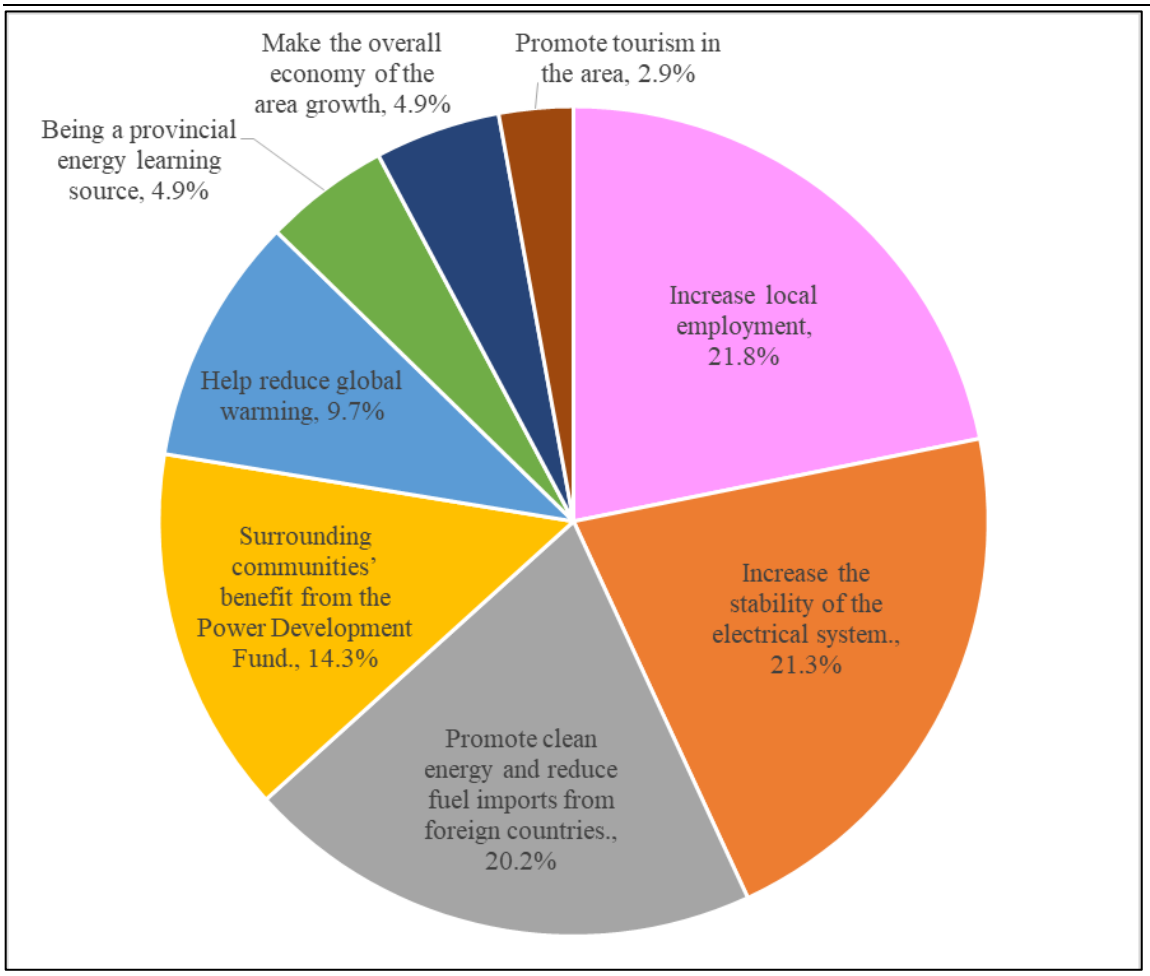


Figure 6.3.2.3-2 Opinions on Expected from the Project

(d) Concerns About Issues or Potential Impacts Arising from Project Development

The majority of respondents (68.1%) expressed no concerns regarding problems or potential impacts that may arise from Project development. Those who indicated concern (31.9%) had worries as follows:

a) Environmental Aspects

- Impacts on air pollution, heat, flooding, wastewater, noise, and odors
- Impacts related to climate change
- Damage or impact on plants near the power plant area
- Desire for surrounding tree planting around the Project site

b) Social Aspects

- Employment opportunities
- Travel disruptions for local residents during construction activities

c) Health and Safety Aspects

- Accidents and safety during transportation of construction equipment
- Visual impacts from reflected light
- Increased air temperature

d) Other Aspects

- Potential impact on agricultural areas near the vicinity

(e) Opinions on Environmental Study and Management Measures of the Project

The majority of respondents (56.0%) believed that the proposed measures were sufficient and comprehensive, while 44.0% felt that additional measures were needed. Those respondents primarily desired additional measures related to air quality (20.9%), followed by safety aspects (18.2%) and noise prevention (13.5%). Details are presented in **Table 6.3.2.3-5** and **Figure 6.3.2.3-3**.

Table 6.3.2.3-5
Aspects Required Additional Measures

Detail	Number of respondents	Percentage
- Ambient air quality	62	20.9
- Safety	54	18.2
- Noise level	40	13.5
- Wastewater management	37	12.5
- Power Development Fund	32	10.8
- Socio-economic and public participation	29	9.8
- Public utilities and resource utilization	22	7.4
- Solid waste and waste management	20	6.9
Total	**296**	**100**

Remark: multiple answers allowed

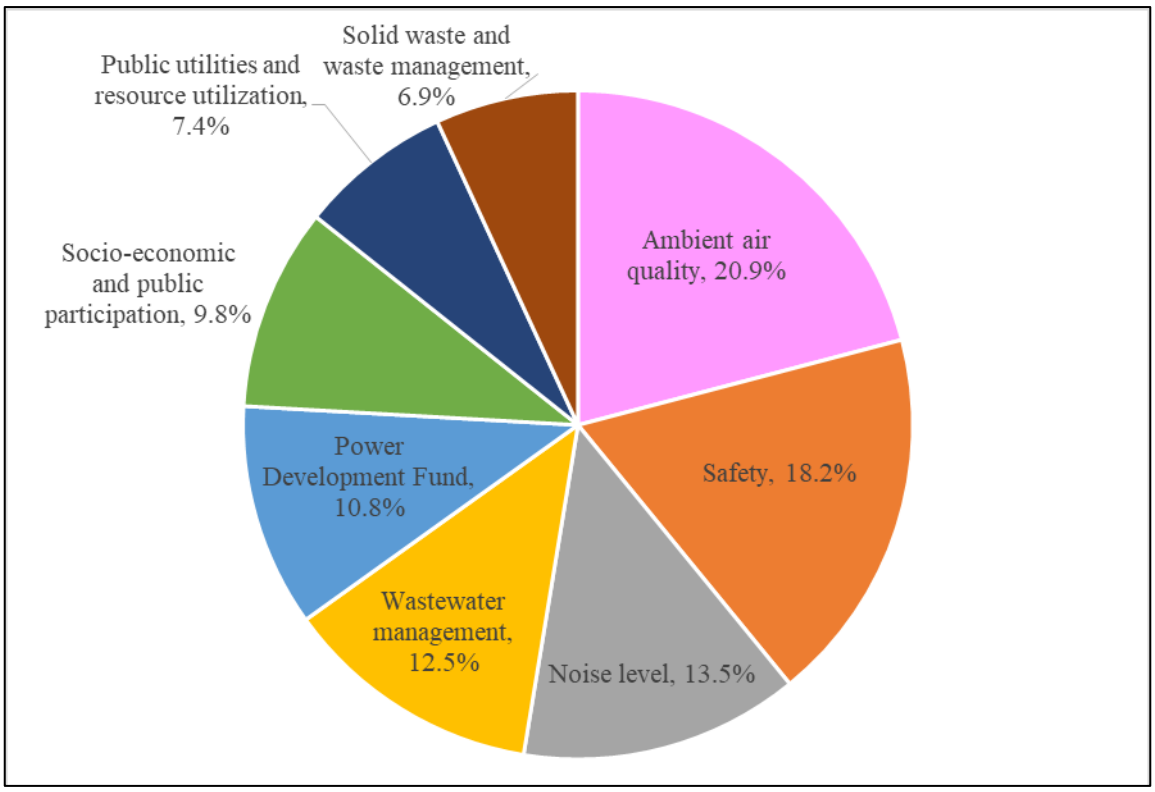


Figure 6.3.2.3-3 Aspects Required Additional Measures

3) Additional Comments after the Meeting/Forum Conclusion

The Project has collected continuously additional feedback for at least 15 Days (After the Conclusion of the Public Meeting) to gather additional feedback from relevant stakeholders, community leaders, and related organizations, the consulting company prepared documents and channels for expressing further opinions along with meeting materials. This was done to enable stakeholders to consider and provide additional feedback to the Project. Channels for feedback included telephone, postal mail (business reply mail), and email. The feedback period was open continuously from June 22nd, - July 6th, B.E. 2566 (2023). During this period, no additional feedback was received.

As for vulnerable groups, COT invited representatives from relevant authorities responsible for overseeing vulnerable groups, such as the Public Health Agency, Child Development Center, Office of Community Development, Women's Group, and Occupation Group. However, only representatives from the Women's Group and Occupation Group attended the public meeting. No concerns were raised by these representatives.

6.3.2.4 Dissemination of Summary Report on Public Meeting Results

The Project has carried out the preparation of a summary report on the public meeting results within 30 days from the meeting day. The report was disseminated by sending a letter along with the Project's summary report to relevant agencies and community leaders within a 3-kilometer radius of the Project area (**Appendix 6-10**). Additionally, the summary report was also disseminated at the community board and local government offices in the study area as mandated by the regulations of the Energy Regulatory Commission regarding public meeting procedures (**Figure 6.3.2.4-1**). This process was conducted between July 11-13, B.E. 2566 (2023), and the dissemination was carried out continuously for at least 15 days from July 14-29, B.E. 2566 (2023).

The summary report was also disseminated to the relevant agencies responsible for vulnerable groups, the same groups that were invited. No concerns or issues were raised by these groups either.

6.3.2.5 Providing Opportunity for the Public and Stakeholders to Express Opinions to the Summary Report

After the dissemination of the summary report on the public meeting results to the public and stakeholders through various channels, an opportunity was given to express opinions to the report within 30 days from the date of dissemination, from July 14 to August 13, B.E. 2566 (2023), totaling 31 days. This was done through various channels, including:

Postal Mail: Consultants of Technology Co., Ltd. (COT)
39 Ladprao 124 Lane, Ladprao Road, Plubpla, Wang Thonglang, Bangkok, 10310
Phone: 02-934 3233 ext. 517 or 088-3093994
Email: akarux.cot@gmail.com
Line ID: 088-3093994
Online Comment Form: https://shorturl.at/fxyHY

During the specified period, no opinions to the summary report were received.

	
Construction area	Office of Energy Regulatory Commission, Regional Office 9 (Kanchanaburi)
	
Suphanburi Provincial Industry Office	Doem Bang Nang Buat District Office
	
Dan Chang District Office	Nong Krathum Sub-district Municipality
	
Ban Nong Hin School	Wat Nong Hin

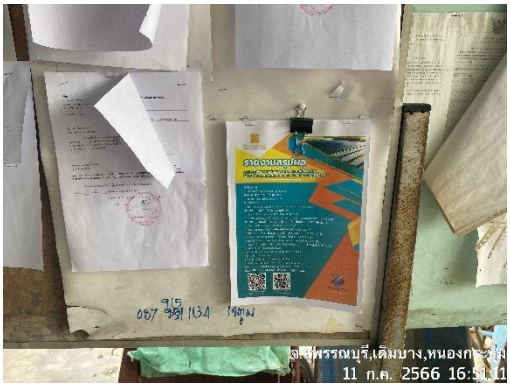
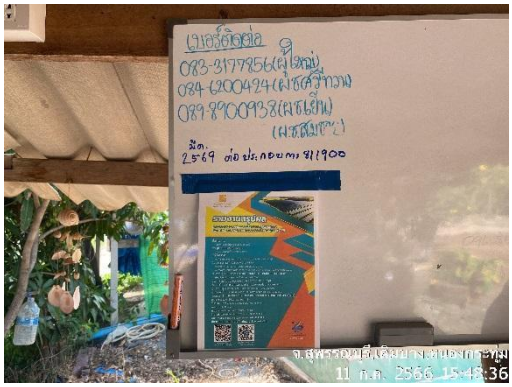
	
Nong Krathum Sub-district, Village Headman's Office	Moo 6 Ban Nong Na, Headman's Office
	
Moo 8 Ban Nong Hin, Multipurpose Hall	Moo 3 Ban Nong Chanuan, Headman's Office

Figure 6.3.2.4-1 Dissemination of the Summary Report in Public Places and Community Areas

6.3.2.6 Additional Activities After the Public Meeting

(1) Improvement of Project Details

After completing the public meeting event, the Project has undertaken modification in its Project details. Changes include making the Project design clearer, which involves modifying the size of the rainwater retention pond from the initial size of 600 cubic meters to 700 cubic meters. Additionally, specific equipment details, which were previously integrated into the solar panel installation set of the Project, have been added. This includes 48 units of 3.437 MVA transformer and 21 units of Power Conversion Systems (PCS). These modifications do not affect power generation capacity and environmental impacts. Furthermore, environmental impact prevention and mitigation measures, and environmental impact monitoring measures of the Project are consistent with the proposals presented during the public meeting. These changes of the Project details do not impact the ongoing environmental impact assessment study, as described in the Code of Practice (CoP) report, which has already been carried out. Detailed information is provided in **Table 6.3.2.6-1**.

Table 6.3.2.6-1
Project Details Modification

Description	Previous Details	Details after Modification
1. Size of rainwater retention pond (Designed to be able to adequately withstand rainwater in a period of 3 hours.)	600 cubic meters Adequate support	700 cubic meters Adequate support
2. Installation of electrical equipment 2.1 3.437 MVA transformer	not listed in the report. It is a component included in the solar panel.	48
2.2 PCS		21

(2) Dissemination of Project Description for Public Meeting (Additional)

The Project has further disseminated documents to gather feedback from the public and stakeholders. This was achieved by sending letters along with documents to receive feedbacks from the stakeholders (**Appendix 6-11**). Additionally, the Project has disseminated information about the changes in Project details on notification boards at government agencies and community areas in the study area, as required by the Energy Regulatory Commission's regulations on public participation. Moreover, the Project has publicized materials for public relations concerning changes in Project details, and this was done from August 3 to 4, B.E. 2566 (2023). Furthermore, an opportunity was provided for affected stakeholders to inquire and provide additional comments from August 5 to 20,

B.E. 2566 (2023). This was facilitated through various channels, including phone calls, emails, and QR code, spanning a period of 16 days. After the specified period, it was observed that no additional comments were received regarding the aforementioned changes in Project details.

6.4 CONSULTATION IN REGARDING TO TRANSMISSION LINE

6.4.1 Description of Consultation

PEA is the government authority with the mandate to plan, construct and operate transmission lines (TL), which may traverse private or public land. In the case of this project, the TL will be in the Right of Way (RoW) on existing public roads, some of which are under the jurisdiction of the Department of Highways, Therefore, PEA seeks approval from the Department and represents the Project in all matters related to the TL, including leading all stakeholder engagement activities. PEA has corporate stakeholder engagement plans (SEP), If the Project receives complaints related to the contractor for the TL, the Project will coordinate with PEA to ensure resolution. The following sets out the TL-related stakeholder engagement to date.

On Thursday 23rd, November B.E. 2566 (2023), the Project's Community Relations (CR) officers, who are in charge of stakeholder engagement, met with representatives of the local communities, namely, the sub-district mayor, assistant sub-district headman, and village headman (as shown in **Table 6.4.1-1** and **Appendix 6-12**, brochure of transmission line), referring to their engagement plan to provide information about the Project's transmission line (TL) (route, construction plan, and responsible authority) that was not presented in the public consultation. This occurred at the time because PEA is the competent authority for TL construction, the Project's CR officers were not mandated to communicated TL information to local residents along the TL route. It is entirely the duty of PEA.

Table 6.4.1-1

Summary of Consultation in Regarding to Transmission Line

on Thursday 23rd, November B.E. 2566 (2023)

Meet with	Information provided	Question/Suggestion
Nong Krathum Sub-district Mayor 	Who is responsible for overseeing and managing the construction of transmission line? What impacts will the construction cause on the local community, and what are the solutions?	The construction of the transmission line is under PEA responsibility, which is an experienced organization with stringent safety measures. During construction, there may be traffic at certain times, such as when moving equipment. To ensure safety, traffic officers will be present, and signs or warnings will be displayed to reduce the risk of accidents. Before commencing each phase of the construction, community relations officers will be present on-site to provide information to community leaders and residents, ensuring clear and widespread understanding. In the event of any impact during construction, community relations officers will serve as coordinators to address and resolve issues.
Moo. 8 Village Headman 	The village headman provided information that in the vicinity of the route, there are several animal farms that rely on electricity. Will be power interruptions during construction? If so, what measures will be taken to minimize the impact?	Community relations officers informed the community that the PEA, as the responsible organization for construction, has plans and management strategies to minimize adverse effects. In cases where power needs to be temporarily cut, public announcements will be made to inform the community in advance for preparedness. If there is a risk of adverse effects, additional measures, such as providing alternative power sources, may be implemented after evaluation. All efforts will be made to minimize impacts on the community.
Moo. 3 Village Headman 	Propose to install lighting along the transmission line construction area and emphasize the need to avoid heavy vehicle traffic on community roads as they cannot withstand the weight of heavy vehicles.	Community relations officers acknowledged and recorded suggestions for continuous improvement.

Meet with	Information provided	Question/Suggestion
Moo. 1 Village Headman 	The installation of transmission lines may have an impact on local residents who cultivate crops along the road. How will assistance be provided?	Community relations officers informed that PEA will coordinate and negotiate to mitigate impacts, such as ensuring a smooth harvest or negotiating compensation based on humanitarian principles.
Assistant Nong Krathum Sub-district Headman 	Which organization is responsible for the construction, and where will the transmission lines be located?	Community relations officers described that PEA is responsible for constructing transmission line, the lines will be on both sides of the road. Before each construction phase, community relations officers will coordinate to provide additional details to the community leaders for continuous communication.

6.4.2 Further Engagement

There is a need to continue consultation activities further during the project implementation phase. For this purpose, the Project Stakeholder Engagement Plan will be developed, to ensure appropriate communication and engagement activities with the parties affected by the TL. Some of the key content of consultation related to the TL is to:

(1) Inform the stakeholders about site clearance prior to civil works (in preconstruction phase).

(2) Inform the stakeholders about tentative project schedule for project works.

(3) Inform stakeholders about the Project Grievance Redress Mechanism and ensure contacts for Project and PEA CR officers are known.

If the Project receives complaints related to the contractor for the TL, the Project will coordinate with PEA to ensure resolution. As PEA and the Project have separate, but similar, Grievance Redress Mechanisms (GRMs), the Project will also ensure close coordination with PEA. The Project will record complaints and issues in grievance log.

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CHAPTER 7

EXTERNAL COMMUNICATIONS AND GRIEVANCE MECHANISM

CHAPTER 7
EXTERNAL COMMUNICATIONS AND GRIEVANCE MECHANISM

7.1 EXTERNAL COMMUNICATIONS

The Project acknowledges the potential for individuals to raise their concern regarding the execution of the Project. As part of its obligations, the Project assumes the responsibility of disseminating information, offering solutions, and providing responses to the local communities.

(1) Information Disclosure

As part of the Project's external communication, information will be disseminated to stakeholders from the beginning of the Project and will continue to be disseminated throughout the Project's construction and operation. The following information is provided:

1) Key Project information,
2) Key Project impacts and corresponding mitigation measures and monitoring program,
3) Participation of the local stakeholders in the implementation and monitoring program and measures,
4) Project’s progress, and Project’s activities
5) Implementation of mitigation measures and monitoring programs.

(2) Process of External Communication

External communication involves the disclosure of project information to stakeholders while also allowing for feedback. To facilitate this, the information will be disclosed in the local language and made easily accessible to stakeholders by posting it at suitable and convenient locations in the community. The list of the mitigation measures related to the external communication are proposed as follows:

1) Construction Phase

- Publicize and disseminate information related to the construction plan by placing announcement in the Project's location or other suitable channels, at least 7 days in advance, to inform the public and stakeholders about the upcoming construction activities.

- Assign Project personnel to visit communities regularly throughout the construction period to inquire about and listen to feedbacks from the nearby communities regarding environmental and social impacts occurring from the Project's construction activities to identify potential mitigation measures.
- Provide channels to receive suggestions and complaints concerning any disturbances arising from the construction activities.
- When the public complains about the effects of construction activities, the Project must investigate and correct the situation as soon as possible.
- Establish an environmental audit committee, one month prior to the commencement of construction, involving the community to foster their participation in Project implementation, and community and environmental development. The committee should consist of representatives from local community organizations, educational institutions or academics in the area, and the Project owner company. The committee should have a significant proportion of members from the public sector, totaling at least half of the overall committee members. The structure, composition, number of members, responsibilities, term duration, meeting format, and frequency should be clearly defined. The committee's activities should be integrated into the Project management, with the committee having powers and duties including receiving complaints, and considering the implementation of Project measures. In this regard, the committee can continue to perform duties during the operational period as well.

2) Operation Phase

- Offer opportunities for the community to visit the Project in order to alleviate concerns.
- Establish a complaint receiving plan that outlines the channels for receiving complaints, the steps and timelines for addressing and resolving complaints, Responsibility, and a clear organizational chart. In cases where the resolution is not completed, provide progress updates to the complainant every 7 days.
- Assign a community relations representative to participate in various community engagement activities, follow up on complaints, and monitor any concerns related to the Project.

- Disseminate Project information, updates, and report the monitoring results to the community and the environmental impact audit committee. Give opportunities for community involvement in monitoring and evaluating the Project throughout the Project life cycle.
- Promote community engagement activities and initiatives to foster positive relationships with the local community.
- Establish an environmental audit committee involving the community to foster their participation in Project implementation, and community and environmental development. The committee should consist of representatives from local community organizations, educational institutions or academics in the area, and the Project owner company. The committee should have a significant proportion of members from the public sector, totaling at least half of the overall committee members. The structure, composition, number of members, responsibilities, term duration, meeting format, and frequency should be clearly defined. The committee's activities should be integrated into the Project management, with the committee having powers and duties including receiving complaints, and considering the implementation of Project measures. In this regard, at the beginning of the operation phase, the committee can be the same as the construction phase.
- If it can be proven that damages have occurred due to Project operation, the environmental impact audit committee has authority to consider compensation for the incurred damages.

If the Project receives complaints related to the contractor for the transmission line, the project will coordinate with PEA to ensure resolution. As PEA and the Project have separate, but similar, GRMs, the Project will also ensure close coordination with PEA to report to lenders on any and all reported grievances, the extent possible.

7.2 GRIEVANCE MECHANISM

7.2.1 Internal Grievance Mechanism

(1) Employee

If an employee wishes to raise a grievance regarding any abuse within the company, there are channels for lodging complaints as follows:

1) Email: ac@gulf.co.th or id@gulf.co.th or ia@gulf.co.th

2) Letter: To Chairman of the Audit Committee
M.Thai Tower 11th floor, All Seasons Place, Wireless Road, Lumpini, Pathumwan Bangkok 10330
3) Report to the supervisor or internal audit department
4) Phone: 02-0804500

For anonymous complaints, the complainant should raise issues via a phone call. After receiving the issue, the following steps for resolution as shown in **Figure 7.2.1-1**.

In the event that an employee is subjected to disciplinary sanctions or is issued an unjust order of termination, employee possesses the right to file a grievance against the supervisory authority by submitting a written document within 7-day timeframe to the Human Resources department. Subsequently, the Human Resources department shall present the document to the supervisory authority for consideration of the grievance within 15-day period starting from the date of submission. In the event that the employee disagrees with the outcome of the evaluation, they are entitled to submit a second grievance within 7-day timeframe.

(2) Supplier and Contractor

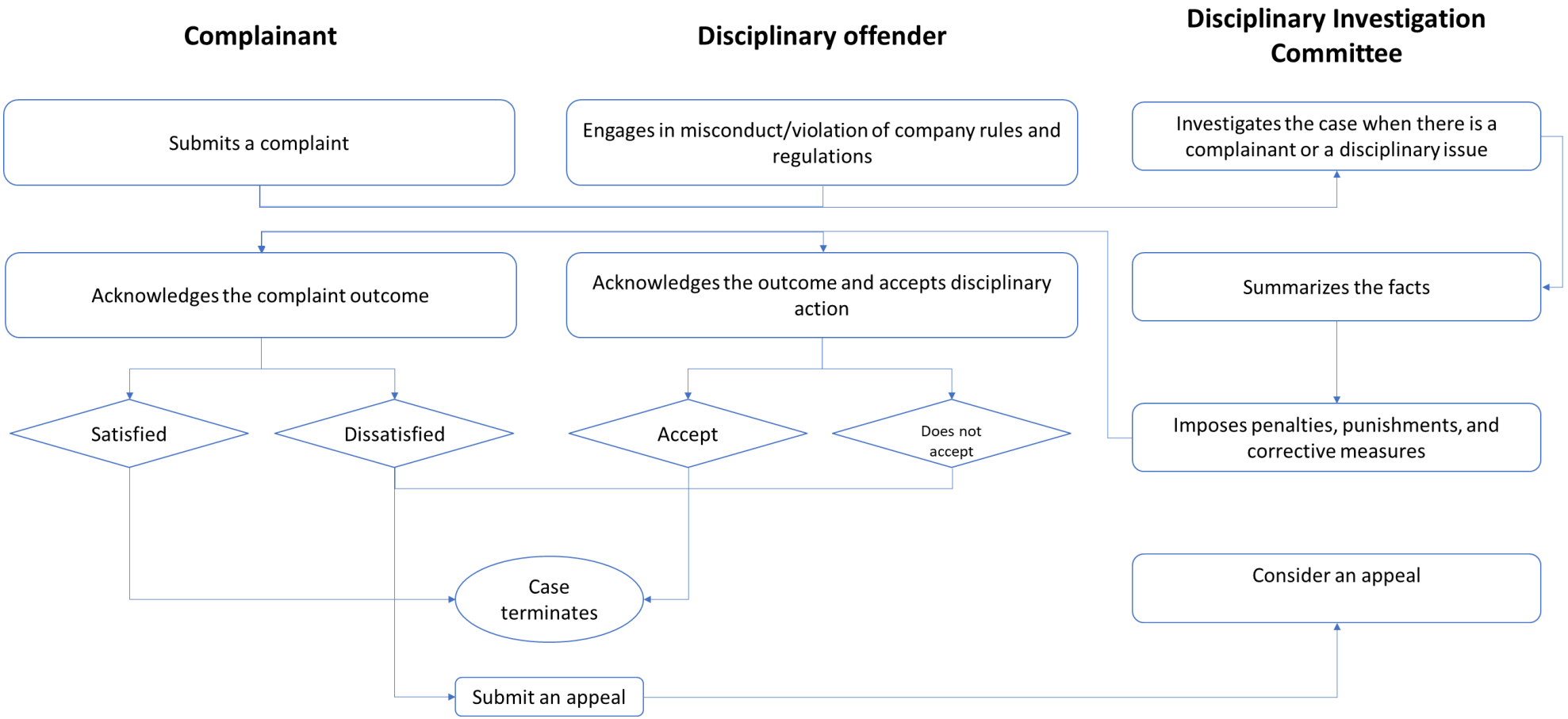
The company's grievance processes do not apply to suppliers. However, the corporation has a supplier code of conduct that states that suppliers must provide a grievance process for any incidents to be reported and investigated.

7.2.2 External Grievance Mechanism

In order to effectively address such circumstances, the Project has established an initial grievance mechanism, which will be made available to relevant stakeholders. The Project is committed to enhancing and upholding a grievance mechanism that is characterized by transparency, gender inclusivity, cultural appropriateness, ease of access, and lack of financial burden for complainants.

(1) Introduction

Project development may incur impacts to surrounding communities of the Project area, from the construction phase through operation phase. In order to mitigate these impacts and alleviate concerns expressed by the neighboring communities proximate to the Project, grievance mechanism is to be provided. Consequently, mechanism for grievance redressal is established to rectify the potential consequences arising from Project development for both construction and operation phases. Additionally, receptivity is demonstrated towards recommendations and feedback from all pertinent stakeholders.



Remark: **Component of Disciplinary Investigation Committee**

1. Committee Chair (Appointed or empowered by the company)
2. Committee Members (Representative from HR Department, Head of the Department, Legal Representative, Internal Audit Representative, Secretary of the Committee appointed by the Committee Chair)

Figure 7.2.1-1 Internal Grievance Mechanism

(2) Objectives

According a communication channel to receive complaints and address issues that may arise from Project development, the Project defines a clear operational mechanism to facilitate the reception of grievances. The mechanism aims to identify, rectify, mitigate, and monitor potential problems, ensuring the Project's harmonious coexistence within the community while minimizing adverse impacts. Additionally, the mechanism serves as an effective channel to receive suggestions that can benefit the Project's development.

(3) Scope of Implementation

The implementation comprises of complaints receiving, managing grievances, and considering suggestions from complainants and proposers. This pertains to the surrounding communities, governmental entities, private organizations, and the general public, all of whom are affected by Project operation and dissatisfied with certain aspects of the Project's implementation.

(4) Grievance Mechanism

The Project developer establishes the "Center for Receiving Complaints and Suggestions " and delegates responsibility for promoting the Project and listening to comments, recommendations, and complaints about the Project. People can send information or complaints by a variety of channels, including verbal communication, telephone, written form, line, letter, e-mail, or the project's officers. The project manager, who is appointed to oversee the project's development at each stage, will thereafter be in charge of managing the resolution of complaints. The grievance redress mechanism is shown in **Figure 7.2.2-1**.

1) In case of reporting through verbal communication, telephone or community relations officers, an officer will be assigned to prepare and fill in the complaint form (**Figure 7.2.2-2**) and send the complaint to the person assigned by the company.

2) If the complaint is received via mail, email, or in person, an officer will be assigned to send the complaint to the person assigned by the company, along with the complaint form.

3) When a complainant files through various channels to the project, the responsible officer will receive and inspect the initial cause. The officer will categorize the nature of complaint and try to confirm if it is caused by the project. Main categorization of complaints include:

- Complaints about environmental impact
- Complaints about the damage or nuisance
- Complaints about health and safety incident
- Complaints about workforce or employee behavior
- Request for the support, donation, or information

4) If it is found that the problem may be caused by the project, the responsible officer will notify to the relevant section manager. Inform the complainant within 48 hours that they have received the complaint and have sent it to the project manager. If the Project receives complaints related to the contractor for the transmission line, the project will coordinate with PEA to ensure resolution. As PEA and the Project have separate, but similar, GRMs, the Project will also ensure close coordination with PEA to report to lenders on any and all reported grievances, the extent possible.

5) The project manager will arrange a meeting to identify the cause, determine a solution and prevention plan, and assign a person responsible for solving the problem. They must report progress on the problem-solving plan to the complainant every 7 days or as agreed upon until the problem has been resolved.

6) When a complaint has been successfully resolved, the project will provide an explanation of how it was resolved and inform the complainant and relevant parties. The complainant must sign to acknowledge that they have received and accepted the project's resolution of the problem.

7) If the problem cannot be solved and it is proved that the problem was caused by project operation, a fair remedy must be provided to all stakeholders. The ad hoc working group comprised of representatives from 5 parties which are complainants, community leaders, environmental impact monitoring committees, representative from the Office of Energy Regulatory Commission Region 4 (Khon Kaen), and the project manager or the assigned person will be established.

8) Arrange the meeting of the working group to summarize the results and collect complaint and suggestions forms and solutions. These documents will be kept as record to support the preparation of a monitoring report according to the CoP Monitor which must be submitted to the Office of the Energy Regulatory Commission (ERC) and report to the Environmental Impact Monitoring Committee in annual meeting or by notification letter.

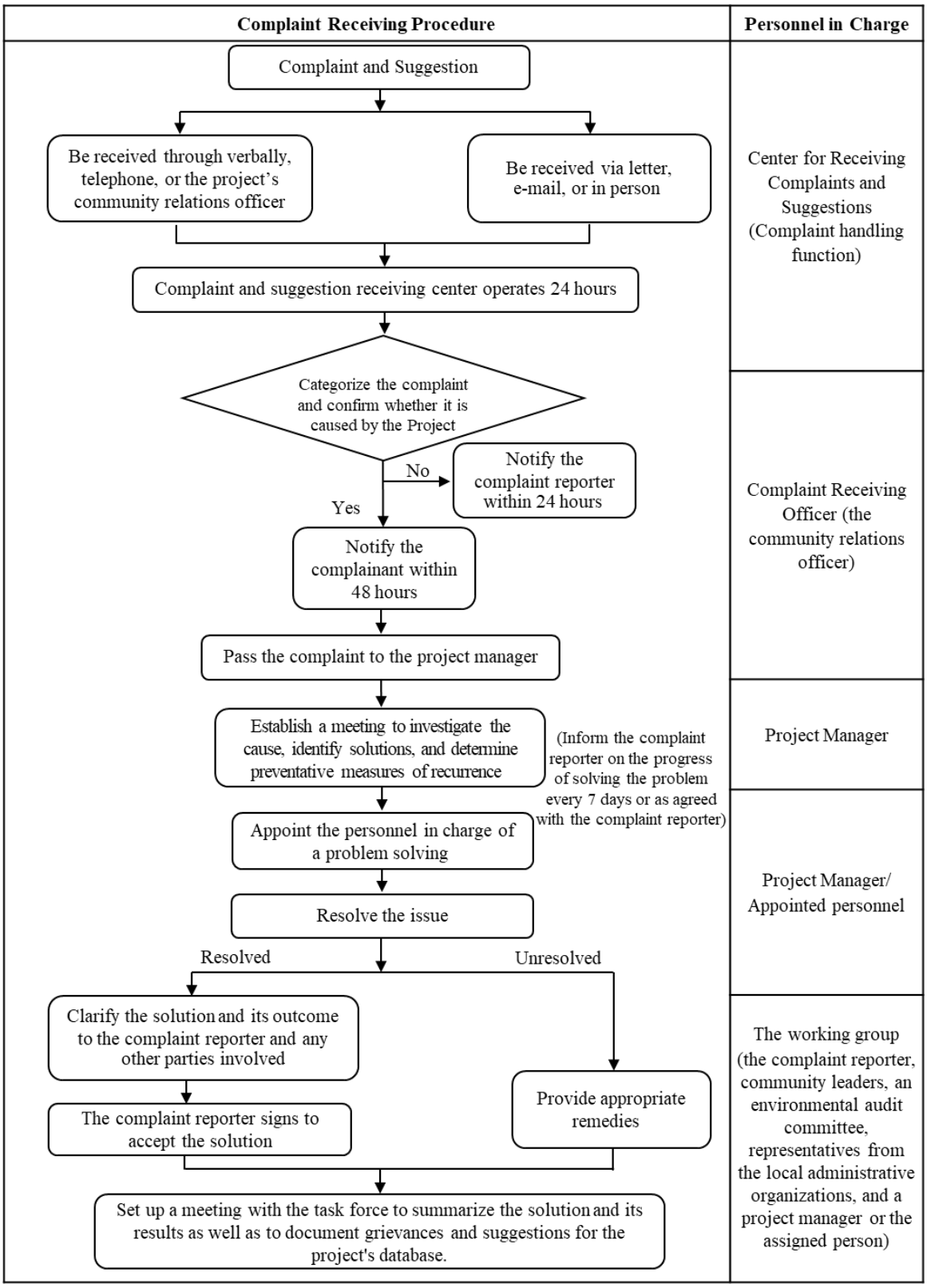


Figure 7.2.2-1 Grievance Mechanism (External)

Reference No: .....

□□ - □□□ / □□

Receiving Complaints and Suggestions Form

Details

☐	Complaint	☐	Suggestion
☐	Complaint Follow-up	☐	Others (.....)

Channels of complaint

☐	Personal notification	☐	Verbal communication
☐	Telephone	☐	Project's officer
☐	Electronic mail	☐	Others (.....)

Topics of complaint/suggestion

☐	Environment	☐	Socio-economic
☐	Occupational health and safety	☐	Damage or Nuisance
☐	Request for Donation/Support	☐	Request for Information
☐	Workforce or Employee Behavior	☐	Others (.....)

Location ..... Date .....

Moo. ..... Sub-district ..... District ..... Province .....

Complainant information

Name .....

Occupation .....

Address .....

Phone .....

Complaints/Suggestions

Details	Suggestion/Corrective Action

Signature .....

Complainant *

(* sign when inspection of the area with the Project's officers)

Figure 7.2.2-2 Sample of Project Complaints Recording Form

For Project's officer

Finding .....

.....

.....

.....

Preliminary cause of impact (Construction phase)

- ☐ Fail to adhere to environmental impact prevention and mitigation measures
- ☐ Non-compliance with regulations, requirements, and contracts by contractors
- ☐ Delays in Project execution
- ☐ Inadequate or improper work execution
- ☐ Discrepancies or deviations from the completed work agreement
- ☐ Other (.....)

Preliminary cause of impact (Operation phase)

- ☐ Fail to adhere to environmental impact prevention and mitigation measures
- ☐ Other (.....)
- ☐ Other (.....)

Topics of complaint/suggestion

- ☐ Environment
- ☐ Occupational health and safety
- ☐ Socio-economic
- ☐ Damage or Nuisance
- ☐ Request for Donation/Support
- ☐ Request for Information
- ☐ Workforce or Employee Behavior
- ☐ Other (.....)

Signature .....

Complaint recipient

(...../...../.....)

Figure 7.2.2-2 (continue)

MINUTE OF THE MEETING

(Meetings to identify causes and prevention)

Cause .....

.....

.....

Prevention .....

.....

.....

(Note: Attach meeting documents (if any))

Opinion / Command .....

.....

.....

Signature .....

Company Representative

(...../...../.....)

Correction result .....

.....

.....

Signature.....

Operator

(...../...../.....)

The complaint has been successfully resolved.

Signature ..... Signature.....

The reviewing personnel acknowledge and record the complaint. Complainant

(...../...../.....) (...../...../.....)

Signature.....

Company Representative

(...../...../.....)

Figure 7.2.2-2 (continue)

(5) Center for Receiving Complaints and Suggestions (Complaint handling function)

Breeze and Shine Power Company Limited's Project requires the establishment of a center for receiving complaints and suggestions, as follows:

- Local governing authorities (during construction phase)
- Community's office (during construction phase)
- Project office (during construction and operation phases).

7.3 COMPLAINTS CHANNELS IN REGARDING TO TRANSMISSION LINE

Apart from the project's grievance mechanism that was discussed above, people can also raise their concern regarding to the transmission line (for both construction and operation phases) through the following channels of PEA;

- Website: https://complaint.pea.co.th/addnew-stakeholders-complaint.
- Hotline: 1129
- Complaints via electricity billing officers or local electricity office

If the Project receives complaints related to the contractor for the TL, the Project will coordinate with PEA to ensure resolution. As PEA and the Project have separate, but similar, Grievance Redress Mechanisms (GRMs), the Project will also ensure close coordination with PEA. The Project will record complaints and issues in grievance log.

7.4 GRIEVANCE MONITORING

The Project shall record complaints and issues from the community regarding the Project implementation, including the methods and timeframe for addressing complaints and issues. The Project shall provide monthly summary of grievances in a grievance log **(Table 7.4-1)**.

Table 7.4-1

Example of Grievance Log

Monthly Summary Record of Complaint Receipt				
Month/Year:		**Project Name**:		
Date of Complaint	Issues	Date of Correction	Result of Correction	Remark

****

APPENDIX

Appendix 1-1	Project's land title deed
Appendix 1-2	Land use inspection letter
Appendix 2-1	Details of the design and installation of solar panel systems
Appendix 2-2	Single line diagram
Appendix 2-3	PV modules specification
Appendix 2-4	Inverters specification
Appendix 2-5	Transformer specification
Appendix 2-6	BESS specification
Appendix 2-7	Cabling specification
Appendix 2-8	A letter confirming the ability to provide water services
Appendix 2-9	Design calculations for rainwater retention pond
Appendix 3-1	Results of environmental sampling (Dry Season)
Appendix 3-2	Results of environmental sampling (Rainy Season)
Appendix 3-3	Lab Certificate and Equipment Calibration
Appendix 4-1	Process of Human Rights Impact Assessment
Appendix 6-1	Invitation letter for pre-engagement meeting
Appendix 6-2	Letter to disseminating documents for pre-engagement meeting
Appendix 6-3	Brochure for pre-engagement meeting
Appendix 6-4	Presentation for pre-engagement meeting
Appendix 6-5	Letter to disseminating meeting summary report (pre-engagement meeting)
Appendix 6-6	Invitation letter for public meeting
Appendix 6-7	Letter to disseminating documents for public meeting
Appendix 6-8	Brochure for public meeting
Appendix 6-9	Presentation for public meeting
Appendix 6-10	Letter to disseminating meeting summary report (public meeting)

Appendix 6-11 Additional activities after public meeting
Appendix 6-12 Brochure for consultation in regarding to transmission line

Appendix 1-1

Project's land title deed

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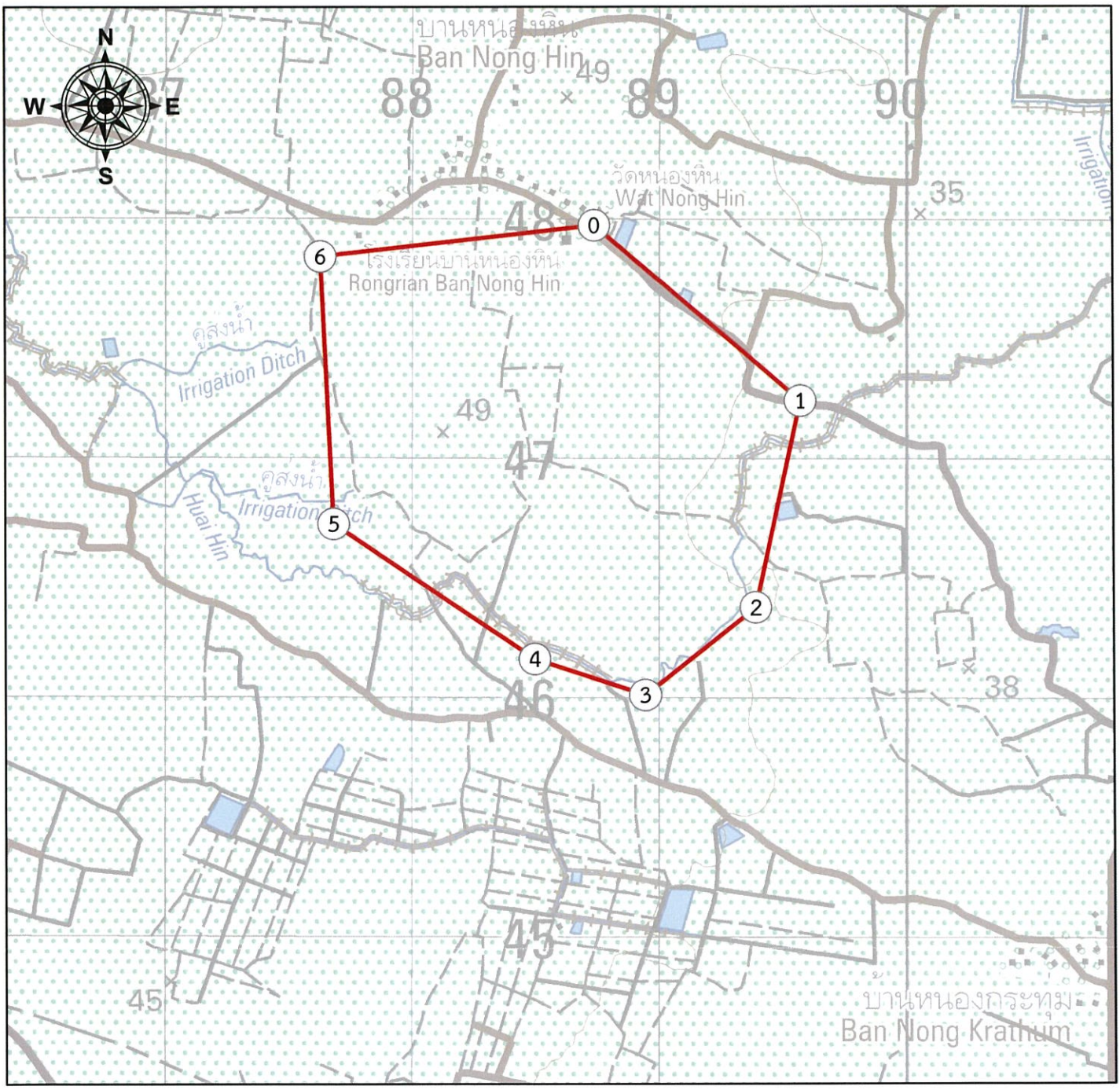
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Appendix 1-2

Land use inspection letter

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แผนที่สังเขปมาตราส่วน 1 : 25,000
แสดงบริเวณพื้นที่โครงการพลังงานไฟฟ้าด้วยแสงอาทิตย์บนพื้นดิน ตั้งอยู่ในตำบลหนองกระทุ่ม อำเภอเดิมนางบวช จังหวัดสุพรรณบุรี

สัญลักษณ์

เส้นแสดงขอบเขตพื้นที่โครงการโดยสังเขป

จุดพิกัด

ตารางแสดงจุดพิกัดอ้างอิง		
จุดพิกัด	ละติจูด	ลองติจูด
0	14.9048989	99.8249959
1	14.8982604	99.8327456
2	14.8904528	99.8310449
3	14.8871481	99.8268995
4	14.8885202	99.8227348
5	14.8936319	99.8151591
6	14.9037297	99.8146663
7	14.9048989	99.8249959



ที่ มท ๐๗๑๑.๘/๑๐๖๔

สำนักผังประเทศและผังภาค
กรมโยธาธิการและผังเมือง
ถนนพระราม ๙ กทม. ๑๐๓๑๐

๕ สิงหาคม ๒๕๖๕

เรื่อง แจ้งผลการตรวจสอบการใช้ประโยชน์ที่ดินโครงการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ จังหวัดสุพรรณบุรี

เรียน นายทศพล เจิ่งมโนธรรม กรรมการ บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด

อ้างถึง หนังสือบริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด ที่ BSP O ๐๗๒๒/๐๐๑ ลงวันที่ ๑๕ กรกฎาคม ๒๕๖๕

สิ่งที่ส่งมาด้วย ๑. บริเวณที่ตั้งโครงการฯ ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี จำนวน ๑ แผ่น
๒. ข้อกำหนดการใช้ประโยชน์ที่ดินกฎกระทรวงให้ใช้บังคับผังเมืองรวม จังหวัดสุพรรณบุรี พ.ศ. ๒๕๖๐ จำนวน ๙ แผ่น

ตามหนังสือที่อ้างถึง บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด ขอความอนุเคราะห์ตรวจสอบการใช้ประโยชน์ที่ดินโครงการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดิน โรงงานลำดับที่ ๘๘ (๑) ในพื้นที่ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี เพื่อจำหน่ายไฟฟ้าให้กับภาครัฐตามแผนการรับซื้อไฟฟ้าจากพลังงานหมุนเวียนสำหรับปี ๒๕๖๕ - ๒๕๗๓ ว่าสามารถดำเนินการได้โดยไม่ขัดต่อกฎหมายว่าด้วยการผังเมือง นั้น

สำนักผังประเทศและผังภาคได้ตรวจสอบแล้ว ขอเรียนว่า ที่ตั้งโครงการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี อยู่ในเขตผังเมืองรวมจังหวัดสุพรรณบุรี ตามกฎกระทรวงให้ใช้บังคับผังเมืองรวมจังหวัดสุพรรณบุรี พ.ศ. ๒๕๖๐ บริเวณหมายเลข ๓.๑ กำหนดการใช้ประโยชน์ที่ดินเป็นที่ดินประเภทชนบทและเกษตรกรรม (สีเขียว) ให้ใช้ประโยชน์ที่ดินเพื่อเกษตรกรรมหรือเกี่ยวข้องกับเกษตรกรรม การอยู่อาศัย สถาบันการศึกษา สถาบันศาสนา สถาบันราชการ และการสาธารณูปโภคและสาธารณูปการ สำหรับการใช้ประโยชน์ที่ดินเพื่อกิจการอื่น ให้ดำเนินการหรือประกอบกิจการได้ในอาคารที่ไม่ใช่อาคารสูงหรืออาคารขนาดใหญ่ และในบัญชีกำหนดประเภท ชนิด และจำพวกของโรงงานที่ห้ามประกอบกิจการในท้ายกฎกระทรวงให้ใช้บังคับผังเมืองรวมจังหวัดสุพรรณบุรี พ.ศ. ๒๕๖๐ ไม่ห้ามโรงงานลำดับที่ ๘๘ (๑) โรงงานผลิตพลังงานไฟฟ้าจากพลังงานแสงอาทิตย์ ยกเว้นที่ติดตั้งบนหลังคา ดาดฟ้า หรือส่วนหนึ่งส่วนใดบนอาคารซึ่งบุคคลอาจเข้าอยู่หรือใช้สอยได้ โดยมีขนาดกำลังการผลิตติดตั้งสูงสุดรวมกันของแผงเซลล์แสงอาทิตย์ไม่เกิน ๑,๐๐๐ กิโลวัตต์ ทั้งนี้ จะต้องปฏิบัติให้เป็นไปตามกฎหมายอื่นที่เกี่ยวข้องด้วย

จึงเรียนมาเพื่อทราบ

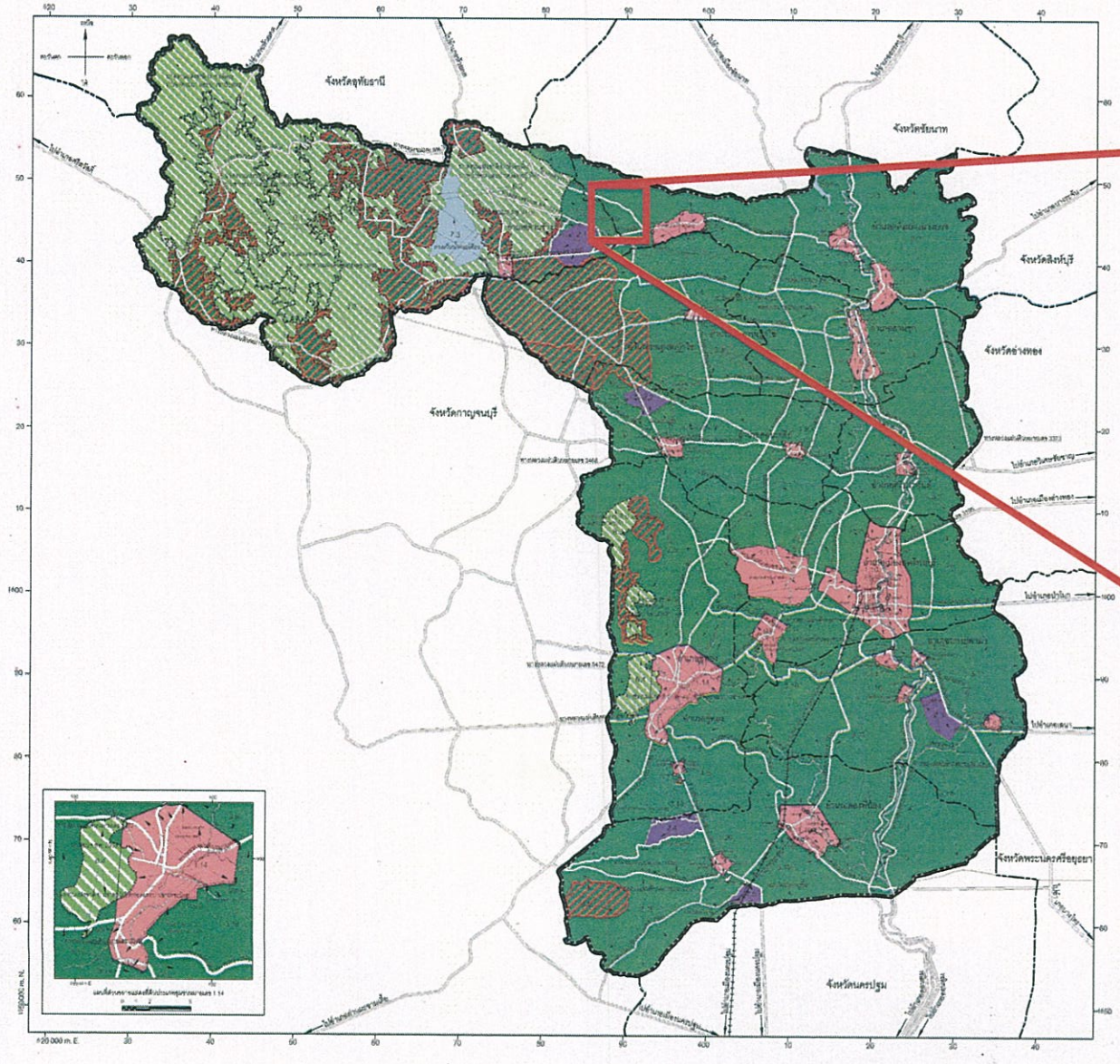
ขอแสดงความนับถือ

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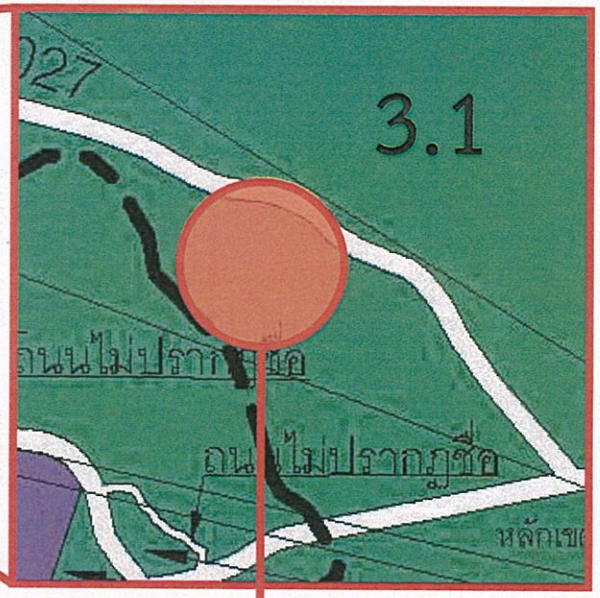
ผู้อำนวยการสำนักผังประเทศและผังภาค

กลุ่มงานผังจังหวัด ๔
โทร. ๐ ๒๒๐๑ ๘๓๑๒
โทรสาร ๐ ๒๖๔๓ ๑๗๑๗

กฎกระทรวงให้ใช้บังคับผังเมืองรวมจังหวัดสุพรรณบุรี พ.ศ. 2560



ที่ตั้งโครงการกิจการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ ของบริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด



ที่ตั้งโครงการกิจการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ ของบริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี อยู่ในที่ดินประเภทชนบทและเกษตรกรรมบริเวณหมายเลข 3.1



กฎกระทรวง

ให้ใช้บังคับผังเมืองรวมจังหวัดสุพรรณบุรี

พ.ศ. ๒๕๖๐

อาศัยอำนาจตามความในมาตรา ๕ แห่งพระราชบัญญัติการผังเมือง พ.ศ. ๒๕๑๘ และมาตรา ๒๖ วรรคหนึ่ง แห่งพระราชบัญญัติการผังเมือง พ.ศ. ๒๕๑๘ ซึ่งแก้ไขเพิ่มเติมโดยพระราชบัญญัติการผังเมือง (ฉบับที่ ๔) พ.ศ. ๒๕๕๘ รัฐมนตรีว่าการกระทรวงมหาดไทยออกกฎกระทรวงไว้ ดังต่อไปนี้

ข้อ ๑ ให้ใช้บังคับผังเมืองรวม ในท้องที่จังหวัดสุพรรณบุรี ภายในแนวเขตตามแผนที่ท้ายกฎกระทรวงนี้ เว้นแต่พื้นที่ที่อยู่ในแนวเขตดังต่อไปนี้ ให้ใช้ประโยชน์ตามวัตถุประสงค์ของที่ดินนั้น ๆ ตามที่มีกฎหมาย กฎ ระเบียบ ข้อบังคับ หรือประกาศที่เกี่ยวข้องกำหนดไว้ โดยไม่อยู่ในบังคับการใช้ประโยชน์ที่ดินที่กำหนดในกฎกระทรวงนี้

(๑) เขตพระราชฐาน

(๒) พื้นที่ที่ได้ใช้หรือสงวนไว้เพื่อประโยชน์ในราชการทหาร

(๓) เขตพัฒนาเศรษฐกิจพิเศษที่จัดตั้งขึ้นตามกฎหมาย

(๔) ท้องที่ที่มีการประกาศใช้บังคับกฎกระทรวงให้ใช้บังคับผังเมืองรวมเมืองหรือผังเมืองรวมชุมชน

ข้อ ๒ การวางและจัดทำผังเมืองรวมตามกฎกระทรวงนี้ มีวัตถุประสงค์เพื่อใช้เป็นแนวทางในการพัฒนา และการดำรงรักษาเมืองและบริเวณที่เกี่ยวข้องหรือชนบท ในด้านการใช้ประโยชน์ในทรัพย์สิน การคมนาคมและการขนส่ง การสาธารณูปโภค บริการสาธารณะ และสภาพแวดล้อมในบริเวณแนวเขตตามข้อ ๑ ให้สอดคล้องกับการพัฒนาระบบเศรษฐกิจและสังคมของประเทศตามแผนพัฒนาเศรษฐกิจและสังคมแห่งชาติ

ข้อ ๓ ผังเมืองรวมตามกฎกระทรวงนี้ มีนโยบายและมาตรการเพื่อจัดระบบการใช้ประโยชน์ที่ดิน โครงข่ายคมนาคมขนส่งและบริการสาธารณะให้มีประสิทธิภาพ สามารถรองรับและสอดคล้องกับการขยายตัวของชุมชนในอนาคต รวมทั้งส่งเสริมและพัฒนาเศรษฐกิจ โดยมีสาระสำคัญดังต่อไปนี้

(๑) สงวนรักษาพื้นที่ที่มีความอุดมสมบูรณ์และมีศักยภาพเหมาะสมในด้านการเกษตร รวมทั้งอนุรักษ์พื้นที่เพื่อรักษาสภาพแวดล้อม

(๒) พัฒนาระบบชุมชนของจังหวัดสุพรรณบุรี เพื่อรองรับการกระจายความเจริญของกิจกรรมต่าง ๆ จากกรุงเทพมหานคร

(๓) สร้างและพัฒนาสถานที่ท่องเที่ยวสู่ระบบการท่องเที่ยวเพื่อเชื่อมต่อกลุ่มจังหวัด

ข้อ ๔ การใช้ประโยชน์ที่ดินภายในเขตผังเมืองรวม ให้เป็นไปตามแผนผังกำหนดการใช้ประโยชน์ที่ดินตามที่ได้จำแนกประเภท และรายการประกอบแผนผังท้ายกฎกระทรวงนี้

ข้อ ๕ การใช้ประโยชน์ที่ดินตามแผนผังกำหนดการใช้ประโยชน์ที่ดินตามที่ได้จำแนกประเภทท้ายกฎกระทรวงนี้ ให้เป็นไปดังต่อไปนี้

(๑) ที่ดินในบริเวณหมายเลข ๑.๑ ถึงหมายเลข ๑.๒๐ ที่กำหนดไว้เป็นสีชมพู ให้เป็นที่ดินประเภทชุมชน

(๒) ที่ดินในบริเวณหมายเลข ๒.๑ ถึงหมายเลข ๒.๕ ที่กำหนดไว้เป็นสีม่วง ให้เป็นที่ดินประเภทอุตสาหกรรมและคลังสินค้า

(๓) ที่ดินในบริเวณหมายเลข ๓.๑ ถึงหมายเลข ๓.๑๖ ที่กำหนดไว้เป็นสีเขียว ให้เป็นที่ดินประเภทชนบทและเกษตรกรรม

(๔) ที่ดินในบริเวณหมายเลข ๔.๑ ถึงหมายเลข ๔.๖ ที่กำหนดไว้เป็นสีเขียวมีกรอบและเส้นทแยงสีน้ำตาล ให้เป็นที่ดินประเภทปฏิรูปที่ดินเพื่อเกษตรกรรม

(๕) ที่ดินในบริเวณหมายเลข ๕ ที่กำหนดไว้เป็นสีเขียวอ่อน ให้เป็นที่ดินประเภทที่โล่งเพื่อนันทนาการและการรักษาคุณภาพสิ่งแวดล้อม

(๖) ที่ดินในบริเวณหมายเลข ๖.๑ ถึงหมายเลข ๖.๔ ที่กำหนดไว้เป็นสีเขียวอ่อนมีเส้นทแยงสีขาว ให้เป็นที่ดินประเภทอนุรักษ์ป่าไม้

(๗) ที่ดินในบริเวณหมายเลข ๗.๑ ถึงหมายเลข ๗.๓ ที่กำหนดไว้เป็นสีฟ้า ให้เป็นที่ดินประเภทที่โล่งเพื่อการรักษาคุณภาพสิ่งแวดล้อม

ข้อ ๖ ที่ดินประเภทชุมชน ให้ใช้ประโยชน์ที่ดินเพื่อการอยู่อาศัย พาณิชยกรรม เกษตรกรรม สถาบันการศึกษา สถาบันศาสนา สถาบันราชการ และการสาธารณูปโภคและสาธารณูปการ สำหรับการใช้ประโยชน์ที่ดินเพื่อกิจการอื่น ให้ดำเนินการหรือประกอบกิจการได้ในอาคารที่ไม่ใช่อาคารสูงหรืออาคารขนาดใหญ่

ที่ดินประเภทนี้ ห้ามใช้ประโยชน์ที่ดินเพื่อกิจการตามที่กำหนด ดังต่อไปนี้

(๑) โรงงานตามกฎหมายว่าด้วยโรงงานตามประเภท ชนิด และจำพวกท้ายกฎกระทรวงนี้

(๒) คลังน้ำมันและสถานที่เก็บรักษาน้ำมัน ลักษณะที่สาม ตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง เพื่อการจำหน่าย

(๓) คลังก๊าซปิโตรเลียมเหลว สถานที่บรรจุก๊าซปิโตรเลียมเหลวประเภทโรงบรรจุ สถานที่บรรจุก๊าซปิโตรเลียมเหลวประเภทห้องบรรจุ และสถานที่เก็บรักษาก๊าซปิโตรเลียมเหลวประเภทโรงเก็บตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง

(๔) เลี้ยงม้า โค กระบือ สุกร สุนัข แพะ แกะ ห่าน เป็ด ไก่ งู จระเข้ หรือสัตว์ป่าตามกฎหมายว่าด้วยการสงวนและคุ้มครองสัตว์ป่า เพื่อการค้า

(๕) จัดสรรที่ดินเพื่อประกอบอุตสาหกรรม

(๖) กำจัดวัตถุอันตรายตามกฎหมายว่าด้วยวัตถุอันตราย

(๗) ไซโลเก็บผลิตผลทางการเกษตร

(๘) สนามยิงปืน เว้นแต่เป็นการดำเนินการของรัฐ

(๙) กำจัดมูลฝอย เว้นแต่เป็นกิจการที่อยู่ภายใต้การควบคุมดูแลหรือได้รับอนุญาตให้ดำเนินการจากองค์กรปกครองส่วนท้องถิ่น

(๑๐) ซื้อขายหรือเก็บเศษวัสดุ

ข้อ ๗ ที่ดินประเภทอุตสาหกรรมและคลังสินค้า ให้ใช้ประโยชน์ที่ดินเพื่อการประกอบอุตสาหกรรมหรือเกี่ยวข้องกับอุตสาหกรรม คลังสินค้า สถาบันราชการ และการสาธารณูปโภคและสาธารณูปการ สำหรับการใช้ประโยชน์ที่ดินเพื่อกิจการอื่น ให้ดำเนินการหรือประกอบกิจการได้ในอาคารที่มีความสูงไม่เกิน ๑๒ เมตร การวัดความสูงของอาคารให้วัดจากระดับพื้นดินที่ก่อสร้างถึงพื้นดาดฟ้า สำหรับอาคารทรงจั่วหรือปั้นหยาให้วัดจากระดับพื้นดินที่ก่อสร้างถึงยอดผนังของชั้นสูงสุด แต่ไม่หมายความรวมถึงโครงสร้างสำหรับใช้ในการรับส่งสัญญาณวิทยุ สัญญาณโทรทัศน์ หรือสัญญาณสื่อสารทุกชนิด หอถังน้ำ ปล่องเมรุ ปล่องโรงงานอุตสาหกรรม และไซโลเก็บผลิตผลทางการเกษตร

ที่ดินประเภทนี้ ห้ามใช้ประโยชน์ที่ดินเพื่อกิจการตามที่กำหนด ดังต่อไปนี้

(๑) จัดสรรที่ดินเพื่อประกอบพาณิชยกรรม

(๒) จัดสรรที่ดินเพื่อการอยู่อาศัย

(๓) การประกอบพาณิชยกรรมประเภทอาคารขนาดใหญ่

(๔) สถานสงเคราะห์หรือรับเลี้ยงเด็ก

(๕) สถานสงเคราะห์หรือรับเลี้ยงคนชรา

การใช้ประโยชน์ที่ดินริมทางหลวงแผ่นดินและทางหลวงชนบท ให้มีที่ว่างตามแนวขนานริมเขตทางไม่น้อยกว่า ๑๐ เมตร

ข้อ ๘ ที่ดินประเภทชนบทและเกษตรกรรม ให้ใช้ประโยชน์ที่ดินเพื่อเกษตรกรรมหรือเกี่ยวข้องกับเกษตรกรรม การอยู่อาศัย สถาบันการศึกษา สถาบันศาสนา สถาบันราชการและการสาธารณูปโภคและสาธารณูปการ สำหรับการใช้ประโยชน์ที่ดินเพื่อกิจการอื่น ให้ดำเนินการหรือประกอบกิจการได้ในอาคารที่ไม่ใช่อาคารสูงหรืออาคารขนาดใหญ่

ที่ดินประเภทนี้ ห้ามใช้ประโยชน์ที่ดินเพื่อกิจการตามที่กำหนด ดังต่อไปนี้

(๑) โรงงานตามกฎหมายว่าด้วยโรงงานตามประเภท ชนิด และจำพวกท้ายกฎกระทรวงนี้

(๒) คลังน้ำมันและสถานที่เก็บรักษาน้ำมัน ลักษณะที่สาม ตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง เพื่อการจำหน่าย

(๓) คลังก๊าซปิโตรเลียมเหลว สถานที่บรรจุก๊าซปิโตรเลียมเหลวประเภทห้องบรรจุ และสถานที่เก็บรักษาก๊าซปิโตรเลียมเหลวประเภทโรงเก็บ ตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง

(๔) จัดสรรที่ดินเพื่อประกอบอุตสาหกรรม

(๕) จัดสรรที่ดินเพื่อประกอบพาณิชยกรรม เว้นแต่เป็นส่วนหนึ่งของการจัดสรรที่ดินเพื่อการอยู่อาศัย และมีพื้นที่ไม่เกินร้อยละสามสิบของพื้นที่โครงการทั้งหมด

(๖) การอยู่อาศัยประเภทอาคารสูงหรืออาคารขนาดใหญ่

(๗) การอยู่อาศัยประเภทอาคารชุด หอพัก หรืออาคารอยู่อาศัยรวม

การใช้ประโยชน์ที่ดินรอบบึงฉวาก ด้านตะวันตกเป็นเส้นขนานระยะ ๑๐๐ เมตร กับทางหลวงชนบทรอบบึงฉวากฝั่งตะวันตก และด้านตะวันออกเป็นเส้นขนานระยะ ๕๐๐ เมตร กับทางหลวงชนบทรอบบึงฉวากฝั่งตะวันออก ให้มีความสูงของอาคารไม่เกิน ๑๒ เมตร การวัดความสูงของอาคารให้วัดจากระดับพื้นดินที่ก่อสร้างถึงพื้นดาดฟ้า สำหรับอาคารทรงจั่วหรือปั้นหยาให้วัดจากระดับพื้นดินที่ก่อสร้างถึงยอดผนังของชั้นสูงสุด แต่ไม่หมายความรวมถึงโครงสร้างสำหรับใช้ในการรับส่งสัญญาณวิทยุ สัญญาณโทรทัศน์ หรือสัญญาณสื่อสารทุกชนิด หอถังน้ำ ปล่องเมรุ ปล่องโรงงานอุตสาหกรรม และไซโลเก็บผลิตผลทางการเกษตร

ข้อ ๙ ที่ดินประเภทปฏิรูปที่ดินเพื่อเกษตรกรรม ให้ใช้ประโยชน์ที่ดินเพื่อการปฏิรูปที่ดินตามกฎหมายว่าด้วยการปฏิรูปที่ดินเพื่อเกษตรกรรม

ที่ดินประเภทนี้ซึ่งเอกชนเป็นเจ้าของหรือผู้ครอบครองโดยชอบด้วยกฎหมาย ให้ใช้ประโยชน์ที่ดินเพื่อเกษตรกรรมหรือเกี่ยวข้องกับเกษตรกรรม การอยู่อาศัย สถาบันการศึกษา สถาบันศาสนา สถาบันราชการ การสาธารณูปโภคและสาธารณูปการ สำหรับการใช้ประโยชน์ที่ดินเพื่อกิจการอื่น ให้ดำเนินการหรือประกอบกิจการได้ในอาคารที่ไม่ใช่อาคารสูงหรืออาคารขนาดใหญ่ และห้ามใช้ประโยชน์ที่ดินเพื่อกิจการตามที่กำหนด ดังต่อไปนี้

(๑) โรงงานตามกฎหมายว่าด้วยโรงงานตามประเภท ชนิด และจำพวกท้ายกฎกระทรวงนี้

(๒) คลังน้ำมันและสถานที่เก็บรักษาน้ำมัน ลักษณะที่สาม ตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง เพื่อการจำหน่าย

(๓) คลังก๊าซปิโตรเลียมเหลว สถานที่บรรจุก๊าซปิโตรเลียมเหลวประเภทห้องบรรจุ และสถานที่เก็บรักษาก๊าซปิโตรเลียมเหลวประเภทโรงเก็บ ตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง

(๔) จัดสรรที่ดินเพื่อประกอบอุตสาหกรรม

(๕) จัดสรรที่ดินเพื่อประกอบพาณิชยกรรม เว้นแต่เป็นส่วนหนึ่งของการจัดสรรที่ดินเพื่อการอยู่อาศัย และมีพื้นที่ไม่เกินร้อยละสามสิบของพื้นที่โครงการทั้งหมด

(๖) การอยู่อาศัยประเภทอาคารสูงหรืออาคารขนาดใหญ่

(๗) การอยู่อาศัยประเภทอาคารชุด หอพัก หรืออาคารอยู่อาศัยรวม

ข้อ ๑๐ ที่ดินประเภทที่โล่งเพื่อนันทนาการและการรักษาคุณภาพสิ่งแวดล้อมเฉพาะที่ดินซึ่งเป็นของรัฐ ให้ใช้ประโยชน์ที่ดินเพื่อนันทนาการหรือเกี่ยวข้องกับนันทนาการ การรักษาคุณภาพสิ่งแวดล้อม หรือสาธารณประโยชน์เท่านั้น

ที่ดินประเภทนี้ซึ่งเอกชนเป็นเจ้าของหรือผู้ครอบครองโดยชอบด้วยกฎหมาย ให้ใช้ประโยชน์ที่ดินเพื่อนันทนาการหรือเกี่ยวข้องกับนันทนาการ การรักษาคุณภาพสิ่งแวดล้อม การอยู่อาศัย เกษตรกรรม หรือเกี่ยวข้องกับเกษตรกรรม การสาธารณูปโภคและสาธารณูปการ หรือสาธารณประโยชน์เท่านั้น และห้ามใช้ประโยชน์ที่ดินเพื่อกิจการตามที่กำหนด ดังต่อไปนี้

(๑) เลี้ยงม้า โค กระบือ สุกร แพะ แกะ ห่าน เป็ด ไก่ งู จระเข้ หรือสัตว์ป่าตามกฎหมายว่าด้วยการสงวนและคุ้มครองสัตว์ป่า เพื่อการค้า

(๒) จัดสรรที่ดินเพื่อการอยู่อาศัย

(๓) การอยู่อาศัยประเภทอาคารสูงหรืออาคารขนาดใหญ่

(๔) การอยู่อาศัยประเภทห้องแถว ตึกแถว หรือบ้านแถว

(๕) การอยู่อาศัยประเภทอาคารชุด หอพัก หรืออาคารอยู่อาศัยรวม

ข้อ ๑๑ ที่ดินประเภทอนุรักษ์ป่าไม้ ให้ใช้ประโยชน์ที่ดินเพื่อการสงวนและคุ้มครองดูแลรักษาหรือบำรุงป่าไม้ สัตว์ป่า ต้นน้ำ ลำธาร และทรัพยากรธรรมชาติอื่น ๆ ตามมติคณะรัฐมนตรีและกฎหมายเกี่ยวกับการป่าไม้ การสงวนและคุ้มครองสัตว์ป่า และการส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติเท่านั้น

ที่ดินประเภทนี้ซึ่งเอกชนเป็นเจ้าของหรือผู้ครอบครองโดยชอบด้วยกฎหมาย ให้ใช้ประโยชน์ที่ดินเพื่อการอยู่อาศัย เกษตรกรรม การสาธารณูปโภคและสาธารณูปการ หรือสาธารณประโยชน์เท่านั้น และห้ามใช้ประโยชน์ที่ดินเพื่อกิจการตามที่กำหนด ดังต่อไปนี้

(๑) เลี้ยงม้า โค กระบือ สุกร แพะ แกะ ห่าน เป็ด ไก่ งู จระเข้ หรือสัตว์ป่าตามกฎหมายว่าด้วยการสงวนและคุ้มครองสัตว์ป่า เพื่อการค้า

(๒) จัดสรรที่ดินเพื่อการอยู่อาศัย

(๓) การอยู่อาศัยประเภทอาคารสูงหรืออาคารขนาดใหญ่

(๔) การอยู่อาศัยประเภทห้องแถว ตึกแถว หรือบ้านแถว

(๕) การอยู่อาศัยประเภทอาคารชุด หอพัก หรืออาคารอยู่อาศัยรวม

ข้อ ๑๒ ที่ดินประเภทที่โล่งเพื่อการรักษาคุณภาพสิ่งแวดล้อม ให้ใช้ประโยชน์ที่ดินเพื่อการรักษาคุณภาพสิ่งแวดล้อมหรือเกี่ยวข้องกับการรักษาคุณภาพสิ่งแวดล้อม การประมง การท่องเที่ยวเชิงอนุรักษ์ หรือสาธารณประโยชน์เท่านั้น

ข้อ ๑๓ ที่ดินในเขตโบราณสถาน ให้ใช้ประโยชน์ที่ดินตามกฎหมายว่าด้วยโบราณสถาน โบราณวัตถุ ศิลปวัตถุ และพิพิธภัณฑสถานแห่งชาติ

ข้อ ๑๔ ให้ผู้มีอำนาจหน้าที่ในการควบคุมการก่อสร้างอาคารหรือการประกอบกิจการในเขตผังเมืองรวมปฏิบัติการให้เป็นไปตามกฎกระทรวงนี้

ให้ไว้ ณ วันที่ ๑๑ เมษายน พ.ศ. ๒๕๖๐
พลเอก อนุพงษ์ เผ่าจินดา
รัฐมนตรีว่าการกระทรวงมหาดไทย

ประเภท ชนิด และจำพวกของโรงงานที่ห้ามประกอบกิจการ
ท้ายกฎกระทรวงให้ใช้บังคับผังเมืองรวมจังหวัดสุพรรณบุรี พ.ศ. ๒๕๖๐

หมายเหตุ ๑. ลำดับที่ หมายถึง ลำดับที่ตามกฎหมายว่าด้วยโรงงาน
๒. จำพวกที่ หมายถึง จำพวกที่ตามกฎหมายว่าด้วยโรงงาน

ที่ดินประเภทชุมชน			
ลำดับที่	ประเภทหรือชนิดของโรงงาน	จำพวกที่	หมายเหตุ
๗	(๑) โรงงานสกัดน้ำมันจากพืช หรือสัตว์ หรือไขมันจากสัตว์ ที่ใช้สารตัวทำละลายในการสกัด	๓	
	(๔) โรงงานทำน้ำมันจากพืช หรือสัตว์ หรือไขมันจากสัตว์ให้บริสุทธิ์ ที่ใช้สารตัวทำละลายในการสกัด	๓	
๔๒	(๑) โรงงานทำเคมีภัณฑ์ สารเคมี หรือวัสดุเคมี ซึ่งมิใช่ปุ๋ย	๓	
	(๒) โรงงานเก็บรักษา ลำเลียง แยก คัดเลือก หรือแบ่งบรรจุเฉพาะเคมีภัณฑ์อันตราย ซึ่งมิใช่ปุ๋ย	๓	
๔๓	(๑) โรงงานทำปุ๋ย หรือสารป้องกันหรือกำจัดศัตรูพืชหรือสัตว์ (Pesticides)	๓	ยกเว้นจำพวกที่ ๓ เฉพาะปุ๋ยอินทรีย์ และปุ๋ยเคมีที่ไม่มีการใช้แอมโมเนียมไนเตรต (Ammonium Nitrate) หรือโปแตสเซียมคลอเรต (Potassium Chlorate) ให้ประกอบกิจการได้
	(๒) โรงงานเก็บรักษาหรือแบ่งบรรจุปุ๋ย หรือสารป้องกันหรือกำจัดศัตรูพืชหรือสัตว์ (Pesticides)	๓	ยกเว้นจำพวกที่ ๓ เฉพาะปุ๋ยอินทรีย์ และปุ๋ยเคมีที่ไม่มีการใช้แอมโมเนียมไนเตรต (Ammonium Nitrate) หรือโปแตสเซียมคลอเรต (Potassium Chlorate) ให้ประกอบกิจการได้
๔๔	โรงงานประกอบกิจการเกี่ยวกับการผลิตยางเรซินสังเคราะห์ ยางอีลาสโตเมอร์ พลาสติก หรือเส้นใยสังเคราะห์ซึ่งมิใช่ใยแก้ว	๓	
๔๕	(๑) โรงงานทำสี (Paints) สำหรับใช้ทา พ่น หรือเคลือบ	๓	ยกเว้นจำพวกที่ ๓ เฉพาะสีน้ำ ให้ประกอบกิจการได้
	(๒) โรงงานทำน้ำมันชักเงา น้ำมันผสมสี หรือน้ำยาล้างสี	๓	
	(๓) โรงงานทำเซลแล็ก แล็กเกอร์ หรือผลิตภัณฑ์สำหรับใช้ยาหรืออุด	๓	

ลำดับที่	ประเภทหรือชนิดของโรงงาน	จำพวกที่	หมายเหตุ
๔๘	(๔) โรงงานทำไม้ขีดไฟ วัตถุระเบิด หรือดอกไม้เพลิง (๖) โรงงานทำหมึกหรือคาร์บอนดำ	๓ ๓	
๔๙	โรงงานกลั่นน้ำมันปิโตรเลียม	๓	
๕๐	(๔) โรงงานผสมผลิตภัณฑ์จากปิโตรเลียมเข้าด้วยกัน หรือการผสมผลิตภัณฑ์จากปิโตรเลียมกับวัสดุอื่น แต่ไม่รวมถึงการผสมผลิตภัณฑ์จากก๊าซธรรมชาติกับวัสดุอื่น	๓	ยกเว้นจำพวกที่ ๓ เฉพาะแอสฟัลต์ติกคอนกรีตให้ประกอบกิจการได้
๘๙	โรงงานผลิตก๊าซ ซึ่งมิใช่ก๊าซธรรมชาติ และโรงงานส่งหรือจำหน่ายก๊าซ แต่ไม่รวมถึงโรงงานส่งหรือจำหน่ายก๊าซที่เป็นน้ำมันเชื้อเพลิงตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง	๓	
๙๑	(๒) โรงงานบรรจุก๊าซ แต่ไม่รวมถึงการบรรจุก๊าซที่เป็นน้ำมันเชื้อเพลิงตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง	๓	
๙๒	โรงงานห้องเย็นที่ใช้แอมโมเนียเป็นสารทำความเย็น	๑ ๒ และ ๓	
๙๙	โรงงานผลิต ซ่อมแซม หรือดัดแปลง เครื่องกระสุนปืน วัตถุระเบิด หรือสิ่งอื่นใดที่มีอำนาจในการประหาร ทำลาย หรือทำให้หมดสมรรถภาพในทำนองเดียวกับเครื่องกระสุนปืน หรือวัตถุระเบิด และรวมถึงสิ่งประกอบของสิ่งดังกล่าว	๓	

ที่ดินประเภทชนบทและเกษตรกรรม

ลำดับที่	ประเภทหรือชนิดของโรงงาน	จำพวกที่	หมายเหตุ
๗	(๑) โรงงานสกัดน้ำมันจากพืช หรือสัตว์ หรือไขมันจากสัตว์ที่ใช้สารตัวทำละลายในการสกัด (๔) โรงงานทำน้ำมันจากพืช หรือสัตว์ หรือไขมันจากสัตว์ให้บริสุทธิ์ที่ใช้สารตัวทำละลายในการสกัด	๓ ๓	
๔๒	(๑) โรงงานทำเคมีภัณฑ์ สารเคมี หรือวัสดุเคมี ซึ่งมิใช่ปุ๋ย (๒) โรงงานเก็บรักษา ลำเลียง แยก คัดเลือก หรือแบ่งบรรจุเฉพาะเคมีภัณฑ์อันตราย ซึ่งมิใช่ปุ๋ย	๓ ๓	
๔๓	(๑) โรงงานทำปุ๋ย หรือสารป้องกันหรือกำจัดศัตรูพืชหรือสัตว์ (Pesticides)	๓	ยกเว้นจำพวกที่ ๓ เฉพาะปุ๋ยอินทรีย์ และปุ๋ยเคมีที่ไม่มีการใช้แอมโมเนียมไนเตรต (Ammonium Nitrate) หรือโปแตสเซียมคลอเรต (Potassium Chlorate) ให้ประกอบกิจการได้

ลำดับที่	ประเภทหรือชนิดของโรงงาน	จำพวกที่	หมายเหตุ
	(๒) โรงงานเก็บรักษาหรือแบ่งบรรจุปุ๋ย หรือสารป้องกันหรือกำจัดศัตรูพืช หรือสัตว์ (Pesticides)	๓	ยกเว้นจำพวกที่ ๓ เฉพาะปุ๋ยอินทรีย์ และปุ๋ยเคมีที่ไม่มีการใช้แอมโมเนียมไนเตรต (Ammonium Nitrate) หรือโปแตสเซียมคลอเรต (Potassium Chlorate) ให้ประกอบกิจการได้
๔๔	โรงงานประกอบกิจการเกี่ยวกับการผลิตยางเรซินสังเคราะห์ ยางอีลาสโตเมอร์ พลาสติก หรือเส้นใยสังเคราะห์ซึ่งมิใช่ใยแก้ว	๓	
๔๕	(๑) โรงงานทำสี (Paints) สำหรับใช้ทา พ่น หรือเคลือบ	๓	ยกเว้นจำพวกที่ ๓ เฉพาะสีน้ำ ให้ประกอบกิจการได้
	(๒) โรงงานทำน้ำมันชักเงา น้ำมันผสมสี หรือน้ำยาล้างสี	๓	
	(๓) โรงงานทำเชลแล็ก แล็กเกอร์ หรือผลิตภัณฑ์สำหรับใช้ยาหรืออุด	๓	
๔๘	(๔) โรงงานทำไม้ขีดไฟ วัตถุระเบิด หรือดอกไม้เพลิง	๓	
	(๖) โรงงานทำหมึกหรือคาร์บอนดำ	๓	
๔๙	โรงงานกลั่นน้ำมันปิโตรเลียม	๓	
๕๐	(๔) โรงงานผสมผลิตภัณฑ์จากปิโตรเลียมเข้าด้วยกัน หรือการผสมผลิตภัณฑ์จากปิโตรเลียมกับวัสดุอื่น แต่ไม่รวมถึงการผสมผลิตภัณฑ์จากก๊าซธรรมชาติกับวัสดุอื่น	๓	ยกเว้นจำพวกที่ ๓ เฉพาะแอสฟัลต์ติกคอนกรีต ให้ประกอบกิจการได้
๘๙	โรงงานผลิตก๊าซ ซึ่งมิใช่ก๊าซธรรมชาติ และโรงงานส่งหรือจำหน่ายก๊าซ แต่ไม่รวมถึงโรงงานส่งหรือจำหน่ายก๊าซที่เป็นน้ำมันเชื้อเพลิงตามกฎหมายว่าด้วยการควบคุมน้ำมันเชื้อเพลิง	๓	ยกเว้นจำพวกที่ ๓ ในท้องที่ตำบลศาลาขาว อำเภอเมืองสุพรรณบุรี จังหวัดสุพรรณบุรี เฉพาะโฉนดที่ดินเลขที่ ๕๖๖๓๖ เลขที่ดิน ๒๘๗ ให้ประกอบกิจการได้
๙๒	โรงงานห้องเย็นที่ใช้แอมโมเนียเป็นสารทำความเย็น	๑ ๒ และ ๓	
๙๙	โรงงานผลิต ซ่อมแซม หรือดัดแปลง เครื่องกระสุนปืน วัตถุระเบิด หรือสิ่งอื่นใดที่มีอำนาจในการประหาร ทำลาย หรือทำให้หมดสมรรถภาพในทำนองเดียวกับเครื่องกระสุนปืน หรือวัตถุระเบิด และรวมถึงสิ่งประกอบของสิ่งดังกล่าว	๓	

Appendix 2-1

Details of the design and installation of solar panel systems

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Appendix 2-2

Single line diagram

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Appendix 2-3

PV modules specification

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Appendix 2-4

Inverters specification

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Appendix 2-5

Transformer specification

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Appendix 2-6

BESS specification

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[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Appendix 2-7

Cabling specification

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Appendix 2-8

A letter confirming the ability to provide water services

ที่ มท ๕๕๔๒๐-๒๒/๕๕๗

การประปาส่วนภูมิภาคสาขาด่านช้าง
๓๐๐ หมู่ ๑ ตำบลด่านช้าง
อำเภอด่านช้าง จังหวัดสุพรรณบุรี ๗๒๑๘๐

๒๗ มิถุนายน ๒๕๖๖

เรื่อง การขอรับรองพื้นที่จำหน่ายน้ำประปา

เรียน กรรมการผู้จัดการ บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด

อ้างถึง หนังสือคำร้องอื่นๆ ลงวันที่ ๒๕ พฤษภาคม ๒๕๖๖

ตามหนังสือที่อ้างถึง ของบริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด มีแผนพัฒนาโครงการโรงไฟฟ้าพลังงานแสงอาทิตย์ร่วมกับระบบกักเก็บพลังงาน โครงการตั้งอยู่ใน ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี โดยบริษัทฯ มีความประสงค์จะขอใช้น้ำจากการประปาส่วนภูมิภาคสาขาด่านช้าง นั้น

การประปาส่วนภูมิภาคสาขาด่านช้าง ได้ดำเนินการตรวจสอบรายละเอียดแนวท่อเมนจ่ายน้ำประปารายละเอียดข้อมูล ดังนี้

๑. แนวท่อเมนจ่ายน้ำประปาเป็นท่อ PVC ขนาด ๒๐๐ มม. อยู่ห่างจากโครงการฯ ประมาณ ๑๐-๕๐ เมตร
๒. ปริมาณการจ่ายน้ำประปาตลอด ๒๔ ชั่วโมง เพียงพอกับความต้องการใช้น้ำประปาของโครงการฯ แต่โครงการควรมีระบบพักน้ำสำรองกรณีการประปาส่วนภูมิภาคซ่อมท่อแตกท่อรั่วหรือการใช้น้ำสูงสุดในแต่ละช่วงเวลา
๓. หากบริษัทมีความประสงค์ขอใช้น้ำประปาภายในโครงการฯ ให้ยื่นเรื่องขอขยายเขตวางท่อประปาพร้อมติดตั้งมาตรวัดน้ำ ณ ที่ทำการการประปาส่วนภูมิภาคสาขาด่านช้าง ได้ทุกวันเวลาราชการตั้งแต่บัดนี้เป็นต้นไป

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้จัดการการประปาส่วนภูมิภาค
สาขาด่านช้าง

งานบริการและควบคุมน้ำสูญเสีย
โทร/โทรสาร ๐ ๓๕๕๙ ๕๓๔๐

๑๓๐ Change for Good กระทรวงมหาดไทย การประปาส่วนภูมิภาค มุ่ง - มั่น - เพื่อปวงชน - สู่ความยั่งยืน

Appendix 2-9

Design calculations for rainwater retention pond

CODE OF PRACTICE (COP)

SOLAR AND BESS PLANT

BREEZE AND SHINE POWER PROJECT

RETENTION POND CALCULATION

***

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PREPARED FOR

บรีสแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

Client Name: Breeze and Shine Power Co., Ltd.

11 JULY 2023

***[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

การออกแบบบ่อหน่วงน้ำฝน

- ออกแบบให้มีบ่อหน่วงน้ำฝนได้อย่างน้อย 3ชั่วโมง และควบคุมอัตราการระบายน้ำออกจากพื้นที่โครงการไม่ให้เพิ่มขึ้นมากกว่าก่อนมีโครงการ โดยต้องแสดงรายการคำนวณปริมาณน้ำฝนที่ตก ในพื้นที่โครงการและอัตราการระบายนน้ำฝนก่อนและหลังพัฒนาโครงการ ตำแหน่งและความจุของบ่อหน่วงน้ำฝน ช่วงเวลาและอัตราการระบายน้ำฝนออกจากพื้นที่โครงการ

รายการคำนวณการคำนวณปริมาตรบ่อหน่วงน้ำ

รายละเอียดโครงการ

ชื่อโครงการ : SB-SPB2.2 สถานที่ : จ.สุพรรณบุรี

การใช้งาน : บ่อหน่วงน้ำภายในโครงการ

CRITERIA

พื้นที่ของโครงการที่พิจารณาออกแบบ = **1,683,133.6** ตร.ม.

ก่อนมีโครงการ

สภาพพื้นที่เป็นพื้นที่ว่างเปล่ามีหญ้าปกคลุมดิน โดยรอบเป็นพื้นที่โล่งทำการเกษตร

DESIGN

คำนวณการไหลนองของน้ำฝน

Q = CIA

โดยที่

Q = อัตราการไหลนองของน้ำฝน, ลบ.ม./ชม (m^3/hr)

C = สัมประสิทธิ์การไหลนองโดยเฉลี่ย

I = ความเข้มของฝน, ม./ชม. (m/hr)

A = พื้นที่รับน้ำ, ตร.ม. (m^2)

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Undeveloped Area พื้นที่ก่อนการพัฒนา

Q = CIA

โดยที่

C= 0.30

I= 0.100 m/3hr

A= **1,683,133.60** m^2

Q=0.30 x (0.1000 m/3hr) x (1,683,133.60 m2)

Qbefore = **50,494.01** m^3/3hr

Developed Area พื้นที่มีการพัฒนา

สุพรรณบุรี 2.2 (SB-SPB2.2) Solar+Batt

Development Area

	W	L	Area	
	m	m	m^2	
Main Power Transformer &Substation	**55**	**33**	**1,815.00**	m^2
Batt Area	60	80	**4,800.00**	m^2
Admin	**8**	15	**120.00**	m^2
		Total	**6,735.00**	m^2

Rainfall

RainfallAmount	176	mm	@25year return period
3 hrs rainfall intensity (I)	100	mm/hr	@25year return period
1 hrs rainfall intensity (I)	95.4	mm/hr	@25year return period

Frequency Analysis of Maximum Rainfall for Each Period at Suphan Buri

(1986 - 1998)

Time	Rainfall Amount (mm)								
(hr)	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr	200 yr	500 yr	1000 yr
0.25	27.3	39.4	47.4	57.5	65.0	72.4	79.8	89.6	97.0
0.5	42.2	62.0	75.2	91.7	104.0	116.3	128.4	144.5	156.6
0.75	47.1	67.0	80.1	96.7	109.0	121.2	133.4	149.4	161.5
1	54.3	70.7	81.6	95.4	105.6	115.7	125.8	139.1	149.2
2	57.7	73.1	83.3	96.2	105.8	115.3	124.8	137.2	146.7
3	58.1	73.8	84.3	97.4	107.2	116.9	126.6	139.3	149.0
6	63.1	78.8	89.2	102.3	112.1	121.8	131.4	144.1	153.8
12	65.1	86.1	100.0	117.5	130.6	143.5	156.4	173.4	186.2
24	79.5	118.6	144.5	177.2	201.5	225.6	249.6	281.2	305.1

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

อ้างอิงจาก "ความสัมพันธ์ระหว่างความเข็มฝน - ช่วงเวลา - ความถี่ฝน และเปอร์เซ็นต์การแผ่กระจายของปริมาณฝนสูงสุดใน ช่วงเวลา 24 ชั่วโมง ภาคกลาง, กรมชลประทาน, กระทรวงเกษตรและสหกรณ์"

Developed Area พื้นที่มีการพัฒนา

โดยที่แบ่งเป็นพื้นที่พัฒนาใหม่

Q = CIA

โดยที่

C= 0.90

I= 0.100 m/3hr @25Y 3 hrs

A= 6,735.00 m^2

Q=0.90 x (0.1000 m/3hr) x (6,735.00 m^2)

Qd1= **606.15** m^3/3hr Used **800.00** m^3 /3hr

Q = CIA

โดยที่

C= 0.30

I= 0.100 m/3hr

A= **1,676,398.60** m^2

Q=0.30 x (0.1000 m/3hr) x (1,676,398.60 m^2)

Qd2 = **50,291.96** m^3/3hr

Qafter = Qd2 + Qd1

Qafter = 50,291.96 + 800.00 m^3/3hr

Qafter = **51,091.96** m^3/3hr

Qafter - Qbefore= 51,091.96 - 50,494.01 m^3/3hr

Qremain = **597.95** m^3/3hr

Used **700.00** m^3/3hr SB site

ดังนั้น ปริมาตรบ่อหน่วงน้ำ Retention Pond = **700** ลบ.ม. (m^3)

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Appendix 3-1

Results of environmental sampling (Dry Season)

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Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
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Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Sampling Source : Ambient Air Quality
Sampling Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591311 E, 1644740 N
Sampling Date : May 24-29, 2023
Sampling Time : 11:20
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Konlayut Inkum
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Folder No. : 2023-AC094
Received Date : May 31, 2023
Analytical Date : May 31-June 6, 2023
Report No. : 2023-RAAK208
Report Date : June 6, 2023

Parameter	Unit	Method of Analysis	Result					Standard[1]	Standard[2]
			May 24-25, 23	May 25-26, 23	May 26-27, 23	May 27-28, 23	May 28-29, 23		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m^3	High-Volume, Gravimetric	0.051	0.070	0.062	0.049	0.044	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m^3	PM10 Size Selective, High-Volume, Gravimetric	0.022	0.033	0.029	0.028	0.026	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	mg/m^3	PM2.5 Size Selective, Low-Volume, Gravimetric	0.008	0.012	0.009	0.006	0.014	-	0.05

Remark : [1] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2] Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Laboratory Reviewer

Laboratory Supervisor

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Sampling Source : Ambient Air Quality
Sampling Point : **โรงเรียนบ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588701 E, 1647913 N
Sampling Date : May 24-29, 2023
Sampling Time : 11:00
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Konlayut Inkum
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Folder No. : 2023-AC094
Received Date : May 31, 2023
Analytical Date : May 31-June 6, 2023
Report No. : 2023-RAAK209
Report Date : June 6, 2023

Parameter	Unit	Method of Analysis	Result					Standard[1']	Standard[2']
			May 24-25, 23	May 25-26, 23	May 26-27, 23	May 27-28, 23	May 28-29, 23		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m^3	High-Volume, Gravimetric	0.067	0.076	0.066	0.046	0.042	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m^3	PM10 Size Selective, High-Volume, Gravimetric	0.038	0.042	0.036	0.026	0.024	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	mg/m^3	PM2.5 Size Selective, Low-Volume, Gravimetric	0.015	0.022	0.011	0.007	0.015	-	0.05

Remark : [1'] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2'] Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

g)

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
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Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Air Quality
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591311 E, 1644736 N
Measured Date : May 24-29, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-001 - 005
Report No. : 2023-RAAK190
Report Date : June 7, 2023

Date/Time	May 24-25, 23		May 25-26, 23		May 26-27, 23		May 27-28, 23		May 28-29, 23	
	WS	WD	WS	WD	WS	WD	WS	WD	WS	WD
11:00-12:00	1.3	NE	1.3	NE	1.3	NE	1.3	NE	1.8	N
12:00-13:00	1.3	ESE	1.3	ENE	1.3	ENE	1.8	NE	1.3	SSE
13:00-14:00	2.2	SE	2.2	SE	1.8	ESE	1.3	ENE	1.8	N
14:00-15:00	1.8	SSW	1.3	SE	2.7	SE	1.8	ENE	1.3	SW
15:00-16:00	1.3	ESE	1.8	SSW	2.7	SE	1.8	SSE	1.3	SSE
16:00-17:00	3.1	S	1.3	SSE	2.2	E	2.2	SSW	2.2	SE
17:00-18:00	2.7	WSW	1.8	SSW	0.9	NNE	1.3	SSW	1.8	SSE
18:00-19:00	1.3	ESE	1.3	SSW	0.4	NNE	2.2	WSW	2.2	SSE
19:00-20:00	0.4	SSW	0.9	N	<0.4	Calm	2.2	N	1.3	N
20:00-21:00	2.7	SSW	1.3	N	0.9	W	2.2	NW	0.9	N
21:00-22:00	2.2	SW	1.3	N	0.9	W	1.3	WNW	0.9	N
22:00-23:00	1.3	WSW	1.8	NNW	0.9	W	0.9	W	1.3	SSE
23:00-00:00	0.9	SSW	0.9	ENE	0.4	WSW	0.9	WNW	2.7	WNW
00:00-01:00	1.3	SW	<0.4	Calm	0.9	W	0.4	WNW	3.1	NW
01:00-02:00	1.3	SW	0.4	NE	0.4	WNW	<0.4	Calm	2.7	NW
02:00-03:00	0.9	SW	0.9	SW	1.3	WSW	0.4	ESE	1.3	N
03:00-04:00	1.3	SW	0.9	W	1.3	WSW	1.8	SE	0.4	N
04:00-05:00	0.9	SW	0.9	W	0.9	WSW	1.3	ESE	0.4	N
05:00-06:00	1.3	SW	0.4	W	0.4	WSW	0.9	E	0.9	SE
06:00-07:00	1.3	WSW	0.4	W	0.4	WSW	0.4	ESE	0.9	SSE
07:00-08:00	1.3	WSW	<0.4	Calm	<0.4	Calm	0.4	E	0.9	SSE
08:00-09:00	1.8	NW	0.9	NNW	0.4	NNW	0.4	WNW	0.9	SSE
09:00-10:00	2.2	NW	1.8	NW	0.9	NNW	0.9	N	0.9	N
10:00-11:00	2.2	NW	1.3	WNW	1.3	N	0.9	SSE	1.3	N

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Laboratory Reviewer

Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Air Quality
Measured Point : **โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0591311 E, 1644736 N
Measured Date : May 24-29, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-001 - 005
Report No. : 2023-RAAK190
Report Date : June 7, 2023

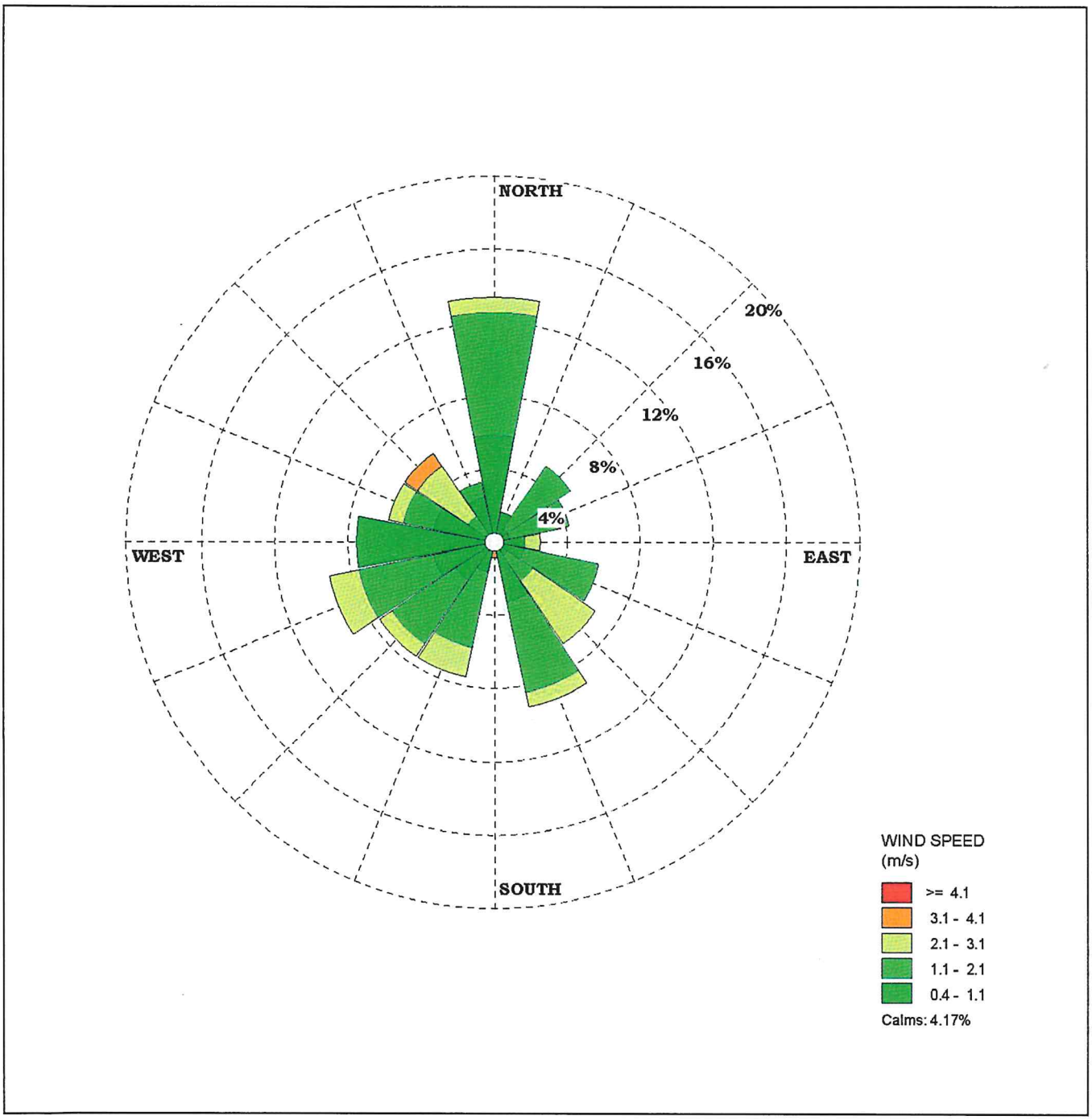
Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	**1.1-2.1**	**2.1-3.1**	**3.1-4.1**	**≥4.1**	**Total**
N	5.83333	6.66667	0.83333	0.00000	0.00000	**13.33333**
NNE	1.66667	0.00000	0.00000	0.00000	0.00000	**1.66667**
NE	0.83333	4.16667	0.00000	0.00000	0.00000	**5.00000**
ENE	0.83333	3.33333	0.00000	0.00000	0.00000	**4.16666**
E	1.66667	0.00000	0.83333	0.00000	0.00000	**2.50000**
ESE	1.66667	4.16667	0.00000	0.00000	0.00000	**5.83334**
SE	0.83333	1.66667	4.16667	0.00000	0.00000	**6.66667**
SSE	3.33333	5.00000	0.83333	0.00000	0.00000	**9.16666**
S	0.00000	0.00000	0.00000	0.83333	0.00000	**0.83333**
SSW	1.66667	4.16667	1.66667	0.00000	0.00000	**7.50001**
SW	2.50000	4.16667	0.83333	0.00000	0.00000	**7.50000**
WSW	3.33333	4.16667	1.66667	0.00000	0.00000	**9.16667**
W	7.50000	0.00000	0.00000	0.00000	0.00000	**7.50000**
WNW	3.33333	1.66667	0.83333	0.00000	0.00000	**5.83333**
NW	0.00000	1.66667	3.33333	0.83333	0.00000	**5.83333**
NNW	2.50000	0.83333	0.00000	0.00000	0.00000	**3.33333**
Calm	**4.16667**					

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name	:	Consultants of Technology Co., Ltd
Project Name	:	โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Measured Point	:	**โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
Measured Date	:	May 24-29, 2023
Report No.	:	2023-RAAK190



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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Air Quality
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588695 E, 1647965 N
Measured Date : May 24-29, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-006 - 010
Report No. : 2023-RAAK191
Report Date : June 7, 2023

Date/Time	May 24-25, 23		May 25-26, 23		May 26-27, 23		May 27-28, 23		May 28-29, 23	
	WS	WD	WS	WD	WS	WD	WS	WD	WS	WD
11:00-12:00	1.8	N	1.8	NW	1.8	WNW	2.2	NW	2.2	E
12:00-13:00	2.2	N	1.8	NNW	1.3	WNW	2.7	NNW	2.2	E
13:00-14:00	1.8	NNW	1.8	E	2.7	N	2.2	NW	1.8	ESE
14:00-15:00	2.2	SSE	1.8	SE	2.7	SE	3.1	NW	0.9	S
15:00-16:00	1.3	SSE	2.2	SE	5.4	ESE	2.2	NW	1.8	E
16:00-17:00	3.1	SSE	2.7	ESE	1.3	NNE	0.9	SE	2.7	E
17:00-18:00	4.5	N	3.1	SE	3.1	W	0.9	SE	3.1	E
18:00-19:00	1.3	E	1.8	S	1.3	W	2.7	SE	3.1	ESE
19:00-20:00	0.4	S	2.7	SE	<0.4	Calm	2.7	SW	2.7	ESE
20:00-21:00	1.8	SSE	2.7	SE	0.4	SSE	2.2	SW	1.3	ESE
21:00-22:00	3.6	S	1.8	SSE	0.4	SSE	2.2	SW	0.9	E
22:00-23:00	1.3	S	2.2	NW	0.9	SSE	1.3	WSW	1.8	WNW
23:00-00:00	1.3	SSE	1.3	NE	0.4	SSE	0.4	SW	3.1	SW
00:00-01:00	1.3	S	<0.4	Calm	0.9	S	0.9	NNW	2.2	WSW
01:00-02:00	0.4	S	<0.4	Calm	1.3	S	0.4	N	2.2	WSW
02:00-03:00	0.9	SSE	1.3	WSW	0.4	SSE	0.4	N	1.8	WNW
03:00-04:00	0.4	S	1.8	WSW	0.9	SSE	2.2	ENE	0.9	NW
04:00-05:00	0.4	S	0.4	WSW	0.4	SSE	1.3	ENE	1.3	NW
05:00-06:00	0.4	SSE	0.4	WSW	<0.4	Calm	0.4	ESE	1.3	ENE
06:00-07:00	0.9	SSW	<0.4	Calm	<0.4	Calm	0.4	E	1.3	ESE
07:00-08:00	0.4	SW	<0.4	Calm	<0.4	Calm	<0.4	Calm	0.9	E
08:00-09:00	1.8	WNW	0.4	NNW	0.9	W	0.4	WSW	0.9	SE
09:00-10:00	3.1	NW	1.8	NW	0.4	W	0.9	SE	1.3	WNW
10:00-11:00	3.1	NW	1.8	NNW	1.3	W	0.9	ESE	2.2	NW

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Laboratory Supervisor

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Air Quality
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588695 E, 1647965 N
Measured Date : May 24-29, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-006 - 010
Report No. : 2023-RAAK191
Report Date : June 7, 2023

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	**1.1-2.1**	**2.1-3.1**	**3.1-4.1**	**≥4.1**	**Total**
N	1.66667	0.83333	1.66667	0.00000	0.83333	**5.00000**
NNE	0.00000	0.83333	0.00000	0.00000	0.00000	**0.83333**
NE	0.00000	0.83333	0.00000	0.00000	0.00000	**0.83333**
ENE	0.00000	1.66667	0.83333	0.00000	0.00000	**2.50000**
E	2.50000	2.50000	2.50000	0.83333	0.00000	**8.33333**
ESE	1.66667	2.50000	1.66667	0.83333	0.83333	**7.50000**
SE	3.33333	0.83333	4.16667	0.83333	0.00000	**9.16666**
SSE	7.50000	3.33333	0.83333	0.83333	0.00000	**12.49999**
S	5.00000	3.33333	0.00000	0.83333	0.00000	**9.16666**
SSW	0.83333	0.00000	0.00000	0.00000	0.00000	**0.83333**
SW	1.66667	0.00000	2.50000	0.83333	0.00000	**5.00000**
WSW	2.50000	2.50000	1.66667	0.00000	0.00000	**6.66667**
W	1.66667	1.66667	0.00000	0.83333	0.00000	**4.16667**
WNW	0.00000	5.00000	0.00000	0.00000	0.00000	**5.00000**
NW	0.83333	2.50000	4.16667	2.50000	0.00000	**10.00000**
NNW	1.66667	2.50000	0.83333	0.00000	0.00000	**5.00000**
Calm	**7.50000**					

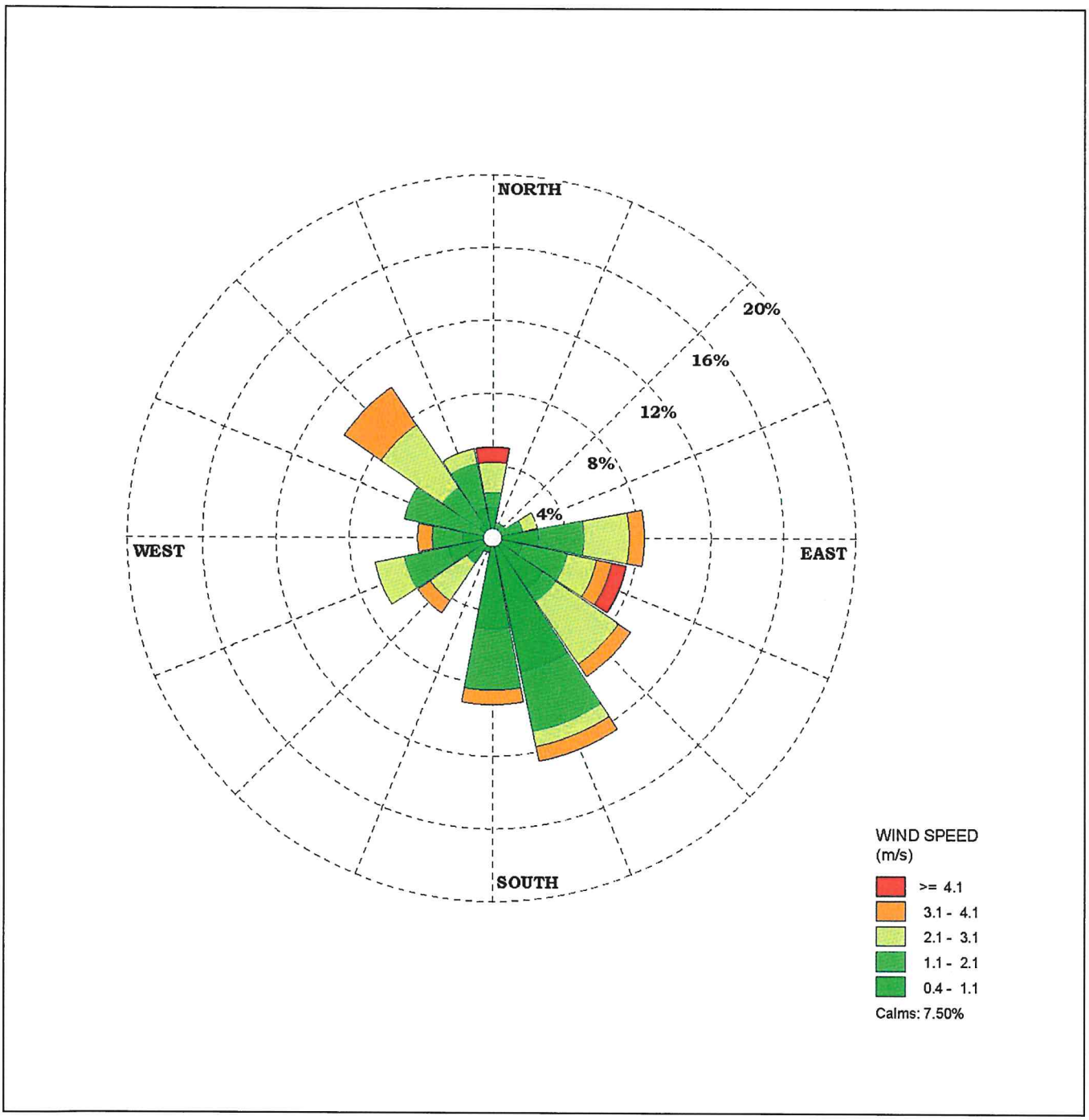
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Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
Measured Date : May 24-29, 2023
Report No. : 2023-RAAK191



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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 24-25, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK253
Report Date : June 7, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
12:00-13:00	48.6	77.8	57.3	53.4	44.4	41.1
13:00-14:00	49.3	81.8	58.0	54.1	44.5	41.4
14:00-15:00	48.7	73.1	58.5	55.4	46.0	41.7
15:00-16:00	48.7	90.9	61.1	59.1	47.5	44.2
16:00-17:00	50.0	84.5	62.5	60.2	49.2	46.6
17:00-18:00	49.7	75.5	61.0	57.3	48.1	42.3
18:00-19:00	48.7	79.4	62.5	58.4	47.3	41.5
19:00-20:00	49.8	71.6	56.7	53.9	46.2	42.1
20:00-21:00	49.7	74.4	53.1	51.2	46.8	44.0
21:00-22:00	47.6	69.3	50.3	48.6	45.2	44.4
22:00-23:00	46.5	78.5	57.9	55.1	43.9	42.8
23:00-00:00	42.5	62.1	44.6	43.3	41.0	40.1
00:00-01:00	45.2	72.0	48.6	45.9	43.4	42.5
01:00-02:00	43.7	56.7	46.1	45.0	42.7	41.5
02:00-03:00	41.4	59.0	44.3	42.5	40.3	39.2
03:00-04:00	40.5	72.3	49.0	44.0	37.7	36.7
04:00-05:00	42.8	70.2	49.4	45.3	38.9	37.1
05:00-06:00	49.0	81.2	57.7	55.0	46.3	42.3
06:00-07:00	51.7	87.4	58.8	56.1	48.6	43.4
07:00-08:00	50.7	71.0	58.6	56.3	47.8	42.3
08:00-09:00	50.3	77.4	59.6	57.3	48.2	42.8
09:00-10:00	49.3	69.3	57.6	55.3	45.9	40.8
10:00-11:00	48.7	73.9	58.8	56.2	46.5	40.9
11:00-12:00	49.5	72.8	59.1	55.6	45.6	42.0
24 Hours Measurement	**48.5**	**90.9**	**57.9**	**55.0**	**45.9**	**42.3**
Standard[1]	**70**	**115**	-	-	-	-
Ldn	**53.4**	-	-	-	-	-

Remark : [1] Notification of Na... ...40 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Gove... ...pril 3, B.E.2540 (1997).

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Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 25-26, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK253
Report Date : June 7, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
12:00-13:00	49.7	78.4	59.1	56.4	46.1	42.5
13:00-14:00	49.9	72.4	55.9	53.4	47.6	43.8
14:00-15:00	50.4	69.7	57.2	54.4	46.0	41.9
15:00-16:00	49.1	72.1	59.5	57.1	46.9	40.8
16:00-17:00	50.6	80.7	66.3	63.5	49.9	43.5
17:00-18:00	51.5	77.1	64.2	61.8	49.9	43.3
18:00-19:00	53.2	77.2	62.4	59.3	51.1	45.3
19:00-20:00	48.8	67.2	54.9	52.4	45.3	41.7
20:00-21:00	49.2	75.0	54.5	52.8	47.7	43.2
21:00-22:00	52.9	79.2	55.3	54.5	51.1	47.5
22:00-23:00	52.7	67.3	54.8	54.3	52.4	49.7
23:00-00:00	51.5	62.0	54.0	53.6	51.4	48.0
00:00-01:00	49.6	66.5	52.2	51.8	49.0	46.2
01:00-02:00	45.4	58.0	48.5	47.7	44.9	41.5
02:00-03:00	40.4	70.7	43.7	42.8	39.6	38.8
03:00-04:00	39.7	64.5	46.0	42.9	39.1	38.1
04:00-05:00	42.8	64.6	47.1	44.0	39.3	38.1
05:00-06:00	49.9	73.1	56.3	53.8	46.3	41.8
06:00-07:00	52.5	75.0	59.2	57.0	49.8	44.6
07:00-08:00	52.3	73.1	60.6	58.5	50.1	44.4
08:00-09:00	50.9	77.4	60.0	57.2	48.8	43.1
09:00-10:00	49.1	79.9	59.6	56.9	46.7	41.1
10:00-11:00	48.8	70.6	58.4	55.2	44.8	40.0
11:00-12:00	47.3	80.3	58.8	55.5	44.6	39.3
24 Hours Measurement	**50.1**	**80.7**	**59.0**	**56.5**	**48.2**	**43.9**
Standard[1]	**70**	**115**	-	-	-	-
Ldn	**55.9**	-	-	-	-	-

Remark : [1] Notification of Natic) (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Goverr l 3, B.E.2540 (1997).

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

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Laboratory Reviewer

Laboratory Supervisor

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Environment Research & Technology Company Limited
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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 26-27, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK253
Report Date : June 7, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
12:00-13:00	49.0	72.7	58.4	55.5	46.0	41.1
13:00-14:00	48.1	83.7	56.1	52.8	43.9	41.3
14:00-15:00	52.5	78.0	58.7	56.7	50.0	45.8
15:00-16:00	56.2	92.0	64.1	60.9	54.9	51.1
16:00-17:00	52.7	80.0	61.1	59.1	51.2	45.3
17:00-18:00	52.4	76.2	60.0	57.5	49.6	43.8
18:00-19:00	51.5	74.3	58.1	55.5	48.0	42.8
19:00-20:00	49.9	76.7	56.1	53.4	47.3	43.2
20:00-21:00	52.4	71.3	55.5	54.0	51.6	47.4
21:00-22:00	51.8	81.4	59.4	53.9	51.3	48.2
22:00-23:00	52.1	59.1	54.3	53.9	51.9	48.9
23:00-00:00	51.0	67.1	53.2	52.8	50.8	47.9
00:00-01:00	50.3	64.1	52.8	52.4	49.9	46.8
01:00-02:00	45.6	56.6	48.6	48.0	45.1	41.2
02:00-03:00	43.1	73.0	45.1	43.6	39.9	39.1
03:00-04:00	43.3	76.0	47.5	43.7	41.2	40.2
04:00-05:00	46.3	78.5	55.0	51.1	44.7	43.3
05:00-06:00	50.6	85.2	58.7	54.6	47.7	44.3
06:00-07:00	50.6	74.8	58.1	55.1	47.8	43.1
07:00-08:00	51.4	72.1	60.3	57.0	48.6	43.0
08:00-09:00	50.1	70.6	58.1	55.6	47.7	41.8
09:00-10:00	47.9	75.2	59.4	55.1	45.1	39.5
10:00-11:00	46.8	64.9	54.8	52.0	43.0	38.3
11:00-12:00	46.4	82.8	57.1	52.2	41.3	37.7
24 Hours Measurement	**50.7**	**92.0**	**57.9**	**55.0**	**48.9**	**45.0**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**56.0**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Gove ril 3, B.E.2540 (1997).

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Laboratory Supervisor

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 27-28, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK253
Report Date : June 7, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
12:00-13:00	46.8	73.0	55.8	52.7	43.7	38.9
13:00-14:00	47.0	77.2	56.5	52.7	42.5	38.9
14:00-15:00	47.3	73.2	57.1	54.0	42.7	39.4
15:00-16:00	48.8	78.7	59.0	55.1	46.2	40.3
16:00-17:00	49.3	85.8	60.6	57.3	47.8	42.0
17:00-18:00	52.4	79.0	61.1	57.6	49.6	44.8
18:00-19:00	50.8	79.2	59.4	56.0	48.4	44.1
19:00-20:00	48.0	77.7	54.6	51.7	44.2	41.4
20:00-21:00	49.6	76.1	55.9	52.4	47.2	43.5
21:00-22:00	54.3	74.5	56.3	55.9	53.9	50.8
22:00-23:00	52.1	72.3	54.3	53.7	51.1	47.0
23:00-00:00	43.6	69.7	46.2	44.2	43.3	42.4
00:00-01:00	45.7	64.8	48.2	46.0	43.4	42.1
01:00-02:00	44.6	66.8	47.2	45.5	42.7	41.4
02:00-03:00	42.8	61.3	44.8	43.6	42.0	40.6
03:00-04:00	44.6	70.7	45.9	45.2	42.0	40.7
04:00-05:00	43.1	58.7	46.6	44.1	41.3	40.2
05:00-06:00	48.0	65.7	54.0	51.5	44.2	40.5
06:00-07:00	52.0	75.1	59.4	57.5	49.0	43.6
07:00-08:00	52.1	86.9	59.7	56.9	49.1	44.3
08:00-09:00	50.3	78.8	58.3	55.2	47.5	42.4
09:00-10:00	49.0	72.6	56.3	54.3	45.9	40.7
10:00-11:00	49.1	78.4	56.4	53.3	44.7	40.9
11:00-12:00	49.9	79.0	55.7	53.1	46.3	41.6
24 Hours Measurement	**49.4**	**86.9**	**56.6**	**53.8**	**47.1**	**43.3**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**54.6**	-	-	-	-	-

Remark : [1'] Notification of Nat[illegible] 10 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Gove[illegible]ril 3, B.E.2540 (1997).

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 28-29, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK253
Report Date : June 7, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
12:00-13:00	49.7	86.1	64.0	58.8	46.7	40.8
13:00-14:00	50.5	70.7	57.4	55.1	48.9	46.7
14:00-15:00	45.7	76.0	56.8	52.1	40.8	37.3
15:00-16:00	47.9	78.6	57.1	53.0	43.1	39.3
16:00-17:00	50.8	74.7	59.9	57.3	48.8	42.7
17:00-18:00	50.9	75.2	58.9	56.5	48.1	43.0
18:00-19:00	50.8	77.3	58.8	56.0	47.3	42.4
19:00-20:00	51.0	72.6	56.5	53.7	49.7	44.6
20:00-21:00	54.1	72.7	55.7	55.4	53.6	49.2
21:00-22:00	53.2	76.3	56.1	55.5	52.9	48.9
22:00-23:00	63.2	77.1	66.7	66.2	62.6	60.8
23:00-00:00	53.5	70.9	57.8	56.9	51.8	48.4
00:00-01:00	52.8	65.2	57.7	56.5	50.7	48.3
01:00-02:00	53.6	71.5	56.5	55.1	52.8	50.8
02:00-03:00	54.2	65.0	55.8	55.4	54.0	52.5
03:00-04:00	54.5	67.6	57.8	56.9	53.4	50.9
04:00-05:00	52.2	67.4	55.7	54.7	51.1	48.7
05:00-06:00	52.6	79.9	58.0	55.8	51.0	48.1
06:00-07:00	52.2	71.4	58.1	55.3	48.4	44.1
07:00-08:00	51.2	79.8	61.3	58.6	50.0	44.3
08:00-09:00	52.2	77.5	61.2	57.9	49.5	44.3
09:00-10:00	51.5	89.1	60.3	57.5	49.4	43.4
10:00-11:00	50.0	74.7	58.0	55.3	46.9	41.6
11:00-12:00	49.5	77.0	59.2	56.7	48.2	44.0
24 Hours Measurement	**53.7**	**89.1**	**59.6**	**57.6**	**52.6**	**49.9**
Standard[1]	**70**	**115**	-	-	-	-
Ldn	**62.2**	-	-	-	-	-

Remark : [1] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Gove ril 3, B.E.2540 (1997).

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Laboratory Supervisor

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 24, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
12:00-12:05	49.2	41.8	15:00-15:05	50.3	42.9	18:00-18:05	51.7	45.9	21:00-21:05	47.1	44.6
12:05-12:10	47.3	40.9	15:05-15:10	50.0	43.9	18:05-18:10	50.2	43.4	21:05-21:10	50.2	44.5
12:10-12:15	46.4	39.9	15:10-15:15	49.2	40.6	18:10-18:15	48.6	42.2	21:10-21:15	48.3	44.4
12:15-12:20	49.3	40.7	15:15-15:20	48.6	42.1	18:15-18:20	50.7	42.9	21:15-21:20	46.3	44.5
12:20-12:25	47.4	41.6	15:20-15:25	47.3	45.0	18:20-18:25	45.6	39.4	21:20-21:25	45.6	44.5
12:25-12:30	49.3	41.5	15:25-15:30	48.4	40.7	18:25-18:30	50.1	40.4	21:25-21:30	50.1	44.5
12:30-12:35	46.6	40.6	15:30-15:35	47.7	43.2	18:30-18:35	47.0	38.2	21:30-21:35	47.5	44.9
12:35-12:40	46.8	41.3	15:35-15:40	46.3	44.6	18:35-18:40	45.4	37.7	21:35-21:40	47.4	44.7
12:40-12:45	50.1	41.6	15:40-15:45	48.9	46.4	18:40-18:45	45.6	39.2	21:40-21:45	45.6	44.6
12:45-12:50	49.6	41.4	15:45-15:50	48.6	47.2	18:45-18:50	46.8	40.0	21:45-21:50	46.5	44.2
12:50-12:55	50.2	40.5	15:50-15:55	47.8	45.0	18:50-18:55	49.1	41.3	21:50-21:55	45.3	44.1
12:55-13:00	48.6	41.1	15:55-16:00	50.1	43.0	18:55-19:00	47.5	39.8	21:55-22:00	48.1	43.7
13:00-13:05	47.4	41.5	16:00-16:05	50.3	46.0	19:00-19:05	45.5	38.6	22:00-22:05	45.1	43.9
13:05-13:10	49.1	42.7	16:05-16:10	49.5	46.6	19:05-19:10	46.8	39.2	22:05-22:10	44.7	44.0
13:10-13:15	50.1	42.6	16:10-16:15	50.0	45.6	19:10-19:15	46.9	38.9	22:10-22:15	45.6	44.8
13:15-13:20	48.0	41.7	16:15-16:20	51.2	46.7	19:15-19:20	47.8	40.6	22:15-22:20	52.5	44.0
13:20-13:25	51.7	42.9	16:20-16:25	50.1	45.9	19:20-19:25	46.8	42.5	22:20-22:25	45.0	44.3
13:25-13:30	50.1	40.9	16:25-16:30	48.5	48.2	19:25-19:30	51.4	41.8	22:25-22:30	44.2	40.9
13:30-13:35	50.9	41.6	16:30-16:35	47.5	46.3	19:30-19:35	48.9	41.6	22:30-22:35	42.5	41.9
13:35-13:40	47.6	41.7	16:35-16:40	47.9	45.6	19:35-19:40	47.3	42.8	22:35-22:40	42.3	41.6
13:40-13:45	46.8	39.8	16:40-16:45	49.6	48.6	19:40-19:45	51.7	42.8	22:40-22:45	42.7	41.8
13:45-13:50	50.1	40.2	16:45-16:50	51.2	47.3	19:45-19:50	46.3	42.5	22:45-22:50	43.3	41.5
13:50-13:55	47.7	40.0	16:50-16:55	51.6	46.8	19:50-19:55	53.6	44.5	22:50-22:55	46.5	41.4
13:55-14:00	48.7	39.0	16:55-17:00	50.2	42.3	19:55-20:00	53.3	44.2	22:55-23:00	48.9	40.2
14:00-14:05	45.9	39.4	17:00-17:05	51.7	42.8	20:00-20:05	49.8	42.4	23:00-23:05	45.2	39.8
14:05-14:10	46.1	40.2	17:05-17:10	50.3	42.2	20:05-20:10	49.2	43.6	23:05-23:10	41.1	40.2
14:10-14:15	48.3	41.3	17:10-17:15	49.6	41.0	20:10-20:15	49.6	42.9	23:10-23:15	41.5	40.2
14:15-14:20	49.2	43.3	17:15-17:20	47.8	40.8	20:15-20:20	48.2	42.6	23:15-23:20	41.2	40.1
14:20-14:25	49.0	42.9	17:20-17:25	48.9	42.5	20:20-20:25	54.8	46.9	23:20-23:25	40.5	39.6
14:25-14:30	48.6	42.2	17:25-17:30	49.6	45.0	20:25-20:30	50.2	46.9	23:25-23:30	43.1	39.0
14:30-14:35	47.6	43.0	17:30-17:35	50.1	42.5	20:30-20:35	48.9	46.1	23:30-23:35	44.4	40.5
14:35-14:40	48.5	40.3	17:35-17:40	50.0	41.3	20:35-20:40	49.8	42.5	23:35-23:40	41.8	40.3
14:40-14:45	49.0	40.4	17:40-17:45	49.6	43.5	20:40-20:45	48.7	40.5	23:40-23:45	40.6	38.9
14:45-14:50	47.6	40.8	17:45-17:50	49.1	40.1	20:45-20:50	43.9	40.2	23:45-23:50	43.8	40.1
14:50-14:55	50.2	42.4	17:50-17:55	49.2	41.3	20:50-20:55	47.9	41.2	23:50-23:55	42.0	40.8
14:55-15:00	51.4	42.2	17:55-18:00	48.9	41.8	20:55-21:00	45.4	44.6	23:55-00:00	41.9	40.8

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 25, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
00:00-00:05	42.1	41.0	03:00-03:05	39.9	38.2	06:00-06:05	54.0	47.3	09:00-09:05	51.6	42.7
00:05-00:10	41.8	40.3	03:05-03:10	37.5	36.5	06:05-06:10	51.0	41.9	09:05-09:10	49.4	39.5
00:10-00:15	45.3	40.5	03:10-03:15	39.2	36.5	06:10-06:15	50.2	40.9	09:10-09:15	50.7	41.6
00:15-00:20	44.8	43.4	03:15-03:20	45.1	36.5	06:15-06:20	50.4	42.3	09:15-09:20	49.1	39.7
00:20-00:25	51.1	43.4	03:20-03:25	39.6	37.0	06:20-06:25	51.1	42.0	09:20-09:25	50.6	40.9
00:25-00:30	44.8	43.4	03:25-03:30	37.0	36.5	06:25-06:30	51.0	43.6	09:25-09:30	51.6	42.2
00:30-00:35	44.1	42.8	03:30-03:35	37.5	36.5	06:30-06:35	50.5	43.1	09:30-09:35	47.6	41.2
00:35-00:40	43.5	42.2	03:35-03:40	45.6	37.0	06:35-06:40	53.0	44.8	09:35-09:40	44.5	39.5
00:40-00:45	43.9	43.1	03:40-03:45	37.8	36.5	06:40-06:45	51.4	42.2	09:40-09:45	45.6	39.3
00:45-00:50	43.9	43.1	03:45-03:50	36.5	36.0	06:45-06:50	54.4	44.5	09:45-09:50	46.2	39.6
00:50-00:55	43.5	42.3	03:50-03:55	37.6	36.1	06:50-06:55	50.3	41.6	09:50-09:55	51.6	42.3
00:55-01:00	44.0	43.0	03:55-04:00	38.0	36.5	06:55-07:00	50.2	42.0	09:55-10:00	44.6	39.2
01:00-01:05	44.0	39.5	04:00-04:05	46.3	37.3	07:00-07:05	49.6	41.1	10:00-10:05	44.6	39.4
01:05-01:10	45.1	42.9	04:05-04:10	40.4	37.5	07:05-07:10	48.2	41.6	10:05-10:10	46.2	40.6
01:10-01:15	43.4	42.5	04:10-04:15	37.8	36.5	07:10-07:15	50.3	41.1	10:10-10:15	48.1	39.4
01:15-01:20	43.5	42.7	04:15-04:20	45.2	37.5	07:15-07:20	52.3	42.6	10:15-10:20	47.5	41.1
01:20-01:25	42.7	39.3	04:20-04:25	43.1	36.8	07:20-07:25	50.2	44.1	10:20-10:25	49.2	40.9
01:25-01:30	43.9	42.9	04:25-04:30	39.6	36.6	07:25-07:30	49.5	42.3	10:25-10:30	45.5	39.1
01:30-01:35	43.6	42.6	04:30-04:35	40.6	36.9	07:30-07:35	52.3	43.3	10:30-10:35	46.2	39.8
01:35-01:40	45.7	42.8	04:35-04:40	38.6	36.8	07:35-07:40	50.7	41.6	10:35-10:40	46.9	40.9
01:40-01:45	44.6	42.5	04:40-04:45	39.8	36.5	07:40-07:45	52.5	44.1	10:40-10:45	50.0	41.0
01:45-01:50	42.1	38.7	04:45-04:50	39.7	36.5	07:45-07:50	50.3	41.0	10:45-10:50	52.7	43.3
01:50-01:55	43.4	39.7	04:50-04:55	45.6	38.4	07:50-07:55	50.1	40.8	10:50-10:55	50.3	41.4
01:55-02:00	38.9	37.8	04:55-05:00	45.4	37.7	07:55-08:00	49.6	41.6	10:55-11:00	50.2	42.3
02:00-02:05	39.4	37.1	05:00-05:05	42.7	37.9	08:00-08:05	49.5	42.9	11:00-11:05	50.8	43.0
02:05-02:10	40.8	39.9	05:05-05:10	47.3	38.4	08:05-08:10	48.5	41.8	11:05-11:10	52.6	43.2
02:10-02:15	42.1	39.7	05:10-05:15	42.6	39.3	08:10-08:15	50.2	42.9	11:10-11:15	49.2	43.4
02:15-02:20	41.1	39.5	05:15-05:20	43.5	39.6	08:15-08:20	49.5	41.9	11:15-11:20	50.0	40.8
02:20-02:25	41.2	39.7	05:20-05:25	47.1	40.5	08:20-08:25	51.2	41.9	11:20-11:25	48.6	39.5
02:25-02:30	41.2	39.4	05:25-05:30	43.6	39.6	08:25-08:30	50.3	42.3	11:25-11:30	47.8	39.4
02:30-02:35	40.1	39.2	05:30-05:35	50.1	42.4	08:30-08:35	49.8	39.9	11:30-11:35	48.6	40.7
02:35-02:40	40.0	38.4	05:35-05:40	51.1	42.7	08:35-08:40	50.6	41.7	11:35-11:40	48.2	42.4
02:40-02:45	41.3	39.7	05:40-05:45	52.5	42.5	08:40-08:45	49.6	42.7	11:40-11:45	49.0	43.2
02:45-02:50	41.0	39.6	05:45-05:50	50.8	42.6	08:45-08:50	53.0	44.7	11:45-11:50	47.1	41.9
02:50-02:55	43.3	39.4	05:50-05:55	50.3	42.5	08:50-08:55	48.9	44.8	11:50-11:55	47.5	42.3
02:55-03:00	43.0	38.6	05:55-06:00	51.2	47.9	08:55-09:00	50.6	43.5	11:55-12:00	51.0	41.7

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 25, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
12:00-12:05	50.4	41.8	15:00-15:05	51.8	42.5	18:00-18:05	49.2	42.9	21:00-21:05	51.6	46.2
12:05-12:10	47.5	41.0	15:05-15:10	50.2	41.8	18:05-18:10	50.0	42.0	21:05-21:10	42.6	40.2
12:10-12:15	48.1	41.7	15:10-15:15	47.6	37.8	18:10-18:15	52.7	45.3	21:10-21:15	46.0	40.5
12:15-12:20	51.7	43.8	15:15-15:20	48.5	39.4	18:15-18:20	56.4	46.7	21:15-21:20	51.2	42.0
12:20-12:25	47.0	40.7	15:20-15:25	51.5	42.0	18:20-18:25	56.1	49.3	21:20-21:25	52.9	49.9
12:25-12:30	45.5	40.5	15:25-15:30	50.2	42.2	18:25-18:30	53.1	46.8	21:25-21:30	52.1	49.5
12:30-12:35	48.2	41.7	15:30-15:35	45.6	36.5	18:30-18:35	51.2	44.4	21:30-21:35	52.0	45.9
12:35-12:40	46.5	42.1	15:35-15:40	48.2	38.9	18:35-18:40	54.7	45.8	21:35-21:40	52.2	46.7
12:40-12:45	48.5	42.1	15:40-15:45	47.6	40.3	18:40-18:45	52.5	42.7	21:40-21:45	51.7	47.2
12:45-12:50	46.1	41.5	15:45-15:50	47.5	39.4	18:45-18:50	54.5	45.9	21:45-21:50	53.9	47.5
12:50-12:55	54.1	45.4	15:50-15:55	48.0	43.5	18:50-18:55	49.5	42.9	21:50-21:55	58.7	49.3
12:55-13:00	52.5	44.2	15:55-16:00	48.5	40.1	18:55-19:00	50.1	42.7	21:55-22:00	53.2	51.3
13:00-13:05	50.0	44.2	16:00-16:05	50.1	42.6	19:00-19:05	47.7	39.8	22:00-22:05	53.8	51.2
13:05-13:10	50.0	42.5	16:05-16:10	47.5	41.0	19:05-19:10	48.8	41.2	22:05-22:10	52.4	49.8
13:10-13:15	47.0	39.7	16:10-16:15	51.2	44.8	19:10-19:15	49.6	41.6	22:10-22:15	52.8	50.5
13:15-13:20	48.1	40.7	16:15-16:20	48.2	38.7	19:15-19:20	50.1	41.9	22:15-22:20	52.6	48.7
13:20-13:25	45.0	39.4	16:20-16:25	50.1	42.2	19:20-19:25	50.1	42.6	22:20-22:25	51.3	48.3
13:25-13:30	48.1	40.0	16:25-16:30	50.6	43.3	19:25-19:30	49.8	42.4	22:25-22:30	51.2	43.0
13:30-13:35	47.9	40.1	16:30-16:35	50.1	43.8	19:30-19:35	49.6	41.7	22:30-22:35	52.4	48.2
13:35-13:40	48.2	40.1	16:35-16:40	51.2	46.2	19:35-19:40	50.5	41.7	22:35-22:40	53.1	51.1
13:40-13:45	52.8	43.1	16:40-16:45	52.3	43.9	19:40-19:45	45.6	42.0	22:40-22:45	52.7	50.6
13:45-13:50	52.6	51.3	16:45-16:50	51.0	43.6	19:45-19:50	46.5	41.5	22:45-22:50	53.3	50.8
13:50-13:55	51.9	42.3	16:50-16:55	51.2	44.0	19:50-19:55	47.0	42.5	22:50-22:55	53.6	50.3
13:55-14:00	50.3	40.4	16:55-17:00	51.2	43.9	19:55-20:00	47.4	41.0	22:55-23:00	52.0	49.2
14:00-14:05	51.1	42.7	17:00-17:05	51.0	41.8	20:00-20:05	48.9	42.4	23:00-23:05	50.2	40.8
14:05-14:10	50.4	42.1	17:05-17:10	52.1	44.1	20:05-20:10	48.5	40.9	23:05-23:10	50.8	40.8
14:10-14:15	50.8	42.1	17:10-17:15	50.3	42.5	20:10-20:15	47.6	40.7	23:10-23:15	52.8	50.3
14:15-14:20	50.3	41.6	17:15-17:20	52.6	45.2	20:15-20:20	50.7	47.5	23:15-23:20	53.0	50.7
14:20-14:25	50.0	42.0	17:20-17:25	53.0	44.5	20:20-20:25	49.3	41.8	23:20-23:25	53.2	50.9
14:25-14:30	50.0	43.4	17:25-17:30	50.1	42.8	20:25-20:30	44.2	41.0	23:25-23:30	52.6	49.7
14:30-14:35	49.0	41.4	17:30-17:35	52.3	43.4	20:30-20:35	43.4	40.8	23:30-23:35	49.7	40.6
14:35-14:40	48.9	40.8	17:35-17:40	50.6	41.2	20:35-20:40	44.5	41.1	23:35-23:40	50.3	47.1
14:40-14:45	51.9	42.0	17:40-17:45	51.2	43.2	20:40-20:45	50.5	44.0	23:40-23:45	51.4	48.8
14:45-14:50	51.3	41.6	17:45-17:50	52.6	43.9	20:45-20:50	51.4	42.7	23:45-23:50	51.3	48.2
14:50-14:55	51.0	42.1	17:50-17:55	50.1	41.9	20:50-20:55	51.0	45.7	23:50-23:55	51.6	48.6
14:55-15:00	48.5	40.6	17:55-18:00	50.2	43.4	20:55-21:00	51.3	43.2	23:55-00:00	49.1	40.0

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 26, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
00:00-00:05	50.5	47.4	03:00-03:05	39.3	38.3	06:00-06:05	50.1	41.9	09:00-09:05	51.0	42.1
00:05-00:10	46.7	40.6	03:05-03:10	39.1	38.3	06:05-06:10	52.6	43.9	09:05-09:10	48.5	39.5
00:10-00:15	51.6	47.1	03:10-03:15	39.0	38.0	06:10-06:15	50.2	44.3	09:10-09:15	45.2	41.6
00:15-00:20	52.1	49.6	03:15-03:20	38.9	37.9	06:15-06:20	52.9	44.1	09:15-09:20	50.1	40.8
00:20-00:25	52.3	49.6	03:20-03:25	40.1	38.2	06:20-06:25	52.6	44.6	09:20-09:25	49.0	40.6
00:25-00:30	51.9	48.9	03:25-03:30	39.2	38.4	06:25-06:30	54.9	47.6	09:25-09:30	50.0	42.0
00:30-00:35	52.2	49.5	03:30-03:35	38.6	37.4	06:30-06:35	53.5	45.6	09:30-09:35	49.2	41.9
00:35-00:40	47.5	40.1	03:35-03:40	38.3	37.1	06:35-06:40	52.3	43.4	09:35-09:40	48.6	42.9
00:40-00:45	39.2	38.1	03:40-03:45	40.4	37.4	06:40-06:45	50.1	43.6	09:40-09:45	51.2	42.0
00:45-00:50	47.4	38.0	03:45-03:50	39.7	38.5	06:45-06:50	51.6	43.1	09:45-09:50	49.6	39.6
00:50-00:55	40.8	39.3	03:50-03:55	42.3	38.5	06:50-06:55	54.1	44.8	09:50-09:55	45.4	38.3
00:55-01:00	38.1	37.4	03:55-04:00	40.1	38.6	06:55-07:00	52.6	45.2	09:55-10:00	47.2	39.0
01:00-01:05	38.1	37.5	04:00-04:05	41.9	38.3	07:00-07:05	52.3	46.3	10:00-10:05	50.2	40.3
01:05-01:10	39.6	39.1	04:05-04:10	41.5	37.6	07:05-07:10	51.5	45.4	10:05-10:10	49.1	42.5
01:10-01:15	39.4	38.6	04:10-04:15	38.4	37.2	07:10-07:15	52.2	43.8	10:10-10:15	48.2	39.1
01:15-01:20	42.0	38.8	04:15-04:20	37.8	37.0	07:15-07:20	50.9	42.4	10:15-10:20	50.9	41.1
01:20-01:25	44.4	39.1	04:20-04:25	43.8	37.6	07:20-07:25	52.4	43.5	10:20-10:25	48.2	38.7
01:25-01:30	51.9	48.9	04:25-04:30	41.7	37.9	07:25-07:30	50.3	41.5	10:25-10:30	47.2	38.9
01:30-01:35	51.2	41.5	04:30-04:35	39.3	37.9	07:30-07:35	52.5	42.5	10:30-10:35	48.1	38.1
01:35-01:40	39.7	38.9	04:35-04:40	43.7	38.4	07:35-07:40	52.0	43.4	10:35-10:40	47.2	37.4
01:40-01:45	40.4	39.7	04:40-04:45	43.2	39.2	07:40-07:45	54.4	45.4	10:40-10:45	48.3	39.7
01:45-01:50	41.1	38.7	04:45-04:50	40.3	38.0	07:45-07:50	53.7	47.1	10:45-10:50	48.0	39.3
01:50-01:55	39.5	38.8	04:50-04:55	42.2	38.9	07:50-07:55	53.0	45.5	10:50-10:55	50.7	41.8
01:55-02:00	42.9	39.5	04:55-05:00	48.1	38.8	07:55-08:00	50.1	42.1	10:55-11:00	47.1	40.7
02:00-02:05	41.4	38.7	05:00-05:05	44.4	39.3	08:00-08:05	52.3	44.7	11:00-11:05	48.2	39.2
02:05-02:10	40.5	38.9	05:05-05:10	47.4	38.2	08:05-08:10	50.1	42.2	11:05-11:10	46.3	38.7
02:10-02:15	40.2	38.8	05:10-05:15	45.2	38.7	08:10-08:15	50.5	41.9	11:10-11:15	47.2	37.2
02:15-02:20	40.1	39.3	05:15-05:20	50.9	40.9	08:15-08:20	51.6	41.6	11:15-11:20	46.2	37.8
02:20-02:25	40.3	39.1	05:20-05:25	46.0	40.9	08:20-08:25	51.2	43.6	11:20-11:25	47.3	38.6
02:25-02:30	40.2	38.6	05:25-05:30	46.2	40.3	08:25-08:30	50.3	43.9	11:25-11:30	46.1	39.4
02:30-02:35	40.0	38.9	05:30-05:35	48.0	40.5	08:30-08:35	50.4	44.1	11:30-11:35	46.2	38.4
02:35-02:40	39.1	38.4	05:35-05:40	51.8	43.1	08:35-08:40	51.0	43.9	11:35-11:40	47.5	39.8
02:40-02:45	39.1	38.5	05:40-05:45	52.6	44.3	08:40-08:45	50.0	42.3	11:40-11:45	47.2	38.8
02:45-02:50	41.8	38.6	05:45-05:50	51.1	43.2	08:45-08:50	52.6	43.8	11:45-11:50	47.2	39.8
02:50-02:55	39.9	39.1	05:50-05:55	50.3	43.2	08:50-08:55	51.6	41.9	11:50-11:55	47.0	41.1
02:55-03:00	41.7	38.5	05:55-06:00	53.3	43.9	08:55-09:00	47.2	40.9	11:55-12:00	50.0	41.2

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 26, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
12:00-12:05	51.2	42.1	15:00-15:05	55.5	50.6	18:00-18:05	52.7	44.5	21:00-21:05	51.6	47.4
12:05-12:10	50.0	40.8	15:05-15:10	57.2	56.7	18:05-18:10	49.8	41.6	21:05-21:10	52.9	50.3
12:10-12:15	50.2	41.5	15:10-15:15	61.2	57.1	18:10-18:15	49.1	40.9	21:10-21:15	52.7	50.3
12:15-12:20	50.1	40.9	15:15-15:20	57.6	50.4	18:15-18:20	53.2	43.7	21:15-21:20	52.2	49.6
12:20-12:25	50.3	41.2	15:20-15:25	57.6	48.6	18:20-18:25	51.9	44.1	21:20-21:25	52.2	49.9
12:25-12:30	47.5	41.2	15:25-15:30	55.3	46.3	18:25-18:30	55.5	46.1	21:25-21:30	51.3	43.4
12:30-12:35	46.2	41.4	15:30-15:35	56.3	48.3	18:30-18:35	50.3	42.7	21:30-21:35	48.1	42.6
12:35-12:40	47.2	41.0	15:35-15:40	52.1	44.0	18:35-18:40	51.2	43.7	21:35-21:40	48.1	43.5
12:40-12:45	47.9	40.6	15:40-15:45	52.1	42.2	18:40-18:45	50.1	40.3	21:40-21:45	51.2	46.9
12:45-12:50	46.2	40.9	15:45-15:50	53.5	48.0	18:45-18:50	50.2	40.2	21:45-21:50	52.5	47.8
12:50-12:55	45.4	40.6	15:50-15:55	51.2	43.5	18:50-18:55	47.1	38.7	21:50-21:55	52.0	48.9
12:55-13:00	51.0	41.2	15:55-16:00	52.6	45.1	18:55-19:00	50.4	41.5	21:55-22:00	53.9	48.9
13:00-13:05	49.2	41.2	16:00-16:05	53.2	46.1	19:00-19:05	50.1	40.7	22:00-22:05	51.9	49.0
13:05-13:10	45.8	40.5	16:05-16:10	51.8	42.4	19:05-19:10	49.6	40.6	22:05-22:10	51.8	48.6
13:10-13:15	49.7	42.0	16:10-16:15	51.2	41.5	19:10-19:15	49.6	41.7	22:10-22:15	50.0	43.1
13:15-13:20	48.9	41.7	16:15-16:20	51.3	43.0	19:15-19:20	50.1	41.7	22:15-22:20	51.1	46.3
13:20-13:25	47.0	41.6	16:20-16:25	50.1	42.5	19:20-19:25	47.6	40.5	22:20-22:25	49.8	42.5
13:25-13:30	49.9	41.9	16:25-16:30	49.0	40.5	19:25-19:30	49.3	41.5	22:25-22:30	51.2	43.3
13:30-13:35	46.8	41.6	16:30-16:35	50.1	44.6	19:30-19:35	46.8	40.8	22:30-22:35	53.9	51.6
13:35-13:40	46.2	40.1	16:35-16:40	54.5	45.2	19:35-19:40	51.3	41.7	22:35-22:40	53.1	51.1
13:40-13:45	45.2	41.0	16:40-16:45	58.1	52.4	19:40-19:45	47.4	40.4	22:40-22:45	51.9	49.4
13:45-13:50	48.1	40.6	16:45-16:50	50.2	43.1	19:45-19:50	50.1	40.7	22:45-22:50	52.4	49.6
13:50-13:55	50.9	41.7	16:50-16:55	52.8	42.9	19:50-19:55	51.0	42.7	22:50-22:55	53.0	50.6
13:55-14:00	44.6	41.1	16:55-17:00	50.1	40.5	19:55-20:00	52.4	50.3	22:55-23:00	52.7	50.3
14:00-14:05	50.1	41.6	17:00-17:05	52.3	45.3	20:00-20:05	54.4	50.5	23:00-23:05	53.0	50.6
14:05-14:10	48.1	41.1	17:05-17:10	52.1	43.1	20:05-20:10	53.0	50.0	23:05-23:10	53.5	50.6
14:10-14:15	45.4	40.9	17:10-17:15	51.4	42.9	20:10-20:15	51.5	43.3	23:10-23:15	52.6	50.2
14:15-14:20	50.7	41.7	17:15-17:20	51.2	42.2	20:15-20:20	52.7	50.0	23:15-23:20	52.6	49.8
14:20-14:25	50.2	41.6	17:20-17:25	51.0	43.0	20:20-20:25	54.9	49.1	23:20-23:25	52.0	47.9
14:25-14:30	52.3	42.4	17:25-17:30	54.0	44.6	20:25-20:30	50.9	43.8	23:25-23:30	51.2	47.4
14:30-14:35	47.4	41.7	17:30-17:35	50.4	43.6	20:30-20:35	51.6	44.3	23:30-23:35	51.5	48.4
14:35-14:40	51.6	44.8	17:35-17:40	55.9	46.3	20:35-20:40	51.4	43.6	23:35-23:40	50.1	42.6
14:40-14:45	56.2	49.6	17:40-17:45	51.3	43.7	20:40-20:45	52.7	47.2	23:40-23:45	51.5	48.7
14:45-14:50	53.1	46.3	17:45-17:50	52.8	43.1	20:45-20:50	51.7	47.1	23:45-23:50	43.4	40.9
14:50-14:55	55.6	50.5	17:50-17:55	50.9	43.1	20:50-20:55	50.2	45.0	23:50-23:55	41.8	41.1
14:55-15:00	55.8	48.8	17:55-18:00	51.5	43.1	20:55-21:00	50.6	44.9	23:55-00:00	42.5	41.4

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 27, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
00:00-00:05	42.7	40.9	03:00-03:05	41.0	39.8	06:00-06:05	51.3	43.1	09:00-09:05	48.9	40.0
00:05-00:10	42.6	41.4	03:05-03:10	41.2	39.7	06:05-06:10	52.4	44.9	09:05-09:10	48.2	39.5
00:10-00:15	42.2	41.5	03:10-03:15	40.4	39.5	06:10-06:15	52.3	44.3	09:10-09:15	49.2	40.2
00:15-00:20	48.4	41.6	03:15-03:20	45.4	40.0	06:15-06:20	52.1	44.2	09:15-09:20	44.6	36.6
00:20-00:25	48.3	41.5	03:20-03:25	43.0	40.2	06:20-06:25	48.9	42.1	09:20-09:25	48.1	40.8
00:25-00:30	52.3	49.2	03:25-03:30	41.5	40.2	06:25-06:30	47.4	41.3	09:25-09:30	49.5	39.6
00:30-00:35	52.1	49.4	03:30-03:35	42.3	40.5	06:30-06:35	48.2	41.6	09:30-09:35	47.6	39.2
00:35-00:40	52.0	48.3	03:35-03:40	40.3	39.6	06:35-06:40	51.8	43.8	09:35-09:40	47.2	38.5
00:40-00:45	52.1	49.0	03:40-03:45	42.1	39.4	06:40-06:45	51.2	42.7	09:40-09:45	47.6	41.3
00:45-00:50	52.1	49.1	03:45-03:50	47.9	39.9	06:45-06:50	49.5	43.8	09:45-09:50	46.1	37.3
00:50-00:55	51.7	47.6	03:50-03:55	42.4	39.9	06:50-06:55	48.6	41.0	09:50-09:55	48.1	39.4
00:55-01:00	51.2	47.3	03:55-04:00	44.1	42.9	06:55-07:00	49.1	42.3	09:55-10:00	48.2	39.6
01:00-01:05	50.0	44.0	04:00-04:05	44.3	43.1	07:00-07:05	53.0	43.4	10:00-10:05	47.0	38.3
01:05-01:10	49.6	42.2	04:05-04:10	43.9	41.8	07:05-07:10	51.8	42.3	10:05-10:10	46.1	37.1
01:10-01:15	49.3	42.4	04:10-04:15	43.5	42.1	07:10-07:15	51.2	42.9	10:10-10:15	46.0	37.7
01:15-01:20	46.7	39.7	04:15-04:20	44.2	42.1	07:15-07:20	50.3	42.2	10:15-10:20	45.1	38.6
01:20-01:25	41.3	40.2	04:20-04:25	45.3	43.3	07:20-07:25	50.1	43.2	10:20-10:25	44.8	38.7
01:25-01:30	41.3	40.1	04:25-04:30	49.5	43.3	07:25-07:30	50.0	42.2	10:25-10:30	49.5	39.8
01:30-01:35	40.8	40.2	04:30-04:35	44.2	43.1	07:30-07:35	49.3	41.6	10:30-10:35	48.1	38.7
01:35-01:40	41.7	40.7	04:35-04:40	49.3	43.1	07:35-07:40	49.2	42.1	10:35-10:40	47.7	38.6
01:40-01:45	41.5	40.8	04:40-04:45	45.8	44.2	07:40-07:45	52.9	43.0	10:40-10:45	46.2	37.0
01:45-01:50	42.2	40.4	04:45-04:50	45.8	44.4	07:45-07:50	51.2	44.7	10:45-10:50	46.0	37.5
01:50-01:55	41.7	40.7	04:50-04:55	46.2	44.3	07:50-07:55	54.1	45.0	10:50-10:55	45.7	39.0
01:55-02:00	41.7	40.2	04:55-05:00	48.1	44.2	07:55-08:00	51.0	41.6	10:55-11:00	47.2	37.4
02:00-02:05	40.9	40.2	05:00-05:05	46.0	44.9	08:00-08:05	50.6	41.3	11:00-11:05	46.2	36.7
02:05-02:10	41.5	39.6	05:05-05:10	47.8	44.7	08:05-08:10	49.1	39.7	11:05-11:10	46.6	37.4
02:10-02:15	41.6	39.9	05:10-05:15	49.3	45.1	08:10-08:15	50.1	42.6	11:10-11:15	46.3	36.6
02:15-02:20	47.6	40.3	05:15-05:20	49.8	44.4	08:15-08:20	50.2	43.5	11:15-11:20	46.3	36.5
02:20-02:25	48.2	38.9	05:20-05:25	47.1	44.1	08:20-08:25	52.3	43.4	11:20-11:25	46.3	37.9
02:25-02:30	39.5	38.6	05:25-05:30	50.8	44.3	08:25-08:30	50.1	42.7	11:25-11:30	46.5	37.7
02:30-02:35	40.4	38.8	05:30-05:35	48.8	44.0	08:30-08:35	49.2	39.8	11:30-11:35	45.2	36.6
02:35-02:40	42.1	38.6	05:35-05:40	52.2	43.6	08:35-08:40	50.2	42.2	11:35-11:40	46.3	37.1
02:40-02:45	42.6	38.5	05:40-05:45	52.5	44.5	08:40-08:45	50.0	40.2	11:40-11:45	46.1	38.9
02:45-02:50	38.9	38.2	05:45-05:50	49.2	43.8	08:45-08:50	49.8	40.0	11:45-11:50	46.2	36.5
02:50-02:55	39.0	38.4	05:50-05:55	54.5	44.9	08:50-08:55	48.5	41.7	11:50-11:55	47.1	38.8
02:55-03:00	40.6	39.0	05:55-06:00	51.9	43.3	08:55-09:00	49.7	42.5	11:55-12:00	47.0	39.6

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 27, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
12:00-12:05	46.2	37.7	15:00-15:05	47.2	38.1	18:00-18:05	51.2	45.2	21:00-21:05	51.7	47.2
12:05-12:10	47.7	38.4	15:05-15:10	48.9	39.9	18:05-18:10	50.4	43.7	21:05-21:10	50.6	45.1
12:10-12:15	48.6	39.2	15:10-15:15	48.7	39.2	18:10-18:15	51.6	44.2	21:10-21:15	51.6	48.7
12:15-12:20	46.3	38.2	15:15-15:20	48.9	40.2	18:15-18:20	52.8	43.9	21:15-21:20	54.6	50.6
12:20-12:25	45.2	37.7	15:20-15:25	49.1	40.8	18:20-18:25	52.1	45.2	21:20-21:25	55.0	52.2
12:25-12:30	46.1	37.9	15:25-15:30	48.1	40.2	18:25-18:30	49.1	44.8	21:25-21:30	57.5	52.8
12:30-12:35	46.1	40.0	15:30-15:35	49.1	42.3	18:30-18:35	49.7	44.8	21:30-21:35	54.9	52.2
12:35-12:40	47.5	39.8	15:35-15:40	48.6	40.9	18:35-18:40	48.2	44.1	21:35-21:40	55.0	52.5
12:40-12:45	47.2	39.7	15:40-15:45	49.9	40.4	18:40-18:45	50.2	43.3	21:40-21:45	54.7	51.6
12:45-12:50	46.2	39.7	15:45-15:50	49.1	39.4	18:45-18:50	50.3	44.7	21:45-21:50	54.4	51.3
12:50-12:55	46.7	39.5	15:50-15:55	48.1	40.7	18:50-18:55	50.1	40.9	21:50-21:55	53.9	50.3
12:55-13:00	46.3	38.4	15:55-16:00	49.3	39.8	18:55-19:00	51.4	42.2	21:55-22:00	53.9	49.4
13:00-13:05	47.6	39.4	16:00-16:05	48.0	41.2	19:00-19:05	50.1	40.7	22:00-22:05	53.8	48.7
13:05-13:10	46.7	39.4	16:05-16:10	48.6	42.7	19:05-19:10	48.7	41.5	22:05-22:10	53.8	49.6
13:10-13:15	46.6	39.8	16:10-16:15	47.2	41.7	19:10-19:15	48.0	41.0	22:10-22:15	54.2	50.8
13:15-13:20	48.1	39.7	16:15-16:20	51.0	43.6	19:15-19:20	48.1	40.4	22:15-22:20	53.8	46.9
13:20-13:25	47.6	38.6	16:20-16:25	50.1	42.1	19:20-19:25	47.5	40.2	22:20-22:25	50.2	40.7
13:25-13:30	48.8	39.2	16:25-16:30	49.6	41.5	19:25-19:30	43.0	40.0	22:25-22:30	48.6	43.3
13:30-13:35	48.9	39.3	16:30-16:35	49.2	40.6	19:30-19:35	45.6	41.0	22:30-22:35	51.2	44.9
13:35-13:40	47.3	38.5	16:35-16:40	48.2	40.9	19:35-19:40	50.1	42.2	22:35-22:40	54.8	48.2
13:40-13:45	46.2	38.0	16:40-16:45	49.1	40.2	19:40-19:45	45.9	40.0	22:40-22:45	50.4	46.7
13:45-13:50	46.4	38.1	16:45-16:50	50.2	43.6	19:45-19:50	47.8	41.6	22:45-22:50	52.0	45.3
13:50-13:55	42.8	38.4	16:50-16:55	50.0	41.7	19:50-19:55	48.1	42.7	22:50-22:55	47.7	44.4
13:55-14:00	43.1	38.3	16:55-17:00	49.2	42.9	19:55-20:00	48.4	43.7	22:55-23:00	45.2	44.4
14:00-14:05	47.2	38.2	17:00-17:05	48.9	42.4	20:00-20:05	45.8	42.9	23:00-23:05	44.4	43.7
14:05-14:10	47.6	39.0	17:05-17:10	49.1	42.2	20:05-20:10	46.9	42.2	23:05-23:10	44.8	44.1
14:10-14:15	47.8	38.7	17:10-17:15	48.8	41.9	20:10-20:15	46.2	43.4	23:10-23:15	44.8	44.1
14:15-14:20	46.0	38.7	17:15-17:20	51.1	44.6	20:15-20:20	47.7	41.0	23:15-23:20	43.5	42.2
14:20-14:25	47.8	39.6	17:20-17:25	50.1	44.1	20:20-20:25	46.0	41.4	23:20-23:25	42.8	42.1
14:25-14:30	47.1	39.3	17:25-17:30	52.4	44.9	20:25-20:30	45.8	41.2	23:25-23:30	43.2	41.0
14:30-14:35	47.5	41.1	17:30-17:35	52.0	46.1	20:30-20:35	47.5	41.9	23:30-23:35	42.7	41.9
14:35-14:40	46.7	41.7	17:35-17:40	54.4	46.4	20:35-20:40	51.2	45.6	23:35-23:40	42.0	41.1
14:40-14:45	47.3	39.7	17:40-17:45	53.1	46.1	20:40-20:45	53.2	47.9	23:40-23:45	42.4	41.0
14:45-14:50	46.9	38.5	17:45-17:50	55.5	46.0	20:45-20:50	49.6	40.8	23:45-23:50	44.7	42.0
14:50-14:55	47.5	38.4	17:50-17:55	54.7	45.9	20:50-20:55	50.9	42.4	23:50-23:55	43.7	42.3
14:55-15:00	47.7	38.1	17:55-18:00	51.6	43.7	20:55-21:00	53.2	44.7	23:55-00:00	42.8	41.6

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 28, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
00:00-00:05	47.7	42.8	03:00-03:05	41.3	40.4	06:00-06:05	49.3	42.2	09:00-09:05	50.0	41.4
00:05-00:10	48.1	42.3	03:05-03:10	42.4	40.8	06:05-06:10	50.1	43.9	09:05-09:10	49.8	42.5
00:10-00:15	44.5	43.2	03:10-03:15	42.6	40.8	06:10-06:15	54.1	45.3	09:10-09:15	48.1	39.6
00:15-00:20	45.1	42.6	03:15-03:20	41.8	40.4	06:15-06:20	53.2	44.5	09:15-09:20	49.9	40.0
00:20-00:25	43.7	42.7	03:20-03:25	45.6	40.3	06:20-06:25	53.0	43.9	09:20-09:25	48.5	39.3
00:25-00:30	43.2	42.4	03:25-03:30	43.9	40.4	06:25-06:30	53.0	43.8	09:25-09:30	46.8	41.5
00:30-00:35	43.4	42.6	03:30-03:35	42.3	40.4	06:30-06:35	52.1	43.1	09:30-09:35	47.7	41.2
00:35-00:40	47.5	41.3	03:35-03:40	42.4	41.1	06:35-06:40	51.4	42.9	09:35-09:40	51.1	42.6
00:40-00:45	45.3	40.5	03:40-03:45	43.9	40.7	06:40-06:45	52.1	43.4	09:40-09:45	50.1	40.4
00:45-00:50	47.7	41.3	03:45-03:50	51.0	41.0	06:45-06:50	51.4	42.9	09:45-09:50	50.6	41.3
00:50-00:55	44.2	41.5	03:50-03:55	42.9	41.4	06:50-06:55	48.9	42.0	09:50-09:55	44.5	37.4
00:55-01:00	42.8	41.6	03:55-04:00	42.7	40.5	06:55-07:00	52.3	44.5	09:55-10:00	46.6	38.7
01:00-01:05	42.7	41.5	04:00-04:05	43.4	41.5	07:00-07:05	52.2	42.5	10:00-10:05	46.2	38.7
01:05-01:10	42.3	40.8	04:05-04:10	43.0	41.8	07:05-07:10	51.7	42.9	10:05-10:10	47.5	39.5
01:10-01:15	42.4	41.0	04:10-04:15	43.2	41.0	07:10-07:15	53.4	46.0	10:10-10:15	49.0	39.6
01:15-01:20	42.0	40.8	04:15-04:20	42.5	41.1	07:15-07:20	56.3	46.3	10:15-10:20	45.4	38.7
01:20-01:25	44.7	40.5	04:20-04:25	44.6	41.4	07:20-07:25	53.4	44.0	10:20-10:25	50.5	41.8
01:25-01:30	42.7	41.4	04:25-04:30	44.9	42.2	07:25-07:30	51.7	45.4	10:25-10:30	47.7	40.1
01:30-01:35	48.2	41.9	04:30-04:35	43.4	37.8	07:30-07:35	51.0	46.8	10:30-10:35	48.0	40.6
01:35-01:40	42.4	40.2	04:35-04:40	39.6	38.1	07:35-07:40	51.2	44.6	10:35-10:40	47.3	40.4
01:40-01:45	45.7	41.8	04:40-04:45	41.6	37.9	07:40-07:45	49.1	39.8	10:40-10:45	48.1	42.2
01:45-01:50	47.9	42.0	04:45-04:50	43.4	38.4	07:45-07:50	50.1	42.3	10:45-10:50	49.1	41.7
01:50-01:55	43.3	42.2	04:50-04:55	43.0	38.4	07:50-07:55	50.2	42.8	10:50-10:55	52.7	42.8
01:55-02:00	43.6	42.4	04:55-05:00	42.8	38.2	07:55-08:00	49.8	43.5	10:55-11:00	51.5	42.4
02:00-02:05	45.1	42.4	05:00-05:05	43.0	38.0	08:00-08:05	49.5	40.7	11:00-11:05	50.1	40.2
02:05-02:10	43.2	41.7	05:05-05:10	41.4	38.2	08:05-08:10	49.5	41.6	11:05-11:10	48.1	39.4
02:10-02:15	42.3	40.7	05:10-05:15	44.3	40.2	08:10-08:15	48.9	43.1	11:10-11:15	50.1	40.6
02:15-02:20	43.8	41.7	05:15-05:20	41.5	38.5	08:15-08:20	49.5	41.4	11:15-11:20	46.3	40.5
02:20-02:25	43.0	39.9	05:20-05:25	44.8	38.4	08:20-08:25	49.9	41.1	11:20-11:25	49.6	40.1
02:25-02:30	41.3	39.4	05:25-05:30	44.8	39.6	08:25-08:30	50.2	41.2	11:25-11:30	48.4	40.1
02:30-02:35	45.6	40.5	05:30-05:35	45.1	39.1	08:30-08:35	52.0	44.9	11:30-11:35	50.8	41.8
02:35-02:40	40.9	39.8	05:35-05:40	50.0	40.5	08:35-08:40	52.7	42.9	11:35-11:40	49.6	41.7
02:40-02:45	41.3	40.2	05:40-05:45	50.4	41.4	08:40-08:45	51.3	42.1	11:40-11:45	48.1	39.0
02:45-02:50	41.2	40.1	05:45-05:50	52.4	43.4	08:45-08:50	50.1	43.7	11:45-11:50	48.1	40.1
02:50-02:55	41.1	40.0	05:50-05:55	49.2	41.3	08:50-08:55	48.9	41.8	11:50-11:55	50.8	42.7
02:55-03:00	41.2	40.1	05:55-06:00	50.7	43.1	08:55-09:00	49.6	42.0	11:55-12:00	54.0	46.5

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 28, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
12:00-12:05	54.2	44.5	15:00-15:05	47.4	38.3	18:00-18:05	52.1	43.6	21:00-21:05	53.2	45.7
12:05-12:10	50.3	40.4	15:05-15:10	48.2	39.6	18:05-18:10	53.1	43.5	21:05-21:10	53.6	48.1
12:10-12:15	47.8	40.5	15:10-15:15	47.9	38.5	18:10-18:15	52.6	44.0	21:10-21:15	52.9	47.9
12:15-12:20	52.0	42.0	15:15-15:20	47.8	39.2	18:15-18:20	51.4	43.9	21:15-21:20	53.6	48.8
12:20-12:25	48.2	40.7	15:20-15:25	47.5	39.7	18:20-18:25	50.9	43.4	21:20-21:25	52.4	45.5
12:25-12:30	48.1	40.2	15:25-15:30	48.1	38.3	18:25-18:30	50.8	43.8	21:25-21:30	53.0	51.2
12:30-12:35	48.0	39.4	15:30-15:35	48.0	38.0	18:30-18:35	50.1	41.9	21:30-21:35	52.9	49.5
12:35-12:40	48.5	38.9	15:35-15:40	48.5	39.7	18:35-18:40	49.8	41.4	21:35-21:40	52.7	49.6
12:40-12:45	47.2	39.8	15:40-15:45	47.5	39.5	18:40-18:45	49.9	40.9	21:40-21:45	52.8	46.5
12:45-12:50	47.6	40.5	15:45-15:50	48.7	39.6	18:45-18:50	49.8	39.8	21:45-21:50	50.1	41.4
12:50-12:55	49.0	40.1	15:50-15:55	47.1	39.9	18:50-18:55	47.1	38.8	21:50-21:55	54.6	48.5
12:55-13:00	48.1	39.1	15:55-16:00	47.4	40.6	18:55-19:00	48.2	39.8	21:55-22:00	54.6	53.4
13:00-13:05	47.2	40.9	16:00-16:05	50.0	40.5	19:00-19:05	45.0	39.0	22:00-22:05	54.0	49.3
13:05-13:10	55.9	53.7	16:05-16:10	52.4	42.6	19:05-19:10	46.1	37.4	22:05-22:10	50.1	49.0
13:10-13:15	55.8	53.8	16:10-16:15	46.8	40.3	19:10-19:15	46.9	38.0	22:10-22:15	64.8	61.4
13:15-13:20	48.4	42.0	16:15-16:20	49.6	40.9	19:15-19:20	46.0	39.1	22:15-22:20	65.6	63.8
13:20-13:25	49.6	40.4	16:20-16:25	48.9	40.7	19:20-19:25	46.2	39.1	22:20-22:25	64.2	62.6
13:25-13:30	48.5	41.1	16:25-16:30	51.4	42.9	19:25-19:30	47.1	40.8	22:25-22:30	63.8	61.8
13:30-13:35	47.1	40.0	16:30-16:35	51.9	44.7	19:30-19:35	50.7	41.5	22:30-22:35	65.6	63.2
13:35-13:40	46.8	38.1	16:35-16:40	50.4	43.6	19:35-19:40	50.1	41.8	22:35-22:40	64.7	62.7
13:40-13:45	45.6	36.5	16:40-16:45	52.1	45.6	19:40-19:45	53.9	47.8	22:40-22:45	65.8	63.5
13:45-13:50	48.1	38.2	16:45-16:50	51.0	41.4	19:45-19:50	53.8	47.8	22:45-22:50	61.9	58.8
13:50-13:55	47.8	37.8	16:50-16:55	52.5	43.7	19:50-19:55	54.4	49.8	22:50-22:55	59.1	52.8
13:55-14:00	46.1	36.5	16:55-17:00	48.6	41.8	19:55-20:00	54.2	47.3	22:55-23:00	49.2	47.0
14:00-14:05	46.8	37.3	17:00-17:05	51.8	43.2	20:00-20:05	54.5	49.2	23:00-23:05	49.9	45.6
14:05-14:10	46.2	36.5	17:05-17:10	49.2	40.9	20:05-20:10	50.1	40.1	23:05-23:10	49.2	45.3
14:10-14:15	46.2	36.5	17:10-17:15	50.2	41.0	20:10-20:15	53.4	48.2	23:10-23:15	50.4	46.8
14:15-14:20	46.5	36.5	17:15-17:20	50.1	45.0	20:15-20:20	53.9	47.7	23:15-23:20	51.3	46.6
14:20-14:25	45.2	36.5	17:20-17:25	50.9	43.2	20:20-20:25	54.2	49.0	23:20-23:25	51.6	46.2
14:25-14:30	45.5	36.5	17:25-17:30	49.8	43.5	20:25-20:30	55.0	50.8	23:25-23:30	52.7	47.7
14:30-14:35	46.5	36.9	17:30-17:35	52.0	42.7	20:30-20:35	56.5	51.6	23:30-23:35	54.8	47.2
14:35-14:40	44.3	37.5	17:35-17:40	51.0	43.1	20:35-20:40	54.8	50.3	23:35-23:40	53.8	46.2
14:40-14:45	45.6	38.5	17:40-17:45	51.8	43.1	20:40-20:45	54.5	51.5	23:40-23:45	57.5	53.0
14:45-14:50	45.2	38.0	17:45-17:50	50.3	42.2	20:45-20:50	53.0	44.3	23:45-23:50	56.3	51.2
14:50-14:55	45.6	37.9	17:50-17:55	51.6	44.0	20:50-20:55	53.6	48.7	23:50-23:55	53.3	49.1
14:55-15:00	44.6	38.0	17:55-18:00	50.8	42.3	20:55-21:00	53.4	49.6	23:55-00:00	52.6	48.2

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม บ้านหนองปอ หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591321 E, 1644722 N
Measured Date : May 29, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820448

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-011
Report No. : 2023-RAAK255
Report Date : June 7, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
00:00-00:05	52.6	47.7	03:00-03:05	54.9	51.8	06:00-06:05	53.0	43.2	09:00-09:05	52.1	45.5
00:05-00:10	51.6	47.3	03:05-03:10	53.6	51.7	06:05-06:10	54.1	45.4	09:05-09:10	51.3	44.3
00:10-00:15	54.2	48.0	03:10-03:15	54.0	52.4	06:10-06:15	47.5	42.0	09:10-09:15	52.1	45.1
00:15-00:20	53.9	47.8	03:15-03:20	54.8	51.8	06:15-06:20	50.6	43.2	09:15-09:20	50.5	43.1
00:20-00:25	53.2	47.6	03:20-03:25	56.1	52.8	06:20-06:25	51.3	43.4	09:20-09:25	53.0	44.8
00:25-00:30	54.6	48.5	03:25-03:30	57.1	53.2	06:25-06:30	51.0	44.1	09:25-09:30	53.6	45.5
00:30-00:35	53.0	48.2	03:30-03:35	54.9	50.5	06:30-06:35	53.8	46.0	09:30-09:35	51.9	42.1
00:35-00:40	52.0	48.0	03:35-03:40	51.9	49.8	06:35-06:40	53.7	45.1	09:35-09:40	49.3	40.6
00:40-00:45	50.1	48.2	03:40-03:45	51.4	46.9	06:40-06:45	54.2	45.4	09:40-09:45	50.0	41.1
00:45-00:50	50.4	48.2	03:45-03:50	52.1	46.4	06:45-06:50	50.1	40.9	09:45-09:50	50.9	41.1
00:50-00:55	52.7	49.7	03:50-03:55	54.4	48.5	06:50-06:55	50.6	42.5	09:50-09:55	50.3	41.2
00:55-01:00	53.1	50.0	03:55-04:00	54.9	49.2	06:55-07:00	52.3	44.7	09:55-10:00	50.3	41.0
01:00-01:05	55.8	49.1	04:00-04:05	55.2	48.6	07:00-07:05	52.3	43.0	10:00-10:05	50.6	42.3
01:05-01:10	53.7	50.8	04:05-04:10	54.0	48.7	07:05-07:10	50.3	44.0	10:05-10:10	51.2	43.7
01:10-01:15	55.3	52.3	04:10-04:15	53.3	48.7	07:10-07:15	51.2	43.6	10:10-10:15	49.5	40.5
01:15-01:20	55.5	52.4	04:15-04:20	50.0	46.3	07:15-07:20	51.0	44.1	10:15-10:20	50.3	40.8
01:20-01:25	52.9	50.3	04:20-04:25	47.6	45.1	07:20-07:25	50.3	47.1	10:20-10:25	49.6	39.7
01:25-01:30	51.2	49.9	04:25-04:30	49.4	47.0	07:25-07:30	51.0	45.5	10:25-10:30	49.5	42.3
01:30-01:35	51.6	50.3	04:30-04:35	51.3	48.1	07:30-07:35	52.3	45.3	10:30-10:35	52.8	43.4
01:35-01:40	52.3	50.9	04:35-04:40	50.7	48.4	07:35-07:40	52.3	45.3	10:35-10:40	48.6	40.4
01:40-01:45	52.3	50.4	04:40-04:45	52.4	50.3	07:40-07:45	50.3	40.8	10:40-10:45	48.1	41.4
01:45-01:50	53.1	51.0	04:45-04:50	52.8	50.8	07:45-07:50	50.5	44.9	10:45-10:50	49.2	40.7
01:50-01:55	54.0	50.8	04:50-04:55	52.8	50.9	07:50-07:55	50.3	41.7	10:50-10:55	49.1	41.0
01:55-02:00	52.2	50.3	04:55-05:00	50.9	48.2	07:55-08:00	51.2	41.4	10:55-11:00	49.8	41.6
02:00-02:05	52.8	50.6	05:00-05:05	52.9	48.6	08:00-08:05	53.1	43.1	11:00-11:05	48.8	42.3
02:05-02:10	53.7	52.0	05:05-05:10	52.1	48.2	08:05-08:10	51.4	42.4	11:05-11:10	48.6	41.3
02:10-02:15	53.8	52.4	05:10-05:15	53.1	50.6	08:10-08:15	51.2	42.0	11:10-11:15	48.9	42.6
02:15-02:20	54.0	52.4	05:15-05:20	51.7	49.6	08:15-08:20	52.5	42.8	11:15-11:20	49.9	42.8
02:20-02:25	54.3	52.8	05:20-05:25	52.9	49.0	08:20-08:25	52.2	43.2	11:20-11:25	49.1	44.0
02:25-02:30	54.6	53.0	05:25-05:30	53.3	49.6	08:25-08:30	52.1	44.1	11:25-11:30	48.8	44.0
02:30-02:35	54.4	52.9	05:30-05:35	51.9	49.4	08:30-08:35	52.3	48.3	11:30-11:35	50.3	44.8
02:35-02:40	54.5	53.0	05:35-05:40	54.0	47.3	08:35-08:40	51.6	45.3	11:35-11:40	49.6	44.7
02:40-02:45	54.6	53.2	05:40-05:45	50.5	43.8	08:40-08:45	52.0	44.4	11:40-11:45	48.5	43.8
02:45-02:50	55.0	53.6	05:45-05:50	52.1	44.7	08:45-08:50	51.3	43.5	11:45-11:50	51.2	45.8
02:50-02:55	54.2	51.2	05:50-05:55	52.1	45.4	08:50-08:55	52.1	42.8	11:50-11:55	50.0	44.6
02:55-03:00	54.1	52.5	05:55-06:00	53.0	43.9	08:55-09:00	53.9	45.5	11:55-12:00	50.0	44.9

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Laboratory Reviewer

Laboratory Supervisor

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Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 24-25, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK254
Report Date : June 9, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
11:00-12:00	44.7	73.5	55.0	50.7	41.8	37.8
12:00-13:00	47.5	82.3	58.8	54.3	45.3	41.0
13:00-14:00	49.2	78.9	58.6	55.7	46.4	41.9
14:00-15:00	47.6	80.3	58.5	53.8	44.4	40.7
15:00-16:00	51.7	81.6	62.4	58.3	48.6	45.6
16:00-17:00	53.0	73.3	59.0	55.5	49.0	45.7
17:00-18:00	45.9	87.4	60.4	56.3	43.3	38.5
18:00-19:00	48.3	75.5	54.3	50.3	43.9	41.7
19:00-20:00	46.7	76.6	55.4	49.2	41.5	39.9
20:00-21:00	45.8	73.4	51.9	47.0	40.6	38.9
21:00-22:00	43.1	70.1	48.4	45.9	38.0	36.4
22:00-23:00	41.4	69.8	49.6	45.9	37.7	36.4
23:00-00:00	40.2	66.4	41.9	41.0	37.3	36.5
00:00-01:00	37.0	59.7	38.8	38.0	36.3	35.8
01:00-02:00	37.7	59.1	39.8	39.0	37.3	36.3
02:00-03:00	41.5	65.4	49.5	47.3	37.7	36.2
03:00-04:00	37.5	76.2	45.0	40.0	36.7	36.1
04:00-05:00	37.9	57.5	39.7	38.9	36.9	36.2
05:00-06:00	47.8	69.3	56.5	52.0	44.7	41.8
06:00-07:00	48.6	77.6	58.1	54.2	44.8	40.1
07:00-08:00	48.5	78.2	67.2	63.5	46.8	42.1
08:00-09:00	49.1	79.1	69.3	67.2	47.9	45.6
09:00-10:00	48.4	72.9	61.8	56.8	45.7	43.3
10:00-11:00	49.5	76.9	59.4	56.5	46.9	41.0
24 Hours Measurement	**47.3**	**87.4**	**60.1**	**56.9**	**44.3**	**41.0**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**51.0**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

(Ms

Laboratory Reviewer

Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 25-26, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK254
Report Date : June 9, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
11:00-12:00	47.6	76.9	57.4	52.2	42.7	38.6
12:00-13:00	49.5	70.5	58.4	55.6	47.2	42.1
13:00-14:00	47.1	83.7	59.0	54.4	44.2	39.4
14:00-15:00	47.0	77.9	56.8	52.6	43.7	41.0
15:00-16:00	51.5	83.7	61.0	58.1	49.1	44.0
16:00-17:00	47.2	83.5	60.5	56.3	44.3	39.1
17:00-18:00	46.6	73.3	58.8	53.7	42.6	38.0
18:00-19:00	47.2	80.9	58.7	54.3	44.1	40.6
19:00-20:00	45.0	72.6	54.3	52.7	41.5	39.0
20:00-21:00	43.2	68.7	47.0	45.0	37.2	36.2
21:00-22:00	40.4	71.8	50.2	47.3	37.3	36.5
22:00-23:00	42.4	67.6	47.4	45.6	38.9	36.0
23:00-00:00	38.5	70.4	44.9	43.0	35.9	35.5
00:00-01:00	37.4	62.6	45.2	43.5	36.3	35.5
01:00-02:00	36.6	58.1	40.2	38.8	35.9	35.0
02:00-03:00	37.1	55.9	41.0	39.1	36.5	36.0
03:00-04:00	41.5	64.3	49.0	45.1	38.4	35.8
04:00-05:00	41.2	63.9	43.8	42.6	37.4	36.0
05:00-06:00	49.1	69.2	54.9	51.5	44.9	42.6
06:00-07:00	48.5	79.4	59.6	54.7	45.3	41.1
07:00-08:00	49.5	77.2	61.0	56.9	47.0	41.8
08:00-09:00	50.0	75.2	57.6	54.0	46.0	42.8
09:00-10:00	49.2	74.5	57.5	53.9	44.7	41.5
10:00-11:00	46.5	82.0	54.9	50.1	43.0	38.6
24 Hours Measurement	**46.8**	**83.7**	**56.6**	**52.7**	**43.5**	**39.7**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**51.1**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

(Ms.

Laboratory Reviewer

Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 26-27, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK254
Report Date : June 9, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
11:00-12:00	46.3	78.2	60.9	56.1	44.4	39.4
12:00-13:00	47.9	84.5	59.7	55.8	45.6	40.9
13:00-14:00	47.0	83.8	56.9	51.0	41.1	38.5
14:00-15:00	58.3	78.4	62.6	61.3	57.1	54.2
15:00-16:00	56.6	79.6	63.8	60.9	54.4	50.7
16:00-17:00	60.9	81.5	66.2	64.2	58.9	55.2
17:00-18:00	48.6	77.2	58.1	54.6	44.2	40.4
18:00-19:00	49.1	80.1	57.6	52.7	43.4	41.6
19:00-20:00	45.5	76.2	52.2	48.3	40.1	37.8
20:00-21:00	44.4	70.6	51.9	48.5	38.4	37.6
21:00-22:00	42.3	80.5	50.0	46.2	38.9	37.6
22:00-23:00	42.3	68.5	44.1	43.1	38.8	38.2
23:00-00:00	40.5	67.8	52.6	49.8	38.8	37.9
00:00-01:00	40.9	68.2	43.5	42.5	38.4	37.6
01:00-02:00	40.1	67.2	41.7	41.0	37.9	37.0
02:00-03:00	40.5	65.8	41.8	41.4	37.7	36.6
03:00-04:00	41.6	77.3	45.9	44.3	38.3	37.2
04:00-05:00	41.8	76.0	51.9	46.0	38.9	37.3
05:00-06:00	63.1	84.0	69.5	68.0	61.4	55.2
06:00-07:00	58.5	83.1	70.6	68.8	58.2	50.6
07:00-08:00	49.1	80.3	59.8	55.0	44.7	41.0
08:00-09:00	48.8	75.1	58.0	53.3	44.4	40.5
09:00-10:00	49.6	79.8	61.4	55.2	44.5	42.3
10:00-11:00	46.4	86.6	56.4	51.5	42.4	39.3
24 Hours Measurement	**53.9**	**86.6**	**61.9**	**59.6**	**52.1**	**47.4**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**61.2**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 27-28, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK254
Report Date : June 9, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
11:00-12:00	46.5	87.7	61.8	55.3	41.7	38.8
12:00-13:00	45.4	86.5	59.2	52.1	39.2	36.4
13:00-14:00	46.2	86.5	59.4	54.1	41.1	38.2
14:00-15:00	45.3	72.1	51.4	48.2	40.0	38.2
15:00-16:00	47.1	71.8	56.9	52.0	42.4	39.2
16:00-17:00	46.2	76.4	57.7	53.5	42.7	39.8
17:00-18:00	47.1	69.5	56.7	52.5	42.2	39.2
18:00-19:00	45.0	76.7	55.3	51.4	41.7	38.9
19:00-20:00	44.6	72.0	52.6	48.0	38.1	36.6
20:00-21:00	40.2	67.3	41.8	40.8	36.4	35.5
21:00-22:00	42.4	69.4	49.6	45.6	37.5	36.3
22:00-23:00	42.4	72.6	51.4	48.2	37.9	36.0
23:00-00:00	43.1	67.7	49.8	45.1	37.3	36.3
00:00-01:00	40.6	68.0	44.5	41.8	36.9	35.5
01:00-02:00	39.7	69.9	44.4	42.4	35.6	35.2
02:00-03:00	38.2	65.8	39.7	38.8	35.5	35.2
03:00-04:00	42.7	77.0	47.7	46.3	39.0	35.8
04:00-05:00	39.7	62.4	42.6	41.1	36.2	35.4
05:00-06:00	47.6	72.4	53.6	50.3	42.8	40.4
06:00-07:00	48.1	75.3	58.1	53.6	44.6	41.1
07:00-08:00	49.7	72.2	59.3	54.9	44.3	41.8
08:00-09:00	52.1	74.7	58.6	54.6	45.7	44.1
09:00-10:00	50.0	77.6	55.9	52.0	44.7	41.8
10:00-11:00	51.5	77.8	57.0	53.2	45.2	42.5
24 Hours Measurement	**46.6**	**87.7**	**55.9**	**51.2**	**41.5**	**39.1**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**51.0**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 28-29, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK254
Report Date : June 9, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
11:00-12:00	45.6	76.8	57.9	53.0	41.6	38.6
12:00-13:00	45.6	85.4	55.6	49.7	41.5	38.2
13:00-14:00	47.2	80.6	56.7	50.4	41.8	39.3
14:00-15:00	45.5	75.0	57.4	51.9	41.2	39.0
15:00-16:00	45.9	81.7	58.7	54.5	41.9	38.8
16:00-17:00	47.7	75.3	61.7	58.3	45.5	40.5
17:00-18:00	46.5	78.0	63.3	58.6	44.1	41.3
18:00-19:00	47.5	76.5	58.9	54.8	42.5	39.4
19:00-20:00	40.7	73.7	47.4	42.9	36.5	35.9
20:00-21:00	39.7	77.3	46.7	42.1	37.2	36.5
21:00-22:00	51.7	69.2	57.1	56.2	43.9	42.5
22:00-23:00	63.0	78.5	66.3	65.8	62.4	59.1
23:00-00:00	52.3	66.9	57.0	56.0	49.8	46.6
00:00-01:00	50.5	64.3	54.8	53.5	48.8	46.6
01:00-02:00	49.4	69.1	53.3	52.3	47.6	45.4
02:00-03:00	46.5	66.6	51.1	49.2	44.5	43.2
03:00-04:00	44.7	69.0	46.6	45.6	42.7	41.6
04:00-05:00	42.7	68.5	44.1	43.5	41.2	40.4
05:00-06:00	47.4	69.7	54.8	51.5	43.4	40.5
06:00-07:00	49.2	75.4	58.4	55.3	45.9	41.4
07:00-08:00	51.0	78.3	63.0	60.2	47.7	42.1
08:00-09:00	50.5	75.3	62.2	58.4	47.0	43.2
09:00-10:00	49.1	75.4	58.9	54.4	44.1	40.3
10:00-11:00	51.1	76.1	58.1	54.2	46.8	44.9
24 Hours Measurement	**51.7**	**85.4**	**59.1**	**56.4**	**50.1**	**46.9**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**60.5**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 24, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
11:00-11:05	44.6	37.1	14:00-14:05	46.0	38.0	17:00-17:05	43.2	38.5	20:00-20:05	49.2	41.8
11:05-11:10	45.8	36.6	14:05-14:10	48.1	38.3	17:05-17:10	43.5	39.8	20:05-20:10	49.9	40.3
11:10-11:15	45.2	37.3	14:10-14:15	48.2	42.2	17:10-17:15	50.2	40.2	20:10-20:15	45.6	42.0
11:15-11:20	46.2	38.8	14:15-14:20	44.9	39.1	17:15-17:20	42.3	37.5	20:15-20:20	45.6	39.0
11:20-11:25	44.6	37.9	14:20-14:25	45.1	42.2	17:20-17:25	41.2	36.9	20:20-20:25	45.6	40.0
11:25-11:30	43.1	38.2	14:25-14:30	49.8	41.2	17:25-17:30	42.3	38.2	20:25-20:30	45.6	37.0
11:30-11:35	47.1	38.0	14:30-14:35	44.2	39.3	17:30-17:35	41.2	36.6	20:30-20:35	44.3	37.5
11:35-11:40	41.3	37.2	14:35-14:40	45.2	40.0	17:35-17:40	47.8	37.8	20:35-20:40	38.5	37.1
11:40-11:45	41.5	36.9	14:40-14:45	48.8	40.1	17:40-17:45	46.2	38.3	20:40-20:45	47.0	37.2
11:45-11:50	45.7	39.0	14:45-14:50	48.2	43.2	17:45-17:50	42.3	38.4	20:45-20:50	45.6	36.6
11:50-11:55	44.1	38.3	14:50-14:55	51.4	41.4	17:50-17:55	47.2	37.5	20:50-20:55	35.6	35.2
11:55-12:00	42.6	37.7	14:55-15:00	44.3	40.4	17:55-18:00	49.2	40.2	20:55-21:00	36.3	36.0
12:00-12:05	46.5	38.4	15:00-15:05	44.1	40.4	18:00-18:05	45.2	36.7	21:00-21:05	44.6	36.6
12:05-12:10	46.6	39.9	15:05-15:10	45.6	40.2	18:05-18:10	46.2	37.2	21:05-21:10	37.3	36.4
12:10-12:15	48.3	42.2	15:10-15:15	48.1	42.0	18:10-18:15	47.2	37.4	21:10-21:15	36.7	36.2
12:15-12:20	45.5	42.8	15:15-15:20	46.1	41.9	18:15-18:20	47.2	37.9	21:15-21:20	42.3	36.1
12:20-12:25	51.2	44.4	15:20-15:25	48.2	42.9	18:20-18:25	49.8	41.5	21:20-21:25	46.6	36.6
12:25-12:30	48.2	42.2	15:25-15:30	48.1	42.5	18:25-18:30	51.4	43.8	21:25-21:30	40.5	36.4
12:30-12:35	48.2	38.2	15:30-15:35	46.2	45.6	18:30-18:35	47.9	40.1	21:30-21:35	42.3	36.3
12:35-12:40	45.2	37.6	15:35-15:40	57.1	49.2	18:35-18:40	45.1	42.4	21:35-21:40	42.0	36.4
12:40-12:45	45.3	38.1	15:40-15:45	52.1	48.5	18:40-18:45	47.9	44.0	21:40-21:45	43.4	36.5
12:45-12:50	44.1	36.6	15:45-15:50	54.5	48.1	18:45-18:50	47.5	41.2	21:45-21:50	44.0	36.6
12:50-12:55	43.2	38.4	15:50-15:55	55.6	47.3	18:50-18:55	45.6	37.2	21:50-21:55	44.1	36.3
12:55-13:00	50.3	43.8	15:55-16:00	50.1	45.9	18:55-19:00	52.0	46.5	21:55-22:00	43.8	36.4
13:00-13:05	51.2	44.1	16:00-16:05	50.2	45.4	19:00-19:05	53.0	45.8	22:00-22:05	43.0	36.3
13:05-13:10	52.1	43.4	16:05-16:10	53.5	44.6	19:05-19:10	43.5	37.6	22:05-22:10	37.9	36.7
13:10-13:15	49.1	42.4	16:10-16:15	51.5	46.2	19:10-19:15	46.0	38.1	22:10-22:15	40.9	36.3
13:15-13:20	51.3	43.0	16:15-16:20	51.9	44.8	19:15-19:20	46.2	37.1	22:15-22:20	41.2	36.2
13:20-13:25	47.5	41.5	16:20-16:25	52.3	45.4	19:20-19:25	45.7	36.9	22:20-22:25	38.1	36.3
13:25-13:30	47.2	40.9	16:25-16:30	53.0	47.2	19:25-19:30	44.7	38.3	22:25-22:30	36.3	36.0
13:30-13:35	49.1	41.5	16:30-16:35	53.3	47.6	19:30-19:35	45.6	37.1	22:30-22:35	40.3	36.3
13:35-13:40	48.2	38.4	16:35-16:40	56.4	48.3	19:35-19:40	46.2	37.4	22:35-22:40	43.2	36.4
13:40-13:45	44.3	38.7	16:40-16:45	55.2	46.8	19:40-19:45	41.6	38.5	22:40-22:45	40.5	36.7
13:45-13:50	48.2	43.6	16:45-16:50	53.0	43.7	19:45-19:50	46.6	38.3	22:45-22:50	44.5	36.4
13:50-13:55	45.1	39.5	16:50-16:55	51.0	43.0	19:50-19:55	43.0	38.7	22:50-22:55	38.2	36.4
13:55-14:00	50.0	40.9	16:55-17:00	48.3	39.1	19:55-20:00	44.6	42.8	22:55-23:00	44.3	36.5

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 24-25, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
23:00-23:05	36.8	36.0	02:00-02:05	35.8	35.0	05:00-05:05	42.8	36.4	08:00-08:05	49.8	43.0
23:05-23:10	45.6	36.6	02:05-02:10	36.3	36.0	05:05-05:10	42.3	36.3	08:05-08:10	50.6	49.5
23:10-23:15	39.0	37.5	02:10-02:15	36.3	35.8	05:10-05:15	43.1	36.4	08:10-08:15	45.6	45.0
23:15-23:20	38.8	36.8	02:15-02:20	37.2	36.2	05:15-05:20	43.3	36.4	08:15-08:20	49.8	49.1
23:20-23:25	37.3	36.4	02:20-02:25	43.0	36.6	05:20-05:25	42.5	38.5	08:20-08:25	50.6	43.2
23:25-23:30	37.1	36.2	02:25-02:30	38.3	36.2	05:25-05:30	49.7	43.8	08:25-08:30	48.5	47.8
23:30-23:35	39.9	36.9	02:30-02:35	42.1	36.4	05:30-05:35	51.4	43.8	08:30-08:35	47.9	43.1
23:35-23:40	37.9	36.7	02:35-02:40	45.1	36.8	05:35-05:40	48.2	45.3	08:35-08:40	46.9	38.9
23:40-23:45	44.4	36.8	02:40-02:45	42.6	36.2	05:40-05:45	50.1	45.4	08:40-08:45	49.9	40.0
23:45-23:50	37.2	36.5	02:45-02:50	40.7	36.1	05:45-05:50	50.3	42.4	08:45-08:50	45.6	44.9
23:50-23:55	35.7	35.0	02:50-02:55	46.2	36.9	05:50-05:55	46.7	40.2	08:50-08:55	49.8	45.5
23:55-00:00	36.8	36.2	02:55-03:00	37.6	35.2	05:55-06:00	48.9	41.4	08:55-09:00	50.6	44.8
00:00-00:05	36.5	35.7	03:00-03:05	36.5	35.6	06:00-06:05	48.6	40.5	09:00-09:05	48.5	45.3
00:05-00:10	36.4	35.6	03:05-03:10	36.6	35.8	06:05-06:10	48.5	41.0	09:05-09:10	47.9	45.7
00:10-00:15	36.1	35.1	03:10-03:15	35.6	34.5	06:10-06:15	47.9	38.9	09:10-09:15	46.9	45.1
00:15-00:20	36.7	36.2	03:15-03:20	39.6	36.4	06:15-06:20	46.9	40.3	09:15-09:20	49.9	43.9
00:20-00:25	36.5	35.6	03:20-03:25	37.6	36.2	06:20-06:25	49.9	41.0	09:20-09:25	45.6	45.0
00:25-00:30	36.2	35.2	03:25-03:30	39.2	36.6	06:25-06:30	45.6	40.0	09:25-09:30	49.8	42.8
00:30-00:35	35.9	35.2	03:30-03:35	36.8	36.0	06:30-06:35	49.8	41.5	09:30-09:35	50.6	42.7
00:35-00:40	40.2	36.4	03:35-03:40	37.3	36.2	06:35-06:40	50.6	40.8	09:35-09:40	48.5	41.7
00:40-00:45	37.2	36.2	03:40-03:45	37.8	36.4	06:40-06:45	50.3	40.3	09:40-09:45	47.9	39.6
00:45-00:50	36.6	36.0	03:45-03:50	36.6	36.0	06:45-06:50	49.6	39.6	09:45-09:50	46.9	39.6
00:50-00:55	36.7	36.2	03:50-03:55	36.9	36.2	06:50-06:55	45.3	38.1	09:50-09:55	49.9	42.4
00:55-01:00	36.6	35.6	03:55-04:00	37.3	36.4	06:55-07:00	45.7	38.1	09:55-10:00	44.6	39.5
01:00-01:05	39.0	36.8	04:00-04:05	37.0	36.1	07:00-07:05	48.5	40.8	10:00-10:05	43.6	37.8
01:05-01:10	38.0	36.4	04:05-04:10	36.6	36.1	07:05-07:10	47.9	38.8	10:05-10:10	45.6	38.3
01:10-01:15	39.8	37.9	04:10-04:15	36.5	36.0	07:10-07:15	46.9	41.9	10:10-10:15	43.5	38.8
01:15-01:20	39.1	36.9	04:15-04:20	36.9	36.2	07:15-07:20	49.9	41.6	10:15-10:20	48.6	40.3
01:20-01:25	37.4	36.4	04:20-04:25	36.8	36.2	07:20-07:25	45.6	40.8	10:20-10:25	46.1	37.8
01:25-01:30	37.7	36.5	04:25-04:30	38.0	36.4	07:25-07:30	49.8	40.4	10:25-10:30	43.3	37.4
01:30-01:35	37.8	36.6	04:30-04:35	37.4	36.3	07:30-07:35	50.6	43.5	10:30-10:35	42.5	37.1
01:35-01:40	36.1	35.6	04:35-04:40	40.7	36.5	07:35-07:40	48.5	43.7	10:35-10:40	46.6	38.8
01:40-01:45	36.1	35.4	04:40-04:45	40.7	36.6	07:40-07:45	47.9	42.5	10:40-10:45	47.8	41.2
01:45-01:50	36.8	35.5	04:45-04:50	36.4	35.6	07:45-07:50	46.9	42.7	10:45-10:50	52.0	43.5
01:50-01:55	36.0	35.1	04:50-04:55	36.5	35.7	07:50-07:55	49.9	44.3	10:50-10:55	54.0	44.5
01:55-02:00	36.9	35.7	04:55-05:00	37.5	36.0	07:55-08:00	45.6	41.4	10:55-11:00	54.9	44.9

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 25, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
11:00-11:05	51.2	41.6	14:00-14:05	47.6	42.3	17:00-17:05	47.6	37.8	20:00-20:05	42.9	36.6
11:05-11:10	48.5	39.1	14:05-14:10	45.7	42.4	17:05-17:10	45.6	37.5	20:05-20:10	38.0	36.2
11:10-11:15	47.6	39.8	14:10-14:15	50.8	42.0	17:10-17:15	47.5	38.4	20:10-20:15	39.0	36.1
11:15-11:20	45.6	38.3	14:15-14:20	50.5	42.6	17:15-17:20	45.8	38.9	20:15-20:20	35.6	35.0
11:20-11:25	46.5	38.8	14:20-14:25	43.3	38.4	17:20-17:25	46.7	38.0	20:20-20:25	36.2	34.8
11:25-11:30	47.1	37.3	14:25-14:30	43.2	38.2	17:25-17:30	47.5	39.6	20:25-20:30	34.9	33.5
11:30-11:35	46.8	37.0	14:30-14:35	44.6	38.4	17:30-17:35	46.4	38.4	20:30-20:35	47.4	37.4
11:35-11:40	47.9	38.0	14:35-14:40	45.1	41.1	17:35-17:40	44.2	36.6	20:35-20:40	44.8	36.5
11:40-11:45	48.3	39.0	14:40-14:45	47.5	39.7	17:40-17:45	47.5	38.3	20:40-20:45	47.1	37.1
11:45-11:50	45.2	36.6	14:45-14:50	47.5	40.1	17:45-17:50	46.5	37.3	20:45-20:50	45.6	36.6
11:50-11:55	46.9	37.8	14:50-14:55	44.8	39.6	17:50-17:55	46.1	37.6	20:50-20:55	41.5	36.4
11:55-12:00	46.5	36.7	14:55-15:00	44.9	43.4	17:55-18:00	46.2	36.8	20:55-21:00	43.3	36.6
12:00-12:05	45.6	37.8	15:00-15:05	45.0	41.0	18:00-18:05	46.7	43.0	21:00-21:05	37.3	36.2
12:05-12:10	50.1	43.9	15:05-15:10	50.9	42.0	18:05-18:10	46.8	43.7	21:05-21:10	36.3	35.7
12:10-12:15	47.5	41.5	15:10-15:15	49.4	42.0	18:10-18:15	47.5	42.6	21:10-21:15	42.4	36.6
12:15-12:20	49.6	40.2	15:15-15:20	53.9	45.6	18:15-18:20	48.1	39.9	21:15-21:20	37.8	36.2
12:20-12:25	50.3	43.7	15:20-15:25	53.2	45.5	18:20-18:25	46.8	37.3	21:20-21:25	39.9	36.4
12:25-12:30	51.2	44.1	15:25-15:30	54.2	47.0	18:25-18:30	46.5	37.5	21:25-21:30	38.5	37.0
12:30-12:35	52.6	45.3	15:30-15:35	53.4	45.8	18:30-18:35	46.3	36.7	21:30-21:35	38.5	36.6
12:35-12:40	51.7	41.8	15:35-15:40	46.8	40.8	18:35-18:40	46.1	37.3	21:35-21:40	45.0	36.8
12:40-12:45	49.2	40.7	15:40-15:45	47.5	40.7	18:40-18:45	42.4	36.8	21:40-21:45	40.1	37.2
12:45-12:50	48.5	40.5	15:45-15:50	51.9	44.7	18:45-18:50	52.0	44.7	21:45-21:50	37.1	36.5
12:50-12:55	46.2	39.7	15:50-15:55	52.6	45.0	18:50-18:55	45.0	38.3	21:50-21:55	38.4	36.7
12:55-13:00	44.9	38.6	15:55-16:00	49.1	40.0	18:55-19:00	45.6	36.7	21:55-22:00	43.2	36.4
13:00-13:05	46.7	36.7	16:00-16:05	46.0	39.6	19:00-19:05	47.5	41.0	22:00-22:05	42.9	36.8
13:05-13:10	45.6	36.4	16:05-16:10	46.6	37.7	19:05-19:10	46.5	45.6	22:05-22:10	37.5	36.6
13:10-13:15	45.2	36.3	16:10-16:15	46.5	37.2	19:10-19:15	43.5	38.6	22:10-22:15	45.9	36.8
13:15-13:20	44.9	36.2	16:15-16:20	49.5	40.0	19:15-19:20	42.0	36.6	22:15-22:20	40.1	36.4
13:20-13:25	47.9	38.9	16:20-16:25	48.5	39.8	19:20-19:25	46.5	36.7	22:20-22:25	35.7	35.0
13:25-13:30	47.6	38.6	16:25-16:30	46.2	36.6	19:25-19:30	46.3	36.6	22:25-22:30	46.3	36.6
13:30-13:35	47.6	38.2	16:30-16:35	45.2	36.7	19:30-19:35	46.1	36.5	22:30-22:35	35.7	35.0
13:35-13:40	48.6	44.2	16:35-16:40	47.5	39.3	19:35-19:40	46.4	36.6	22:35-22:40	34.8	34.0
13:40-13:45	49.8	43.2	16:40-16:45	46.5	40.0	19:40-19:45	43.4	36.5	22:40-22:45	35.4	35.0
13:45-13:50	46.2	37.1	16:45-16:50	47.3	40.2	19:45-19:50	43.5	36.4	22:45-22:50	39.9	35.8
13:50-13:55	46.2	37.6	16:50-16:55	48.5	40.4	19:50-19:55	40.5	36.2	22:50-22:55	45.3	36.2
13:55-14:00	46.1	38.3	16:55-17:00	45.6	39.1	19:55-20:00	41.7	36.4	22:55-23:00	45.2	36.6

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 25-26, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
23:00-23:05	38.2	35.8	02:00-02:05	35.1	34.6	05:00-05:05	41.6	36.9	08:00-08:05	52.1	43.5
23:05-23:10	36.0	35.4	02:05-02:10	35.5	35.0	05:05-05:10	40.2	36.6	08:05-08:10	48.7	41.9
23:10-23:15	35.5	35.0	02:10-02:15	40.3	39.2	05:10-05:15	45.0	36.8	08:10-08:15	47.5	39.7
23:15-23:20	37.9	36.0	02:15-02:20	36.0	35.2	05:15-05:20	44.5	36.4	08:15-08:20	50.3	41.5
23:20-23:25	45.6	36.1	02:20-02:25	36.4	36.0	05:20-05:25	45.9	36.6	08:20-08:25	46.2	41.3
23:25-23:30	35.7	35.0	02:25-02:30	38.0	37.4	05:25-05:30	48.4	46.8	08:25-08:30	45.2	39.2
23:30-23:35	36.1	35.6	02:30-02:35	35.6	35.0	05:30-05:35	50.6	44.4	08:30-08:35	50.9	42.4
23:35-23:40	36.2	35.8	02:35-02:40	35.7	35.0	05:35-05:40	49.5	45.7	08:35-08:40	52.3	45.1
23:40-23:45	35.6	35.0	02:40-02:45	37.2	36.2	05:40-05:45	54.9	45.2	08:40-08:45	50.4	44.4
23:45-23:50	36.1	35.9	02:45-02:50	35.6	34.6	05:45-05:50	49.7	44.4	08:45-08:50	50.8	43.7
23:50-23:55	36.2	35.1	02:50-02:55	35.8	34.2	05:50-05:55	49.5	40.2	08:50-08:55	50.0	43.8
23:55-00:00	35.8	35.0	02:55-03:00	39.8	36.6	05:55-06:00	49.6	39.9	08:55-09:00	50.4	43.2
00:00-00:05	35.2	35.0	03:00-03:05	39.0	36.2	06:00-06:05	47.7	40.4	09:00-09:05	49.6	42.3
00:05-00:10	34.1	33.6	03:05-03:10	51.0	41.2	06:05-06:10	48.6	41.5	09:05-09:10	47.7	41.1
00:10-00:15	35.1	34.5	03:10-03:15	35.1	34.6	06:10-06:15	48.5	39.9	09:10-09:15	48.1	39.3
00:15-00:20	35.9	35.1	03:15-03:20	35.7	35.0	06:15-06:20	47.4	40.9	09:15-09:20	47.6	41.8
00:20-00:25	38.1	36.4	03:20-03:25	35.9	35.0	06:20-06:25	49.0	40.9	09:20-09:25	47.5	40.6
00:25-00:30	37.5	36.2	03:25-03:30	36.0	35.2	06:25-06:30	52.6	42.8	09:25-09:30	47.6	41.4
00:30-00:35	41.7	36.8	03:30-03:35	38.5	36.2	06:30-06:35	46.2	40.5	09:30-09:35	46.2	39.6
00:35-00:40	40.2	36.5	03:35-03:40	34.8	34.0	06:35-06:40	48.5	43.2	09:35-09:40	46.3	40.0
00:40-00:45	35.7	35.0	03:40-03:45	34.4	33.2	06:40-06:45	45.6	40.2	09:40-09:45	50.2	43.3
00:45-00:50	36.0	35.2	03:45-03:50	33.9	33.0	06:45-06:50	47.6	42.3	09:45-09:50	51.9	43.6
00:50-00:55	36.3	35.4	03:50-03:55	34.8	34.0	06:50-06:55	46.5	39.4	09:50-09:55	52.6	43.0
00:55-01:00	35.5	34.7	03:55-04:00	35.0	34.2	06:55-07:00	49.4	39.4	09:55-10:00	48.9	39.4
01:00-01:05	36.0	35.0	04:00-04:05	38.1	36.2	07:00-07:05	50.2	40.9	10:00-10:05	48.6	40.8
01:05-01:10	36.0	35.3	04:05-04:10	35.1	34.6	07:05-07:10	49.6	40.1	10:05-10:10	46.5	39.2
01:10-01:15	35.5	34.5	04:10-04:15	34.9	34.0	07:10-07:15	48.6	40.8	10:10-10:15	48.6	39.3
01:15-01:20	35.7	35.0	04:15-04:20	41.7	36.4	07:15-07:20	45.7	38.8	10:15-10:20	45.6	37.8
01:20-01:25	35.5	35.0	04:20-04:25	45.6	36.8	07:20-07:25	47.0	41.3	10:20-10:25	42.5	36.6
01:25-01:30	35.9	35.1	04:25-04:30	42.9	36.4	07:25-07:30	43.0	37.9	10:25-10:30	43.5	38.0
01:30-01:35	35.5	34.2	04:30-04:35	44.8	36.6	07:30-07:35	47.5	41.0	10:30-10:35	47.1	40.1
01:35-01:40	35.5	35.0	04:35-04:40	39.3	36.8	07:35-07:40	53.2	44.5	10:35-10:40	46.2	37.1
01:40-01:45	35.4	35.0	04:40-04:45	34.7	34.1	07:40-07:45	50.3	43.5	10:40-10:45	46.2	38.1
01:45-01:50	35.3	34.6	04:45-04:50	41.2	36.4	07:45-07:50	50.2	42.8	10:45-10:50	47.1	38.9
01:50-01:55	35.2	34.5	04:50-04:55	40.1	36.2	07:50-07:55	49.1	42.9	10:50-10:55	46.3	37.8
01:55-02:00	41.9	36.6	04:55-05:00	40.0	36.4	07:55-08:00	51.2	42.8	10:55-11:00	46.1	37.3

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 26, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
11:00-11:05	46.2	38.7	14:00-14:05	39.5	36.2	17:00-17:05	50.6	41.9	20:00-20:05	38.6	37.9
11:05-11:10	45.8	38.8	14:05-14:10	46.0	37.1	17:05-17:10	51.0	41.2	20:05-20:10	48.0	38.0
11:10-11:15	47.1	38.0	14:10-14:15	46.2	37.4	17:10-17:15	50.2	40.9	20:10-20:15	46.5	37.5
11:15-11:20	43.5	38.1	14:15-14:20	44.6	40.4	17:15-17:20	46.8	39.6	20:15-20:20	37.2	36.6
11:20-11:25	45.2	40.0	14:20-14:25	51.1	43.1	17:20-17:25	46.2	40.7	20:20-20:25	45.2	37.1
11:25-11:30	45.3	38.9	14:25-14:30	50.0	41.3	17:25-17:30	49.9	40.6	20:25-20:30	46.5	37.6
11:30-11:35	44.6	38.6	14:30-14:35	52.3	43.7	17:30-17:35	49.5	41.0	20:30-20:35	38.5	37.8
11:35-11:40	45.2	38.0	14:35-14:40	54.2	48.2	17:35-17:40	50.1	40.4	20:35-20:40	45.7	37.3
11:40-11:45	44.5	38.5	14:40-14:45	57.6	53.1	17:40-17:45	46.2	39.1	20:40-20:45	38.6	37.5
11:45-11:50	45.1	38.9	14:45-14:50	63.4	56.3	17:45-17:50	46.1	39.7	20:45-20:50	47.2	37.3
11:50-11:55	48.1	39.2	14:50-14:55	64.6	60.7	17:50-17:55	45.6	38.7	20:50-20:55	42.5	37.6
11:55-12:00	50.2	43.6	14:55-15:00	62.5	60.7	17:55-18:00	45.5	39.3	20:55-21:00	41.3	38.3
12:00-12:05	51.0	44.3	15:00-15:05	64.2	59.9	18:00-18:05	45.6	38.8	21:00-21:05	38.8	37.4
12:05-12:10	51.8	43.4	15:05-15:10	59.6	52.6	18:05-18:10	45.6	39.5	21:05-21:10	38.4	37.8
12:10-12:15	50.3	44.4	15:10-15:15	55.2	45.2	18:10-18:15	48.7	39.2	21:10-21:15	38.6	38.0
12:15-12:20	51.2	44.0	15:15-15:20	52.3	43.5	18:15-18:20	46.6	38.5	21:15-21:20	38.5	37.8
12:20-12:25	45.2	36.6	15:20-15:25	52.1	42.3	18:20-18:25	44.6	38.7	21:20-21:25	43.4	38.1
12:25-12:30	42.3	37.9	15:25-15:30	51.2	44.4	18:25-18:30	45.5	38.4	21:25-21:30	42.4	36.8
12:30-12:35	43.2	39.1	15:30-15:35	52.1	44.4	18:30-18:35	45.6	38.6	21:30-21:35	37.8	36.9
12:35-12:40	44.6	36.9	15:35-15:40	52.3	45.0	18:35-18:40	51.7	44.9	21:35-21:40	38.0	37.4
12:40-12:45	45.2	37.8	15:40-15:45	51.3	42.2	18:40-18:45	53.8	44.7	21:40-21:45	45.2	37.9
12:45-12:50	45.4	36.6	15:45-15:50	54.3	45.1	18:45-18:50	52.1	45.0	21:45-21:50	43.8	37.4
12:50-12:55	44.6	36.8	15:50-15:55	52.3	43.7	18:50-18:55	47.4	42.6	21:50-21:55	46.6	38.2
12:55-13:00	43.7	37.8	15:55-16:00	53.3	44.8	18:55-19:00	48.5	39.2	21:55-22:00	42.9	37.0
13:00-13:05	46.0	36.8	16:00-16:05	52.3	44.3	19:00-19:05	46.8	39.0	22:00-22:05	43.5	38.2
13:05-13:10	40.5	36.6	16:05-16:10	64.2	59.0	19:05-19:10	45.8	38.2	22:05-22:10	38.9	37.7
13:10-13:15	40.3	36.8	16:10-16:15	63.2	60.2	19:10-19:15	46.1	37.6	22:10-22:15	38.6	37.6
13:15-13:20	51.5	41.8	16:15-16:20	63.6	59.7	19:15-19:20	46.2	37.2	22:15-22:20	48.3	38.7
13:20-13:25	50.2	40.3	16:20-16:25	65.2	57.8	19:20-19:25	47.2	37.3	22:20-22:25	38.8	38.1
13:25-13:30	50.1	40.2	16:25-16:30	60.8	51.0	19:25-19:30	47.5	37.9	22:25-22:30	38.8	38.1
13:30-13:35	46.8	38.1	16:30-16:35	59.1	50.2	19:30-19:35	46.4	37.5	22:30-22:35	38.4	37.7
13:35-13:40	43.3	38.6	16:35-16:40	61.6	52.2	19:35-19:40	38.9	37.4	22:35-22:40	39.5	38.7
13:40-13:45	45.6	38.4	16:40-16:45	54.8	46.8	19:40-19:45	39.5	37.3	22:40-22:45	39.4	38.9
13:45-13:50	46.2	36.9	16:45-16:50	54.4	47.7	19:45-19:50	38.3	37.6	22:45-22:50	45.9	37.7
13:50-13:55	43.1	36.6	16:50-16:55	51.7	45.3	19:50-19:55	43.2	37.7	22:50-22:55	38.7	38.0
13:55-14:00	42.3	37.0	16:55-17:00	53.9	46.1	19:55-20:00	48.1	38.1	22:55-23:00	41.1	38.2

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 26-27, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
23:00-23:05	38.7	37.8	02:00-02:05	36.9	36.2	05:00-05:05	41.2	38.6	08:00-08:05	45.6	39.8
23:05-23:10	44.4	37.7	02:05-02:10	37.2	36.6	05:05-05:10	43.5	38.4	08:05-08:10	44.4	40.4
23:10-23:15	37.8	36.8	02:10-02:15	37.0	36.4	05:10-05:15	43.2	38.7	08:10-08:15	51.3	42.1
23:15-23:20	38.2	36.8	02:15-02:20	38.2	36.7	05:15-05:20	64.8	56.4	08:15-08:20	50.3	41.0
23:20-23:25	42.0	38.3	02:20-02:25	38.3	36.8	05:20-05:25	64.7	55.6	08:20-08:25	50.2	40.8
23:25-23:30	39.2	38.3	02:25-02:30	38.7	36.4	05:25-05:30	64.2	54.7	08:25-08:30	49.6	40.3
23:30-23:35	42.3	38.4	02:30-02:35	44.6	36.9	05:30-05:35	62.0	55.2	08:30-08:35	48.2	40.4
23:35-23:40	38.9	38.1	02:35-02:40	46.5	36.8	05:35-05:40	60.2	50.7	08:35-08:40	50.3	41.3
23:40-23:45	39.1	38.2	02:40-02:45	38.4	36.6	05:40-05:45	66.5	58.5	08:40-08:45	48.6	39.4
23:45-23:50	41.6	38.5	02:45-02:50	37.2	36.4	05:45-05:50	65.4	58.8	08:45-08:50	47.6	38.5
23:50-23:55	38.5	37.7	02:50-02:55	38.1	36.7	05:50-05:55	66.1	59.4	08:50-08:55	47.2	38.4
23:55-00:00	38.5	37.8	02:55-03:00	38.2	36.9	05:55-06:00	60.2	50.6	08:55-09:00	46.8	42.1
00:00-00:05	38.6	37.7	03:00-03:05	39.2	38.1	06:00-06:05	60.1	51.4	09:00-09:05	53.9	46.2
00:05-00:10	38.5	37.7	03:05-03:10	40.8	37.0	06:05-06:10	61.2	52.3	09:05-09:10	48.8	41.7
00:10-00:15	38.5	37.8	03:10-03:15	46.9	37.1	06:10-06:15	59.2	51.8	09:10-09:15	47.6	44.9
00:15-00:20	39.7	37.9	03:15-03:20	38.6	37.1	06:15-06:20	60.2	51.4	09:15-09:20	47.5	43.5
00:20-00:25	39.0	38.1	03:20-03:25	38.1	36.9	06:20-06:25	59.4	51.1	09:20-09:25	52.3	44.2
00:25-00:30	38.5	37.6	03:25-03:30	37.0	36.6	06:25-06:30	58.6	51.7	09:25-09:30	52.3	42.9
00:30-00:35	47.2	37.9	03:30-03:35	39.1	37.6	06:30-06:35	59.6	51.5	09:30-09:35	49.6	39.8
00:35-00:40	38.6	37.8	03:35-03:40	40.2	36.8	06:35-06:40	58.1	52.3	09:35-09:40	46.2	38.7
00:40-00:45	37.9	36.8	03:40-03:45	38.5	37.0	06:40-06:45	59.6	52.1	09:40-09:45	45.6	38.6
00:45-00:50	38.2	37.5	03:45-03:50	38.1	36.6	06:45-06:50	50.1	42.3	09:45-09:50	47.1	39.1
00:50-00:55	38.1	37.3	03:50-03:55	44.0	37.4	06:50-06:55	48.1	40.3	09:50-09:55	47.5	39.2
00:55-01:00	43.7	37.5	03:55-04:00	44.2	37.5	06:55-07:00	51.2	42.7	09:55-10:00	46.2	37.9
01:00-01:05	38.7	37.1	04:00-04:05	45.2	37.7	07:00-07:05	51.2	42.3	10:00-10:05	43.5	38.2
01:05-01:10	40.1	37.1	04:05-04:10	39.0	37.5	07:05-07:10	52.3	42.4	10:05-10:10	46.2	38.5
01:10-01:15	38.9	36.9	04:10-04:15	37.9	36.6	07:10-07:15	50.1	40.7	10:10-10:15	48.8	39.7
01:15-01:20	37.8	36.6	04:15-04:20	40.2	37.4	07:15-07:20	49.5	41.8	10:15-10:20	45.0	38.7
01:20-01:25	37.8	36.8	04:20-04:25	39.6	37.6	07:20-07:25	47.6	39.9	10:20-10:25	46.5	39.2
01:25-01:30	45.9	37.8	04:25-04:30	39.3	36.9	07:25-07:30	47.5	39.9	10:25-10:30	45.6	38.0
01:30-01:35	38.8	37.3	04:30-04:35	40.7	37.4	07:30-07:35	46.8	41.6	10:30-10:35	46.7	37.3
01:35-01:40	38.0	37.2	04:35-04:40	38.9	37.5	07:35-07:40	49.5	40.0	10:35-10:40	46.5	42.1
01:40-01:45	39.2	37.1	04:40-04:45	44.1	37.6	07:40-07:45	48.5	41.2	10:40-10:45	45.6	37.0
01:45-01:50	37.9	36.8	04:45-04:50	39.9	36.6	07:45-07:50	48.2	40.3	10:45-10:50	46.2	36.6
01:50-01:55	38.2	36.7	04:50-04:55	46.1	37.0	07:50-07:55	47.6	40.5	10:50-10:55	45.6	39.9
01:55-02:00	40.5	36.8	04:55-05:00	39.9	37.3	07:55-08:00	45.0	39.8	10:55-11:00	48.3	42.3

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 27, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
11:00-11:05	48.5	42.1	14:00-14:05	44.5	36.7	17:00-17:05	45.1	37.7	20:00-20:05	45.5	36.4
11:05-11:10	46.5	40.2	14:05-14:10	45.8	36.4	17:05-17:10	46.0	36.6	20:05-20:10	44.1	35.6
11:10-11:15	47.6	39.1	14:10-14:15	46.2	36.6	17:10-17:15	46.2	41.1	20:10-20:15	35.2	34.5
11:15-11:20	46.5	38.1	14:15-14:20	38.1	36.2	17:15-17:20	48.1	38.8	20:15-20:20	35.4	34.6
11:20-11:25	47.1	37.8	14:20-14:25	43.7	36.4	17:20-17:25	47.1	38.1	20:20-20:25	35.2	34.5
11:25-11:30	46.3	38.8	14:25-14:30	45.1	36.6	17:25-17:30	46.1	37.6	20:25-20:30	39.5	37.0
11:30-11:35	42.0	37.5	14:30-14:35	50.6	41.1	17:30-17:35	45.6	39.4	20:30-20:35	35.4	35.0
11:35-11:40	47.1	39.2	14:35-14:40	43.6	39.9	17:35-17:40	50.7	41.4	20:35-20:40	40.6	36.1
11:40-11:45	46.5	37.9	14:40-14:45	44.5	38.9	17:40-17:45	44.6	39.1	20:40-20:45	35.8	35.2
11:45-11:50	45.7	36.6	14:45-14:50	41.8	38.6	17:45-17:50	48.8	39.3	20:45-20:50	35.5	34.6
11:50-11:55	45.6	37.4	14:50-14:55	42.1	40.0	17:50-17:55	45.9	39.5	20:50-20:55	35.3	34.7
11:55-12:00	46.2	37.2	14:55-15:00	45.8	36.6	17:55-18:00	46.1	39.1	20:55-21:00	43.0	36.4
12:00-12:05	45.1	36.8	15:00-15:05	46.1	37.1	18:00-18:05	44.7	38.8	21:00-21:05	45.1	37.4
12:05-12:10	44.4	36.4	15:05-15:10	44.5	38.3	18:05-18:10	43.1	37.4	21:05-21:10	45.6	36.6
12:10-12:15	41.6	36.2	15:10-15:15	46.1	38.4	18:10-18:15	44.1	39.0	21:10-21:15	36.6	36.2
12:15-12:20	46.2	36.6	15:15-15:20	44.1	39.3	18:15-18:20	45.3	38.8	21:15-21:20	37.5	36.0
12:20-12:25	46.1	36.7	15:20-15:25	45.6	36.6	18:20-18:25	48.5	42.1	21:20-21:25	45.2	36.4
12:25-12:30	45.7	36.4	15:25-15:30	44.5	36.9	18:25-18:30	47.2	41.6	21:25-21:30	40.1	36.2
12:30-12:35	45.1	36.2	15:30-15:35	45.9	37.5	18:30-18:35	46.8	40.3	21:30-21:35	39.5	35.8
12:35-12:40	45.6	36.1	15:35-15:40	46.3	37.2	18:35-18:40	39.8	36.4	21:35-21:40	46.2	37.6
12:40-12:45	46.1	36.3	15:40-15:45	43.2	37.4	18:40-18:45	43.1	36.8	21:40-21:45	37.5	36.0
12:45-12:50	46.2	36.5	15:45-15:50	46.2	39.3	18:45-18:50	41.6	36.6	21:45-21:50	43.1	36.2
12:50-12:55	45.8	36.4	15:50-15:55	52.4	42.9	18:50-18:55	44.7	36.4	21:50-21:55	35.3	34.5
12:55-13:00	45.2	36.6	15:55-16:00	50.1	42.6	18:55-19:00	44.2	36.5	21:55-22:00	37.6	35.6
13:00-13:05	45.1	36.9	16:00-16:05	46.7	41.6	19:00-19:05	45.1	36.6	22:00-22:05	35.2	34.6
13:05-13:10	44.6	39.0	16:05-16:10	47.1	40.0	19:05-19:10	45.0	36.9	22:05-22:10	34.9	34.1
13:10-13:15	46.2	38.1	16:10-16:15	46.3	39.4	19:10-19:15	46.1	37.1	22:10-22:15	37.0	35.8
13:15-13:20	46.2	37.1	16:15-16:20	45.1	40.5	19:15-19:20	45.2	36.8	22:15-22:20	36.5	35.4
13:20-13:25	46.0	36.7	16:20-16:25	46.3	40.2	19:20-19:25	42.6	36.4	22:20-22:25	45.6	37.2
13:25-13:30	47.1	37.8	16:25-16:30	45.2	39.2	19:25-19:30	44.8	36.6	22:25-22:30	46.3	36.8
13:30-13:35	47.1	41.1	16:30-16:35	46.6	38.2	19:30-19:35	42.7	36.4	22:30-22:35	35.1	34.6
13:35-13:40	46.6	40.1	16:35-16:40	44.5	36.6	19:35-19:40	39.1	36.7	22:35-22:40	43.1	35.4
13:40-13:45	46.2	38.6	16:40-16:45	46.1	39.5	19:40-19:45	45.8	36.6	22:40-22:45	45.1	36.6
13:45-13:50	46.1	37.2	16:45-16:50	45.0	38.8	19:45-19:50	41.3	36.4	22:45-22:50	46.1	37.2
13:50-13:55	45.6	36.8	16:50-16:55	45.1	40.0	19:50-19:55	46.1	36.6	22:50-22:55	40.1	36.4
13:55-14:00	46.5	36.5	16:55-17:00	48.7	41.0	19:55-20:00	45.8	36.5	22:55-23:00	38.4	36.2

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 27-28, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
23:00-23:05	34.8	34.1	02:00-02:05	43.8	36.2	05:00-05:05	40.4	36.6	08:00-08:05	52.8	44.0
23:05-23:10	39.5	36.6	02:05-02:10	37.0	36.1	05:05-05:10	42.8	37.2	08:05-08:10	53.3	43.5
23:10-23:15	35.2	34.5	02:10-02:15	35.2	34.7	05:10-05:15	42.3	36.8	08:10-08:15	51.7	42.4
23:15-23:20	44.3	36.0	02:15-02:20	43.0	36.3	05:15-05:20	45.9	38.2	08:15-08:20	47.0	41.9
23:20-23:25	36.0	35.1	02:20-02:25	34.4	34.0	05:20-05:25	44.6	37.6	08:20-08:25	51.0	41.5
23:25-23:30	49.2	39.2	02:25-02:30	35.3	34.6	05:25-05:30	45.1	38.4	08:25-08:30	53.3	44.8
23:30-23:35	34.5	34.0	02:30-02:35	35.7	35.0	05:30-05:35	46.1	38.6	08:30-08:35	52.0	44.3
23:35-23:40	34.8	34.0	02:35-02:40	35.4	35.0	05:35-05:40	45.3	38.1	08:35-08:40	52.4	45.2
23:40-23:45	49.5	39.5	02:40-02:45	35.7	35.0	05:40-05:45	51.7	44.4	08:40-08:45	53.1	45.5
23:45-23:50	39.0	36.0	02:45-02:50	35.1	34.6	05:45-05:50	51.2	44.3	08:45-08:50	51.7	44.7
23:50-23:55	37.3	35.1	02:50-02:55	35.0	34.2	05:50-05:55	48.0	41.8	08:50-08:55	53.1	44.1
23:55-00:00	37.4	36.1	02:55-03:00	36.1	35.5	05:55-06:00	50.8	42.0	08:55-09:00	49.9	45.3
00:00-00:05	35.8	35.0	03:00-03:05	34.7	34.0	06:00-06:05	46.6	41.8	09:00-09:05	55.0	45.5
00:05-00:10	34.8	34.0	03:05-03:10	34.9	34.0	06:05-06:10	47.2	42.0	09:05-09:10	48.6	43.2
00:10-00:15	35.4	35.0	03:10-03:15	34.8	33.5	06:10-06:15	47.1	42.4	09:10-09:15	51.3	43.3
00:15-00:20	35.1	34.7	03:15-03:20	38.8	36.0	06:15-06:20	49.6	42.9	09:15-09:20	49.6	41.1
00:20-00:25	35.4	34.7	03:20-03:25	33.9	33.1	06:20-06:25	51.1	41.5	09:20-09:25	47.5	40.6
00:25-00:30	35.9	35.0	03:25-03:30	41.9	36.4	06:25-06:30	50.9	41.0	09:25-09:30	47.4	38.7
00:30-00:35	34.8	34.1	03:30-03:35	34.1	33.6	06:30-06:35	49.6	40.0	09:30-09:35	50.5	41.0
00:35-00:40	35.4	35.0	03:35-03:40	45.0	36.1	06:35-06:40	47.1	38.2	09:35-09:40	43.7	37.2
00:40-00:45	47.9	38.2	03:40-03:45	33.5	33.0	06:40-06:45	46.1	39.8	09:40-09:45	46.9	39.0
00:45-00:50	43.3	36.1	03:45-03:50	47.5	38.8	06:45-06:50	45.6	41.4	09:45-09:50	51.6	43.1
00:50-00:55	42.8	36.2	03:50-03:55	49.8	40.1	06:50-06:55	44.3	40.6	09:50-09:55	50.8	42.6
00:55-01:00	39.5	36.2	03:55-04:00	33.6	33.1	06:55-07:00	46.1	40.1	09:55-10:00	45.5	38.6
01:00-01:05	36.9	36.4	04:00-04:05	34.0	33.1	07:00-07:05	46.9	41.0	10:00-10:05	51.0	41.5
01:05-01:10	34.9	34.0	04:05-04:10	43.3	36.2	07:05-07:10	49.0	40.8	10:05-10:10	51.7	42.3
01:10-01:15	35.1	34.5	04:10-04:15	34.0	33.1	07:10-07:15	48.6	41.2	10:10-10:15	52.1	42.1
01:15-01:20	35.2	35.0	04:15-04:20	33.4	32.5	07:15-07:20	47.6	40.8	10:15-10:20	53.3	43.7
01:20-01:25	34.8	34.0	04:20-04:25	42.9	36.4	07:20-07:25	49.3	42.5	10:20-10:25	49.5	42.4
01:25-01:30	37.3	36.1	04:25-04:30	39.2	35.8	07:25-07:30	49.3	41.3	10:25-10:30	49.6	40.8
01:30-01:35	34.6	34.1	04:30-04:35	37.1	35.6	07:30-07:35	48.6	40.8	10:30-10:35	52.5	43.4
01:35-01:40	44.2	36.5	04:35-04:40	42.9	36.4	07:35-07:40	51.0	41.0	10:35-10:40	52.9	44.0
01:40-01:45	44.2	36.1	04:40-04:45	34.6	34.0	07:40-07:45	51.8	42.6	10:40-10:45	51.1	42.6
01:45-01:50	44.3	36.4	04:45-04:50	36.6	36.1	07:45-07:50	48.8	42.6	10:45-10:50	50.4	41.6
01:50-01:55	34.6	34.0	04:50-04:55	36.9	36.2	07:50-07:55	52.1	42.2	10:50-10:55	50.0	42.1
01:55-02:00	34.4	34.0	04:55-05:00	42.9	36.4	07:55-08:00	49.8	43.2	10:55-11:00	51.3	42.9

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 28, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
11:00-11:05	46.5	38.6	14:00-14:05	46.2	36.6	17:00-17:05	46.4	36.9	20:00-20:05	39.3	36.2
11:05-11:10	47.1	40.2	14:05-14:10	45.6	36.8	17:05-17:10	46.5	38.2	20:05-20:10	38.7	36.4
11:10-11:15	46.1	41.4	14:10-14:15	46.3	38.2	17:10-17:15	44.8	37.8	20:10-20:15	38.0	36.0
11:15-11:20	44.1	37.1	14:15-14:20	44.9	42.2	17:15-17:20	44.7	38.5	20:15-20:20	38.4	36.2
11:20-11:25	43.7	36.7	14:20-14:25	43.5	41.0	17:20-17:25	46.1	41.0	20:20-20:25	37.6	35.8
11:25-11:30	44.0	37.6	14:25-14:30	43.5	39.0	17:25-17:30	46.7	42.6	20:25-20:30	41.0	37.4
11:30-11:35	40.9	37.3	14:30-14:35	46.7	38.9	17:30-17:35	47.7	45.5	20:30-20:35	41.3	37.6
11:35-11:40	46.5	37.1	14:35-14:40	39.9	37.6	17:35-17:40	46.9	46.3	20:35-20:40	42.1	37.4
11:40-11:45	46.0	37.6	14:40-14:45	46.1	39.8	17:40-17:45	46.0	40.1	20:40-20:45	37.3	36.2
11:45-11:50	45.6	36.6	14:45-14:50	47.1	39.1	17:45-17:50	47.1	38.5	20:45-20:50	37.4	36.0
11:50-11:55	47.0	38.5	14:50-14:55	46.7	37.8	17:50-17:55	48.0	38.7	20:50-20:55	40.1	36.2
11:55-12:00	46.6	41.1	14:55-15:00	45.6	36.6	17:55-18:00	46.2	37.0	20:55-21:00	41.4	36.5
12:00-12:05	47.6	38.0	15:00-15:05	46.2	37.3	18:00-18:05	46.2	37.7	21:00-21:05	45.2	36.8
12:05-12:10	47.6	37.8	15:05-15:10	45.6	38.5	18:05-18:10	46.1	36.6	21:05-21:10	35.3	34.6
12:10-12:15	45.2	36.6	15:10-15:15	43.5	41.5	18:10-18:15	48.7	39.1	21:10-21:15	35.0	34.1
12:15-12:20	46.0	36.6	15:15-15:20	44.7	37.8	18:15-18:20	47.1	39.5	21:15-21:20	40.6	36.6
12:20-12:25	43.2	37.2	15:20-15:25	47.2	37.2	18:20-18:25	44.7	37.1	21:20-21:25	39.9	35.8
12:25-12:30	42.2	36.6	15:25-15:30	47.1	37.2	18:25-18:30	45.6	37.9	21:25-21:30	37.2	35.2
12:30-12:35	44.6	36.8	15:30-15:35	46.5	36.9	18:30-18:35	48.4	42.0	21:30-21:35	42.2	36.6
12:35-12:40	41.4	36.7	15:35-15:40	46.3	37.2	18:35-18:40	50.6	42.5	21:35-21:40	37.0	35.4
12:40-12:45	43.1	37.6	15:40-15:45	46.1	43.2	18:40-18:45	50.1	42.3	21:40-21:45	43.3	35.6
12:45-12:50	43.3	36.6	15:45-15:50	45.2	36.6	18:45-18:50	46.3	37.5	21:45-21:50	43.1	37.2
12:50-12:55	45.1	37.3	15:50-15:55	45.6	36.9	18:50-18:55	44.5	36.7	21:50-21:55	44.0	41.6
12:55-13:00	49.9	43.5	15:55-16:00	46.1	39.1	18:55-19:00	46.3	36.8	21:55-22:00	62.1	52.1
13:00-13:05	53.6	43.6	16:00-16:05	47.1	40.9	19:00-19:05	45.1	36.4	22:00-22:05	65.4	59.1
13:05-13:10	46.5	41.4	16:05-16:10	46.5	38.1	19:05-19:10	45.7	36.6	22:05-22:10	56.0	51.1
13:10-13:15	44.8	41.1	16:10-16:15	46.2	37.8	19:10-19:15	35.3	34.7	22:10-22:15	48.3	43.6
13:15-13:20	44.4	39.1	16:15-16:20	46.1	36.6	19:15-19:20	35.5	35.0	22:15-22:20	66.9	63.4
13:20-13:25	44.6	37.6	16:20-16:25	46.5	36.8	19:20-19:25	37.4	36.8	22:20-22:25	65.6	64.1
13:25-13:30	45.1	37.1	16:25-16:30	51.3	44.1	19:25-19:30	39.1	36.6	22:25-22:30	66.6	64.0
13:30-13:35	45.9	36.6	16:30-16:35	50.1	46.0	19:30-19:35	36.8	35.8	22:30-22:35	64.2	57.9
13:35-13:40	46.2	36.7	16:35-16:40	47.6	39.6	19:35-19:40	40.5	36.2	22:35-22:40	64.6	58.6
13:40-13:45	46.0	40.0	16:40-16:45	47.6	39.0	19:40-19:45	43.8	36.8	22:40-22:45	58.8	48.8
13:45-13:50	46.1	37.0	16:45-16:50	46.2	39.1	19:45-19:50	35.7	35.0	22:45-22:50	48.8	46.3
13:50-13:55	45.6	36.9	16:50-16:55	46.1	37.1	19:50-19:55	35.3	34.6	22:50-22:55	49.1	47.3
13:55-14:00	45.8	36.8	16:55-17:00	46.4	37.6	19:55-20:00	37.1	35.6	22:55-23:00	54.8	49.3

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588680 E, 1647958 N
Measured Date : May 28-29, 2023
Measured By : Mr.Noppasit Taweepornpadit
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-21D Serial Number 820459

Quotation No. : 2023-00689
Analysis No. : 2023-AC094-012
Report No. : 2023-RAAK256
Report Date : June 9, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
23:00-23:05	54.4	50.7	02:00-02:05	45.7	43.7	05:00-05:05	40.4	39.3	08:00-08:05	51.0	42.9
23:05-23:10	51.1	46.8	02:05-02:10	45.9	43.7	05:05-05:10	40.1	39.0	08:05-08:10	50.1	48.6
23:10-23:15	47.9	45.6	02:10-02:15	51.6	43.0	05:10-05:15	39.6	38.2	08:10-08:15	49.1	42.0
23:15-23:20	48.2	44.5	02:15-02:20	45.5	42.8	05:15-05:20	37.6	37.0	08:15-08:20	49.6	40.8
23:20-23:25	49.1	44.8	02:20-02:25	45.1	42.4	05:20-05:25	46.6	37.7	08:20-08:25	52.0	42.1
23:25-23:30	48.1	44.1	02:25-02:30	45.1	43.3	05:25-05:30	45.3	37.2	08:25-08:30	50.1	41.3
23:30-23:35	50.2	43.9	02:30-02:35	45.2	43.3	05:30-05:35	46.2	37.9	08:30-08:35	50.4	42.1
23:35-23:40	50.4	44.6	02:35-02:40	45.8	43.1	05:35-05:40	48.1	38.7	08:35-08:40	49.8	40.9
23:40-23:45	52.4	44.8	02:40-02:45	45.1	43.5	05:40-05:45	50.1	44.2	08:40-08:45	50.6	43.4
23:45-23:50	52.1	44.8	02:45-02:50	44.9	43.7	05:45-05:50	50.0	43.5	08:45-08:50	51.4	41.5
23:50-23:55	57.3	49.1	02:50-02:55	44.3	43.0	05:50-05:55	50.1	42.9	08:50-08:55	50.4	44.3
23:55-00:00	54.6	48.0	02:55-03:00	46.8	43.3	05:55-06:00	51.3	41.7	08:55-09:00	50.1	40.5
00:00-00:05	49.0	46.7	03:00-03:05	44.8	43.1	06:00-06:05	50.2	40.7	09:00-09:05	50.2	40.4
00:05-00:10	48.6	46.6	03:05-03:10	46.1	43.0	06:05-06:10	48.9	41.4	09:05-09:10	48.7	41.0
00:10-00:15	49.1	46.8	03:10-03:15	44.0	42.2	06:10-06:15	49.1	40.4	09:10-09:15	49.5	40.2
00:15-00:20	48.5	46.4	03:15-03:20	44.5	41.5	06:15-06:20	52.1	42.3	09:15-09:20	51.2	41.5
00:20-00:25	50.3	46.5	03:20-03:25	42.2	40.6	06:20-06:25	48.6	40.9	09:20-09:25	47.2	41.4
00:25-00:30	46.7	45.3	03:25-03:30	41.1	40.2	06:25-06:30	49.2	40.7	09:25-09:30	48.2	39.1
00:30-00:35	49.1	45.8	03:30-03:35	42.1	40.9	06:30-06:35	48.6	41.2	09:30-09:35	49.6	39.7
00:35-00:40	51.5	46.3	03:35-03:40	48.5	41.7	06:35-06:40	47.5	41.9	09:35-09:40	48.9	40.5
00:40-00:45	54.1	47.0	03:40-03:45	42.8	41.6	06:40-06:45	48.6	41.7	09:40-09:45	48.1	38.9
00:45-00:50	50.9	46.9	03:45-03:50	42.4	41.3	06:45-06:50	48.1	41.8	09:45-09:50	49.6	40.0
00:50-00:55	52.4	47.6	03:50-03:55	47.7	41.5	06:50-06:55	48.9	41.5	09:50-09:55	48.3	39.6
00:55-01:00	50.4	46.9	03:55-04:00	42.1	41.0	06:55-07:00	49.0	42.1	09:55-10:00	48.6	40.1
01:00-01:05	50.4	47.0	04:00-04:05	42.6	41.5	07:00-07:05	48.2	41.2	10:00-10:05	51.5	42.1
01:05-01:10	49.7	46.4	04:05-04:10	41.6	40.5	07:05-07:10	52.2	42.6	10:05-10:10	52.6	46.4
01:10-01:15	50.0	45.1	04:10-04:15	41.8	40.7	07:10-07:15	50.1	40.3	10:10-10:15	55.0	46.4
01:15-01:20	48.8	45.7	04:15-04:20	42.0	40.9	07:15-07:20	50.1	40.5	10:15-10:20	50.2	46.3
01:20-01:25	48.5	45.7	04:20-04:25	47.4	40.8	07:20-07:25	50.2	40.4	10:20-10:25	50.1	45.7
01:25-01:30	47.9	45.6	04:25-04:30	41.4	40.4	07:25-07:30	49.8	39.9	10:25-10:30	52.0	46.8
01:30-01:35	49.0	45.7	04:30-04:35	41.1	40.2	07:30-07:35	51.3	42.4	10:30-10:35	49.0	45.3
01:35-01:40	48.9	44.8	04:35-04:40	42.8	40.2	07:35-07:40	51.0	43.3	10:35-10:40	53.0	45.8
01:40-01:45	49.1	44.9	04:40-04:45	43.7	39.5	07:40-07:45	52.1	42.5	10:40-10:45	50.0	44.7
01:45-01:50	49.2	45.1	04:45-04:50	40.3	39.5	07:45-07:50	53.0	44.7	10:45-10:50	51.2	43.0
01:50-01:55	50.7	44.4	04:50-04:55	41.2	39.7	07:50-07:55	50.1	43.3	10:50-10:55	43.1	39.5
01:55-02:00	49.6	43.7	04:55-05:00	41.1	39.9	07:55-08:00	51.6	41.6	10:55-11:00	42.9	38.2

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Laboratory Reviewer

Laboratory Supervisor

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Appendix 3-2

Results of environmental sampling (Rainy Season)

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Sampling Source : Ambient Air Quality
Sampling Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591311 E, 1644737 N
Sampling Date : October 24-29, 2023
Sampling Time : 13:55
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Folder No. : 2023-AE729
Received Date : November 1, 2023
Analytical Date : November 1-8, 2023
Report No. : 2023-RAAV693
Report Date : November 8, 2023

Parameter	Unit	Method of Analysis	Result					Standard[1']	Standard[2']
			Oct 24-25, 23	Oct 25-26, 23	Oct 26-27, 23	Oct 27-28, 23	Oct 28-29, 23		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m^3	High-Volume, Gravimetric	0.038	0.032	0.028	0.038	0.032	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m^3	PM10 Size Selective, High-Volume, Gravimetric	0.018	0.016	0.015	0.019	0.017	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	$\mu g/m^3$	PM2.5 Size, Low-Volume Air Sampler, Gravimetric Method	7.6	6.7	2.8	12.2	4.3	-	37.5

Remark : 1' Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
2' Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Sampling Source : Ambient Air Quality
Sampling Point : โรงเรียนบ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588695 E, 1647907 N
Sampling Date : October 24-29, 2023
Sampling Time : 15:30
Sampling Method : U.S. EPA 40 CFR Part 50, 53
Sampling By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Folder No. : 2023-AE729
Received Date : November 1, 2023
Analytical Date : November 1-8, 2023
Report No. : 2023-RAAV694
Report Date : November 8, 2023

Parameter	Unit	Method of Analysis	Result					Standard[1']	Standard[2']
			Oct 24-25, 23	Oct 25-26, 23	Oct 26-27, 23	Oct 27-28, 23	Oct 28-29, 23		
Total Suspended Particulate (TSP) 24 Hours Average	mg/m^3	High-Volume, Gravimetric	0.032	0.032	0.033	0.036	0.035	0.330	-
Particulate Size Less Than 10 Micron (PM10) 24 Hours Average	mg/m^3	PM10 Size Selective, High-Volume, Gravimetric	0.018	0.016	0.017	0.019	0.018	0.120	-
Particulate Size Less Than 2.5 Micron (PM2.5) 24 Hours Average	$\mu g/m^3$	PM2.5 Size, Low-Volume Air Sampler, Gravimetric Method	10.8	9.4	5.0	10.7	8.5	-	37.5

Remark : [1'] Notification of National Environmental Board, No.10, B.E.2538 (1995), published in the Royal Government Gazette No.112 Part 42D dated May 25, B.E.2538 (1995) and Notification No.24, B.E.2547 (2004), published in the Royal Government Gazette No.121 Special Part 104D dated September 22, B.E.2547 (2004), under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).
[2'] Notification of National Environmental Board, B.E.2565 (2022), published in the Royal Government Gazette No.139 Special Part 163D dated July 8, B.E.2565 (2022) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

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Laboratory Supervisor

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
25/114 Mu 6 Soi Chinnakhet 1, Ngam Wong Wan Road,
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Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Air Quality
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591314 E, 1644732 N
Measured Date : October 24-29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-001 - 005
Report No. : 2023-RAAV283
Report Date : November 8, 2023

Date/Time	Oct 24-25, 23		Oct 25-26, 23		Oct 26-27, 23		Oct 27-28, 23		Oct 28-29, 23	
	WS	WD	WS	WD	WS	WD	WS	WD	WS	WD
14:00-15:00	1.3	NNW	1.8	E	1.3	E	0.9	NE	0.9	ENE
15:00-16:00	1.3	E	1.3	E	1.8	E	0.9	N	1.3	E
16:00-17:00	1.3	NE	1.8	NE	1.3	E	0.9	ESE	1.3	E
17:00-18:00	1.3	NE	0.9	N	1.3	E	0.9	S	1.3	ESE
18:00-19:00	0.9	NNE	0.9	NE	2.7	NE	0.4	SE	0.9	ESE
19:00-20:00	0.4	NNW	1.3	NE	1.3	NW	0.4	ESE	1.8	ESE
20:00-21:00	0.4	NNW	0.9	NNE	0.4	NNW	0.4	E	0.9	NE
21:00-22:00	0.4	NNW	0.4	NNE	0.4	N	<0.4	Calm	0.4	ENE
22:00-23:00	0.4	NNW	0.4	NNW	0.4	WSW	0.4	SW	1.8	NNW
23:00-00:00	0.9	ENE	0.4	NNW	0.4	N	<0.4	Calm	1.3	NW
00:00-01:00	1.8	NE	<0.4	Calm	0.4	E	0.4	WNW	1.3	W
01:00-02:00	1.3	NE	<0.4	Calm	0.9	SW	0.4	W	0.9	WSW
02:00-03:00	0.9	WNW	0.4	NNW	0.4	WSW	0.4	NE	0.4	SSE
03:00-04:00	1.3	WNW	<0.4	Calm	0.4	SW	<0.4	Calm	<0.4	Calm
04:00-05:00	1.3	NW	<0.4	Calm	0.4	SW	<0.4	Calm	<0.4	Calm
05:00-06:00	1.8	WNW	<0.4	Calm	<0.4	Calm	0.4	SSW	<0.4	Calm
06:00-07:00	0.9	WNW	<0.4	Calm	0.4	NE	0.9	NW	0.4	NE
07:00-08:00	0.4	NNE	<0.4	Calm	0.4	NE	0.4	NNW	0.4	W
08:00-09:00	0.9	NNW	0.4	NNW	1.3	NE	0.9	N	0.9	NNW
09:00-10:00	0.4	N	0.9	NE	1.3	NNE	0.9	N	1.3	NNW
10:00-11:00	0.9	NE	0.9	ENE	0.9	NNE	0.9	N	1.3	NNE
11:00-12:00	1.8	E	0.9	ENE	0.9	NW	0.9	ENE	1.3	NNE
12:00-13:00	1.8	E	0.9	NE	0.9	NE	0.9	N	1.8	NNE
13:00-14:00	1.8	ENE	1.3	E	1.3	NE	0.9	NNE	2.7	NE

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Air Quality
Measured Point : **โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0591314 E, 1644732 N
Measured Date : October 24-29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-001 - 005
Report No. : 2023-RAAV283
Report Date : November 8, 2023

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	**1.1-2.1**	**2.1-3.1**	**3.1-4.1**	**≥4.1**	**Total**
N	7.50000	0.00000	0.00000	0.00000	0.00000	**7.50000**
NNE	5.00000	3.33333	0.00000	0.00000	0.00000	**8.33333**
NE	9.16667	6.66667	1.66667	0.00000	0.00000	**17.50001**
ENE	5.00000	0.83333	0.00000	0.00000	0.00000	**5.83333**
E	1.66667	10.00000	0.00000	0.00000	0.00000	**11.66667**
ESE	2.50000	1.66667	0.00000	0.00000	0.00000	**4.16667**
SE	0.83333	0.00000	0.00000	0.00000	0.00000	**0.83333**
SSE	0.83333	0.00000	0.00000	0.00000	0.00000	**0.83333**
S	0.83333	0.00000	0.00000	0.00000	0.00000	**0.83333**
SSW	0.83333	0.00000	0.00000	0.00000	0.00000	**0.83333**
SW	3.33333	0.00000	0.00000	0.00000	0.00000	**3.33333**
WSW	2.50000	0.00000	0.00000	0.00000	0.00000	**2.50000**
W	1.66667	0.83333	0.00000	0.00000	0.00000	**2.50000**
WNW	2.50000	1.66667	0.00000	0.00000	0.00000	**4.16667**
NW	1.66667	2.50000	0.00000	0.00000	0.00000	**4.16667**
NNW	10.00000	2.50000	0.00000	0.00000	0.00000	**12.50000**
Calm	**12.50000**					

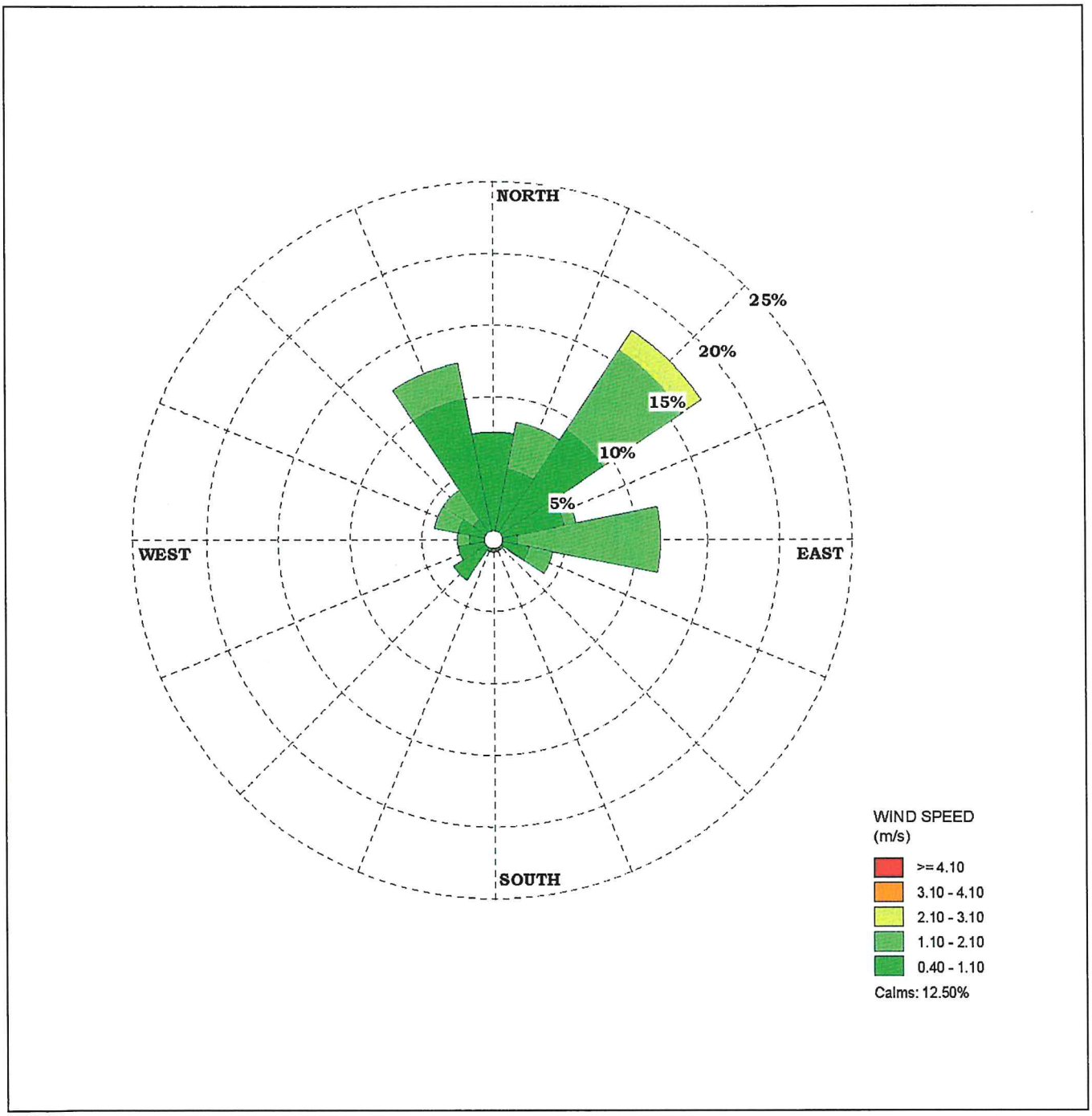
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Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Measured Point : **โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
Measured Date : October 24-29, 2023
Report No. : 2023-RAAV283



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Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Air Quality
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588678 E, 1647914 N
Measured Date : October 24-29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-006 - 010
Report No. : 2023-RAAV284
Report Date : November 8, 2023

Date/Time	Oct 24-25, 23		Oct 25-26, 23		Oct 26-27, 23		Oct 27-28, 23		Oct 28-29, 23	
	WS	WD	WS	WD	WS	WD	WS	WD	WS	WD
16:00-17:00	0.4	ENE	1.3	NNE	1.3	ENE	0.9	SE	1.3	SSE
17:00-18:00	1.3	E	1.8	N	1.3	SE	0.9	S	1.3	SE
18:00-19:00	0.9	NNE	0.9	NE	1.8	ENE	0.9	S	0.9	SE
19:00-20:00	<0.4	Calm	0.9	NE	0.4	NW	<0.4	Calm	1.3	SE
20:00-21:00	<0.4	Calm	0.9	N	<0.4	Calm	<0.4	Calm	0.4	ESE
21:00-22:00	<0.4	Calm	0.4	N	0.4	N	<0.4	Calm	0.4	N
22:00-23:00	<0.4	Calm	0.4	N	0.4	NE	0.4	NW	1.3	N
23:00-00:00	0.4	N	<0.4	Calm	0.4	NNE	0.4	NW	0.9	NNW
00:00-01:00	1.3	E	<0.4	Calm	<0.4	Calm	0.4	W	1.3	WSW
01:00-02:00	1.3	E	<0.4	Calm	0.9	WSW	0.9	N	<0.4	Calm
02:00-03:00	0.4	N	<0.4	Calm	<0.4	Calm	0.4	N	<0.4	Calm
03:00-04:00	0.4	WNW	<0.4	Calm	<0.4	Calm	0.4	N	<0.4	Calm
04:00-05:00	1.3	WNW	<0.4	Calm	<0.4	Calm	<0.4	Calm	0.4	NNE
05:00-06:00	1.3	WNW	<0.4	Calm	<0.4	Calm	<0.4	Calm	0.4	NE
06:00-07:00	0.4	N	<0.4	Calm	<0.4	Calm	0.9	N	<0.4	Calm
07:00-08:00	<0.4	Calm	<0.4	Calm	<0.4	Calm	1.3	N	<0.4	Calm
08:00-09:00	0.4	N	<0.4	Calm	0.9	NE	1.3	N	1.3	N
09:00-10:00	0.9	N	<0.4	Calm	1.3	N	1.8	N	1.8	N
10:00-11:00	0.9	NE	0.9	NNE	0.9	N	1.3	NE	2.7	N
11:00-12:00	1.3	SE	0.9	ESE	0.9	N	0.9	SSE	2.7	N
12:00-13:00	1.8	ESE	1.3	SE	0.9	NE	0.9	NE	2.7	N
13:00-14:00	1.8	ESE	1.8	SE	1.8	N	0.9	ESE	2.7	NNE
14:00-15:00	1.8	SE	1.3	E	0.4	NNE	1.3	E	1.8	NNE
15:00-16:00	1.3	SE	1.8	E	0.9	N	1.3	SSE	1.8	N

Remark : WS = Wind Speed (m/s)
WD = Wind Direction
Height of wind vane and anemometer above ground 10 meters.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Air Quality
Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588678 E, 1647914 N
Measured Date : October 24-29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-006 - 010
Report No. : 2023-RAAV284
Report Date : November 8, 2023

Wind Direction	Percentage frequency of wind in each speed and direction					
	0.4-1.1	**1.1-2.1**	**2.1-3.1**	**3.1-4.1**	**≥4.1**	**Total**
N	14.16670	8.33333	2.50000	0.00000	0.00000	**25.00003**
NNE	4.16667	1.66667	0.83333	0.00000	0.00000	**6.66667**
NE	6.66667	0.83333	0.00000	0.00000	0.00000	**7.50000**
ENE	0.83333	1.66667	0.00000	0.00000	0.00000	**2.50000**
E	0.00000	5.00000	0.00000	0.00000	0.00000	**5.00000**
ESE	2.50000	1.66667	0.00000	0.00000	0.00000	**4.16667**
SE	1.66667	6.66667	0.00000	0.00000	0.00000	**8.33334**
SSE	0.83333	1.66667	0.00000	0.00000	0.00000	**2.50000**
S	1.66667	0.00000	0.00000	0.00000	0.00000	**1.66667**
SSW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
SW	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**
WSW	0.83333	0.83333	0.00000	0.00000	0.00000	**1.66666**
W	0.83333	0.00000	0.00000	0.00000	0.00000	**0.83333**
WNW	0.83333	1.66667	0.00000	0.00000	0.00000	**2.50000**
NW	2.50000	0.00000	0.00000	0.00000	0.00000	**2.50000**
NNW	0.83333	0.00000	0.00000	0.00000	0.00000	**0.83333**
Calm	**28.33330**					

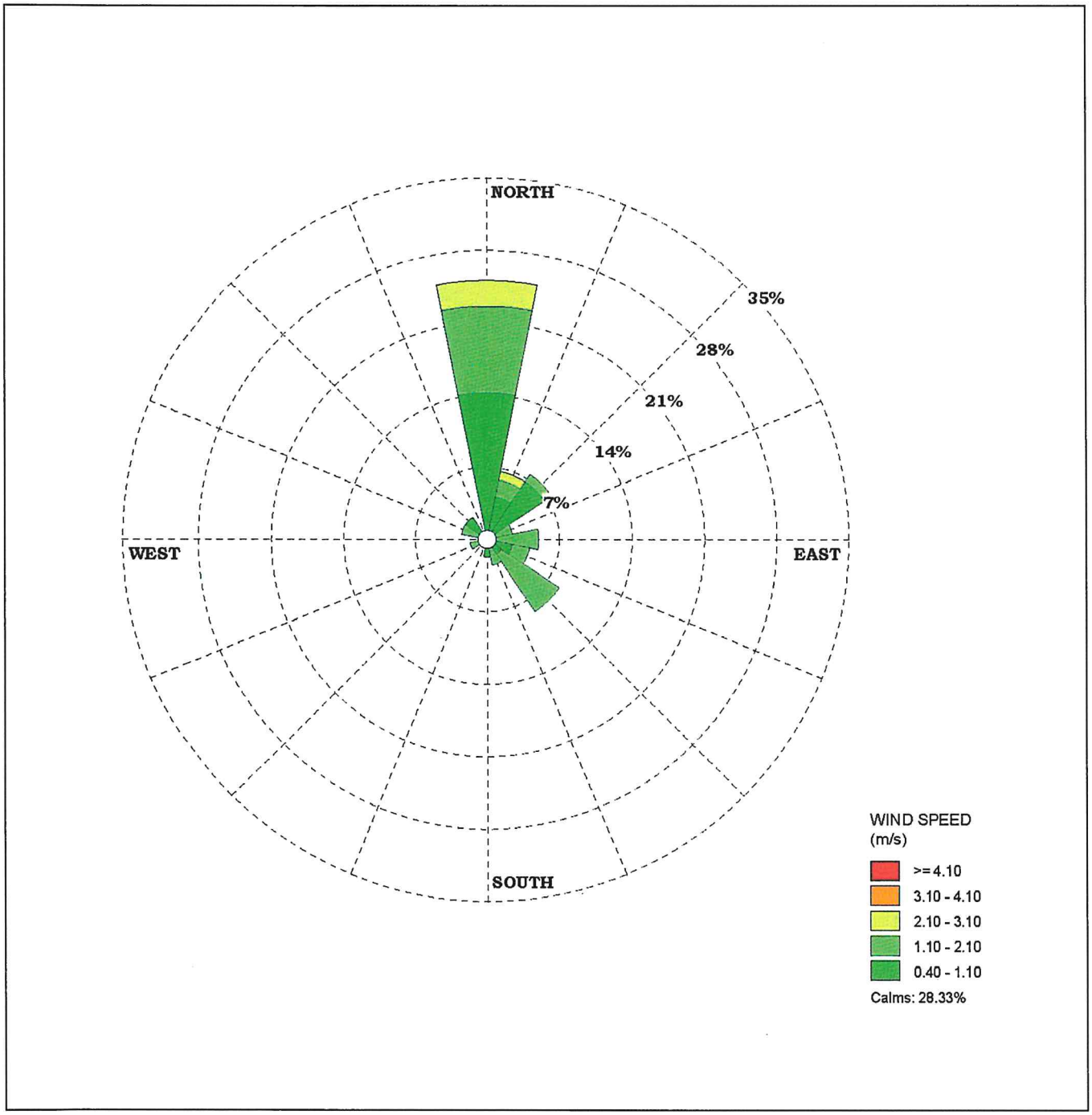
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Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
Measured Date : October 24-29, 2023
Report No. : 2023-RAAV284



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Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 24-25, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
14:00-14:05	47.1	43.6	17:00-17:05	55.5	43.7	20:00-20:05	50.1	48.6	23:00-23:05	50.3	48.9
14:05-14:10	49.3	43.6	17:05-17:10	51.6	42.8	20:05-20:10	49.8	48.0	23:05-23:10	50.5	49.4
14:10-14:15	47.7	43.2	17:10-17:15	52.2	43.8	20:10-20:15	49.0	47.9	23:10-23:15	50.2	48.8
14:15-14:20	52.1	44.1	17:15-17:20	53.5	44.8	20:15-20:20	51.3	48.0	23:15-23:20	50.5	49.1
14:20-14:25	52.7	44.1	17:20-17:25	54.2	46.1	20:20-20:25	52.5	48.9	23:20-23:25	52.9	48.6
14:25-14:30	54.2	45.8	17:25-17:30	56.3	44.3	20:25-20:30	51.2	49.9	23:25-23:30	49.8	47.8
14:30-14:35	56.9	47.0	17:30-17:35	52.4	42.4	20:30-20:35	51.9	50.4	23:30-23:35	48.1	46.9
14:35-14:40	52.7	42.2	17:35-17:40	49.5	42.0	20:35-20:40	52.2	50.6	23:35-23:40	48.9	45.1
14:40-14:45	51.1	43.0	17:40-17:45	55.9	43.1	20:40-20:45	51.4	50.3	23:40-23:45	46.9	45.3
14:45-14:50	51.5	43.8	17:45-17:50	57.2	44.3	20:45-20:50	52.5	50.9	23:45-23:50	47.5	46.1
14:50-14:55	53.0	43.3	17:50-17:55	51.5	41.8	20:50-20:55	52.4	50.8	23:50-23:55	48.4	46.3
14:55-15:00	52.1	43.6	17:55-18:00	55.2	43.3	20:55-21:00	51.9	50.3	23:55-00:00	52.3	47.1
15:00-15:05	53.0	45.1	18:00-18:05	49.9	42.1	21:00-21:05	51.6	50.1	00:00-00:05	51.7	47.6
15:05-15:10	50.4	43.0	18:05-18:10	51.6	41.7	21:05-21:10	53.5	50.0	00:05-00:10	56.7	53.6
15:10-15:15	51.9	43.4	18:10-18:15	49.6	45.6	21:10-21:15	51.9	50.9	00:10-00:15	50.8	47.8
15:15-15:20	48.2	41.8	18:15-18:20	53.3	46.5	21:15-21:20	52.2	51.1	00:15-00:20	49.6	47.5
15:20-15:25	52.2	42.7	18:20-18:25	49.3	47.3	21:20-21:25	52.8	51.2	00:20-00:25	49.9	47.3
15:25-15:30	53.2	43.0	18:25-18:30	50.5	48.6	21:25-21:30	52.9	51.1	00:25-00:30	50.0	48.1
15:30-15:35	49.0	42.8	18:30-18:35	54.8	49.2	21:30-21:35	52.8	51.0	00:30-00:35	49.5	47.3
15:35-15:40	53.4	48.0	18:35-18:40	52.7	49.4	21:35-21:40	52.5	51.1	00:35-00:40	47.4	45.9
15:40-15:45	53.4	43.3	18:40-18:45	52.3	49.3	21:40-21:45	53.1	50.9	00:40-00:45	46.4	45.3
15:45-15:50	56.0	43.2	18:45-18:50	52.9	50.1	21:45-21:50	52.0	50.9	00:45-00:50	48.6	46.9
15:50-15:55	59.4	57.7	18:50-18:55	54.3	51.3	21:50-21:55	51.4	50.1	00:50-00:55	54.0	46.3
15:55-16:00	56.1	44.1	18:55-19:00	51.3	50.4	21:55-22:00	51.4	50.3	00:55-01:00	48.3	44.4
16:00-16:05	53.8	43.2	19:00-19:05	51.3	50.4	22:00-22:05	50.6	49.5	01:00-01:05	45.6	44.7
16:05-16:10	56.2	43.5	19:05-19:10	51.2	49.9	22:05-22:10	51.5	50.3	01:05-01:10	45.8	44.8
16:10-16:15	55.4	44.6	19:10-19:15	50.3	49.3	22:10-22:15	51.5	50.4	01:10-01:15	46.4	45.2
16:15-16:20	51.0	43.4	19:15-19:20	50.6	49.4	22:15-22:20	51.2	50.1	01:15-01:20	48.2	44.9
16:20-16:25	53.1	43.7	19:20-19:25	52.6	49.4	22:20-22:25	51.1	49.6	01:20-01:25	47.2	45.7
16:25-16:30	50.8	44.8	19:25-19:30	50.3	49.1	22:25-22:30	51.0	49.7	01:25-01:30	49.6	46.2
16:30-16:35	54.7	47.4	19:30-19:35	52.2	49.2	22:30-22:35	50.7	48.5	01:30-01:35	48.0	46.6
16:35-16:40	55.3	48.6	19:35-19:40	51.5	49.8	22:35-22:40	50.2	48.4	01:35-01:40	48.8	47.1
16:40-16:45	50.8	43.2	19:40-19:45	52.9	49.7	22:40-22:45	49.8	48.0	01:40-01:45	48.1	46.5
16:45-16:50	55.1	42.8	19:45-19:50	51.8	49.5	22:45-22:50	48.8	47.3	01:45-01:50	50.9	47.3
16:50-16:55	51.9	43.2	19:50-19:55	50.4	48.8	22:50-22:55	53.8	48.4	01:50-01:55	51.2	48.0
16:55-17:00	51.7	43.5	19:55-20:00	50.2	48.6	22:55-23:00	50.1	48.6	01:55-02:00	50.8	46.9

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 25, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
02:00-02:05	50.3	48.4	05:00-05:05	50.3	47.5	08:00-08:05	53.8	43.8	11:00-11:05	52.7	45.1
02:05-02:10	51.3	49.6	05:05-05:10	49.3	47.7	08:05-08:10	54.8	45.5	11:05-11:10	53.9	44.1
02:10-02:15	51.4	49.6	05:10-05:15	48.2	46.6	08:10-08:15	57.1	45.2	11:10-11:15	54.3	44.1
02:15-02:20	51.8	50.1	05:15-05:20	47.9	46.5	08:15-08:20	58.3	45.0	11:15-11:20	48.4	44.0
02:20-02:25	51.9	50.1	05:20-05:25	49.1	46.9	08:20-08:25	54.4	45.7	11:20-11:25	51.6	43.8
02:25-02:30	54.7	51.5	05:25-05:30	50.0	47.9	08:25-08:30	57.3	45.7	11:25-11:30	51.0	44.1
02:30-02:35	55.8	46.7	05:30-05:35	51.7	48.4	08:30-08:35	53.3	45.7	11:30-11:35	52.0	44.2
02:35-02:40	56.9	49.4	05:35-05:40	54.1	50.2	08:35-08:40	55.9	46.2	11:35-11:40	52.1	44.7
02:40-02:45	54.0	45.2	05:40-05:45	54.1	50.8	08:40-08:45	56.3	48.9	11:40-11:45	56.4	46.0
02:45-02:50	47.6	45.3	05:45-05:50	54.7	52.7	08:45-08:50	55.2	48.6	11:45-11:50	57.2	44.9
02:50-02:55	46.5	44.6	05:50-05:55	54.0	50.3	08:50-08:55	51.9	45.8	11:50-11:55	54.3	45.5
02:55-03:00	48.0	45.3	05:55-06:00	52.0	46.8	08:55-09:00	53.6	44.9	11:55-12:00	52.7	46.2
03:00-03:05	48.6	45.7	06:00-06:05	54.1	48.5	09:00-09:05	51.9	44.4	12:00-12:05	53.5	45.0
03:05-03:10	52.9	47.3	06:05-06:10	52.6	45.7	09:05-09:10	53.8	44.7	12:05-12:10	51.0	44.9
03:10-03:15	50.5	47.8	06:10-06:15	49.7	45.4	09:10-09:15	51.5	44.9	12:10-12:15	54.7	44.4
03:15-03:20	48.2	46.0	06:15-06:20	48.4	44.0	09:15-09:20	58.9	47.3	12:15-12:20	56.8	44.3
03:20-03:25	47.5	46.7	06:20-06:25	51.2	44.8	09:20-09:25	57.5	48.5	12:20-12:25	50.3	44.1
03:25-03:30	48.1	47.1	06:25-06:30	50.6	42.8	09:25-09:30	54.0	49.5	12:25-12:30	51.9	44.3
03:30-03:35	49.7	47.1	06:30-06:35	52.4	43.9	09:30-09:35	55.3	50.8	12:30-12:35	53.7	45.1
03:35-03:40	48.4	47.5	06:35-06:40	53.8	44.5	09:35-09:40	53.6	44.0	12:35-12:40	53.6	44.1
03:40-03:45	48.9	47.9	06:40-06:45	52.3	45.0	09:40-09:45	52.7	44.6	12:40-12:45	54.8	44.1
03:45-03:50	50.1	48.5	06:45-06:50	54.2	45.3	09:45-09:50	55.7	45.3	12:45-12:50	53.4	43.7
03:50-03:55	50.8	49.0	06:50-06:55	54.5	46.8	09:50-09:55	61.3	51.8	12:50-12:55	49.7	44.0
03:55-04:00	49.5	48.2	06:55-07:00	53.7	43.9	09:55-10:00	55.2	44.9	12:55-13:00	53.8	44.0
04:00-04:05	51.0	48.4	07:00-07:05	52.7	45.2	10:00-10:05	53.2	44.5	13:00-13:05	52.8	44.7
04:05-04:10	50.0	48.4	07:05-07:10	55.0	44.4	10:05-10:10	55.2	45.5	13:05-13:10	49.7	43.6
04:10-04:15	51.4	49.1	07:10-07:15	49.7	45.2	10:10-10:15	51.6	44.7	13:10-13:15	52.8	44.3
04:15-04:20	50.4	48.2	07:15-07:20	53.5	46.0	10:15-10:20	54.1	44.5	13:15-13:20	55.8	47.3
04:20-04:25	51.1	49.2	07:20-07:25	54.8	47.1	10:20-10:25	55.2	44.9	13:20-13:25	52.4	48.8
04:25-04:30	50.1	48.7	07:25-07:30	59.7	47.7	10:25-10:30	51.3	44.7	13:25-13:30	53.5	47.4
04:30-04:35	50.3	48.6	07:30-07:35	56.2	45.8	10:30-10:35	51.2	44.8	13:30-13:35	56.2	47.3
04:35-04:40	50.4	48.5	07:35-07:40	58.6	46.5	10:35-10:40	51.6	44.6	13:35-13:40	51.7	47.2
04:40-04:45	49.5	47.9	07:40-07:45	52.7	43.6	10:40-10:45	57.5	45.7	13:40-13:45	52.8	47.2
04:45-04:50	49.6	47.2	07:45-07:50	54.2	44.5	10:45-10:50	57.9	45.3	13:45-13:50	49.3	47.1
04:50-04:55	48.1	47.1	07:50-07:55	48.1	44.0	10:50-10:55	51.9	45.2	13:50-13:55	50.4	45.6
04:55-05:00	48.4	47.4	07:55-08:00	54.1	44.3	10:55-11:00	61.3	44.3	13:55-14:00	52.0	47.0

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 25-26, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
14:00-14:05	54.6	44.4	17:00-17:05	57.1	47.9	20:00-20:05	50.6	47.8	23:00-23:05	54.3	53.0
14:05-14:10	52.7	44.7	17:05-17:10	64.3	48.3	20:05-20:10	49.3	47.8	23:05-23:10	54.4	53.1
14:10-14:15	52.6	44.2	17:10-17:15	59.5	47.8	20:10-20:15	49.2	47.8	23:10-23:15	54.2	52.6
14:15-14:20	54.1	45.6	17:15-17:20	56.3	46.6	20:15-20:20	51.5	48.0	23:15-23:20	54.3	52.6
14:20-14:25	55.6	46.9	17:20-17:25	56.6	47.4	20:20-20:25	53.8	51.9	23:20-23:25	53.9	52.4
14:25-14:30	52.2	44.5	17:25-17:30	60.7	48.6	20:25-20:30	53.9	52.0	23:25-23:30	54.0	52.4
14:30-14:35	54.7	45.9	17:30-17:35	53.6	47.1	20:30-20:35	55.1	52.1	23:30-23:35	53.6	52.0
14:35-14:40	53.3	45.3	17:35-17:40	59.2	48.2	20:35-20:40	53.9	49.8	23:35-23:40	53.6	51.3
14:40-14:45	51.0	44.5	17:40-17:45	56.5	48.6	20:40-20:45	53.2	48.8	23:40-23:45	53.1	51.7
14:45-14:50	58.9	45.6	17:45-17:50	53.1	47.3	20:45-20:50	52.2	49.3	23:45-23:50	53.8	52.5
14:50-14:55	54.2	45.9	17:50-17:55	56.5	49.2	20:50-20:55	53.1	48.8	23:50-23:55	53.9	52.7
14:55-15:00	58.1	47.2	17:55-18:00	53.6	47.0	20:55-21:00	51.3	48.5	23:55-00:00	56.5	52.7
15:00-15:05	53.3	46.2	18:00-18:05	55.4	47.5	21:00-21:05	51.4	48.7	00:00-00:05	54.1	52.8
15:05-15:10	51.9	44.9	18:05-18:10	57.3	48.1	21:05-21:10	55.3	50.8	00:05-00:10	53.6	51.5
15:10-15:15	56.8	44.5	18:10-18:15	56.6	46.9	21:10-21:15	54.5	52.1	00:10-00:15	55.3	53.1
15:15-15:20	51.7	43.4	18:15-18:20	51.7	47.1	21:15-21:20	54.3	52.6	00:15-00:20	54.3	53.1
15:20-15:25	50.4	43.1	18:20-18:25	52.2	47.5	21:20-21:25	54.8	53.0	00:20-00:25	54.2	53.0
15:25-15:30	51.9	44.3	18:25-18:30	51.7	47.8	21:25-21:30	57.9	54.1	00:25-00:30	54.2	53.0
15:30-15:35	51.8	43.3	18:30-18:35	51.4	47.8	21:30-21:35	57.4	55.5	00:30-00:35	54.0	52.7
15:35-15:40	50.4	42.8	18:35-18:40	50.5	47.5	21:35-21:40	56.3	53.7	00:35-00:40	53.9	52.6
15:40-15:45	48.7	43.3	18:40-18:45	49.2	47.4	21:40-21:45	54.7	51.6	00:40-00:45	54.0	52.8
15:45-15:50	50.9	44.6	18:45-18:50	48.3	47.5	21:45-21:50	55.9	50.1	00:45-00:50	54.4	53.3
15:50-15:55	53.1	46.8	18:50-18:55	53.0	48.0	21:50-21:55	53.2	50.5	00:50-00:55	54.7	53.7
15:55-16:00	54.7	44.5	18:55-19:00	54.1	48.7	21:55-22:00	55.4	53.0	00:55-01:00	56.8	53.5
16:00-16:05	52.2	44.0	19:00-19:05	56.4	48.8	22:00-22:05	56.3	53.0	01:00-01:05	55.0	53.7
16:05-16:10	52.0	43.0	19:05-19:10	53.1	48.7	22:05-22:10	54.8	53.4	01:05-01:10	55.2	53.5
16:10-16:15	51.5	43.9	19:10-19:15	50.6	48.9	22:10-22:15	54.9	53.1	01:10-01:15	55.4	53.7
16:15-16:20	49.4	43.8	19:15-19:20	49.5	48.1	22:15-22:20	53.5	50.7	01:15-01:20	55.5	53.8
16:20-16:25	56.9	45.9	19:20-19:25	50.0	47.2	22:20-22:25	52.5	50.8	01:20-01:25	55.3	53.9
16:25-16:30	57.7	48.0	19:25-19:30	49.1	47.2	22:25-22:30	53.0	51.2	01:25-01:30	54.2	52.9
16:30-16:35	54.9	47.9	19:30-19:35	48.4	47.3	22:30-22:35	52.4	50.7	01:30-01:35	54.0	52.7
16:35-16:40	56.9	48.2	19:35-19:40	48.6	47.3	22:35-22:40	53.0	51.4	01:35-01:40	52.4	50.3
16:40-16:45	52.8	46.8	19:40-19:45	52.6	48.0	22:40-22:45	52.8	51.3	01:40-01:45	52.0	50.7
16:45-16:50	56.8	49.1	19:45-19:50	50.1	47.8	22:45-22:50	53.4	51.9	01:45-01:50	52.1	51.1
16:50-16:55	57.7	47.2	19:50-19:55	48.8	47.3	22:50-22:55	54.3	53.0	01:50-01:55	51.3	50.2
16:55-17:00	62.0	48.5	19:55-20:00	51.5	47.5	22:55-23:00	53.9	52.5	01:55-02:00	52.0	50.7

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 26, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
02:00-02:05	52.0	50.8	05:00-05:05	54.4	48.8	08:00-08:05	57.3	47.1	11:00-11:05	57.7	45.0
02:05-02:10	56.3	51.3	05:05-05:10	54.5	49.8	08:05-08:10	56.6	46.7	11:05-11:10	51.5	44.6
02:10-02:15	54.9	51.4	05:10-05:15	54.7	50.0	08:10-08:15	51.3	45.3	11:10-11:15	52.1	44.9
02:15-02:20	52.3	50.7	05:15-05:20	54.6	49.2	08:15-08:20	52.6	45.8	11:15-11:20	56.1	45.4
02:20-02:25	52.0	50.5	05:20-05:25	51.0	48.9	08:20-08:25	53.8	45.6	11:20-11:25	56.1	45.7
02:25-02:30	52.9	51.2	05:25-05:30	51.6	49.5	08:25-08:30	55.2	44.9	11:25-11:30	55.1	47.4
02:30-02:35	52.4	51.5	05:30-05:35	49.7	47.8	08:30-08:35	52.5	44.5	11:30-11:35	51.3	45.4
02:35-02:40	52.4	51.3	05:35-05:40	50.8	48.5	08:35-08:40	53.4	45.4	11:35-11:40	55.2	44.6
02:40-02:45	52.5	51.6	05:40-05:45	52.4	48.2	08:40-08:45	55.5	45.4	11:40-11:45	50.1	45.5
02:45-02:50	52.4	51.3	05:45-05:50	53.5	48.8	08:45-08:50	53.0	46.9	11:45-11:50	53.6	46.6
02:50-02:55	52.7	51.4	05:50-05:55	55.4	49.1	08:50-08:55	53.5	46.7	11:50-11:55	55.0	47.2
02:55-03:00	55.1	50.8	05:55-06:00	52.4	49.8	08:55-09:00	58.5	48.1	11:55-12:00	56.0	45.2
03:00-03:05	54.5	48.8	06:00-06:05	52.6	49.1	09:00-09:05	54.5	46.9	12:00-12:05	52.0	45.0
03:05-03:10	52.7	51.1	06:05-06:10	50.0	47.2	09:05-09:10	58.4	46.0	12:05-12:10	53.5	44.8
03:10-03:15	53.0	49.9	06:10-06:15	52.1	48.7	09:10-09:15	54.1	46.0	12:10-12:15	49.2	44.4
03:15-03:20	53.6	50.2	06:15-06:20	52.7	47.3	09:15-09:20	53.9	45.4	12:15-12:20	55.0	47.7
03:20-03:25	50.5	49.0	06:20-06:25	53.1	47.8	09:20-09:25	54.7	45.9	12:20-12:25	56.7	44.3
03:25-03:30	50.4	48.8	06:25-06:30	51.7	46.5	09:25-09:30	52.4	46.4	12:25-12:30	51.3	44.7
03:30-03:35	50.2	48.2	06:30-06:35	55.5	45.0	09:30-09:35	52.0	46.7	12:30-12:35	52.1	44.8
03:35-03:40	50.9	49.1	06:35-06:40	54.3	46.8	09:35-09:40	58.1	47.2	12:35-12:40	53.1	44.4
03:40-03:45	50.9	49.1	06:40-06:45	50.7	45.7	09:40-09:45	53.3	46.6	12:40-12:45	53.9	45.6
03:45-03:50	50.1	49.1	06:45-06:50	49.4	45.1	09:45-09:50	55.3	45.9	12:45-12:50	56.1	45.2
03:50-03:55	50.6	49.3	06:50-06:55	53.9	47.3	09:50-09:55	55.5	44.7	12:50-12:55	51.6	47.0
03:55-04:00	51.7	49.7	06:55-07:00	52.0	47.5	09:55-10:00	49.9	44.0	12:55-13:00	54.0	48.2
04:00-04:05	50.8	48.7	07:00-07:05	57.5	46.9	10:00-10:05	47.5	43.9	13:00-13:05	53.1	47.8
04:05-04:10	50.5	49.5	07:05-07:10	52.7	46.8	10:05-10:10	48.5	43.8	13:05-13:10	51.0	47.4
04:10-04:15	55.1	51.3	07:10-07:15	53.7	45.5	10:10-10:15	52.3	44.9	13:10-13:15	51.9	47.2
04:15-04:20	55.5	51.4	07:15-07:20	53.3	45.7	10:15-10:20	55.4	46.6	13:15-13:20	52.5	47.8
04:20-04:25	55.4	51.4	07:20-07:25	56.0	46.7	10:20-10:25	55.4	45.0	13:20-13:25	53.3	47.6
04:25-04:30	55.1	50.3	07:25-07:30	51.1	46.6	10:25-10:30	53.0	45.9	13:25-13:30	50.4	47.7
04:30-04:35	55.7	52.3	07:30-07:35	51.4	46.0	10:30-10:35	55.2	45.5	13:30-13:35	52.8	47.2
04:35-04:40	55.7	51.7	07:35-07:40	52.3	45.8	10:35-10:40	57.2	45.1	13:35-13:40	52.5	47.3
04:40-04:45	55.3	50.6	07:40-07:45	52.3	45.9	10:40-10:45	56.3	45.0	13:40-13:45	49.1	44.6
04:45-04:50	54.4	50.1	07:45-07:50	52.8	46.9	10:45-10:50	56.7	45.4	13:45-13:50	51.9	45.9
04:50-04:55	54.7	49.9	07:50-07:55	55.3	48.1	10:50-10:55	51.6	44.1	13:50-13:55	49.7	43.8
04:55-05:00	55.2	51.5	07:55-08:00	60.7	46.6	10:55-11:00	51.1	44.8	13:55-14:00	49.2	44.5

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 26-27, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
14:00-14:05	51.9	45.3	17:00-17:05	54.8	46.4	20:00-20:05	55.4	51.9	23:00-23:05	52.8	50.9
14:05-14:10	53.7	44.6	17:05-17:10	56.0	47.5	20:05-20:10	54.9	50.5	23:05-23:10	52.6	51.2
14:10-14:15	52.2	44.2	17:10-17:15	62.8	51.3	20:10-20:15	56.5	51.5	23:10-23:15	52.6	51.2
14:15-14:20	48.9	44.3	17:15-17:20	62.6	51.3	20:15-20:20	57.1	52.5	23:15-23:20	55.6	51.2
14:20-14:25	49.1	44.5	17:20-17:25	68.7	52.2	20:20-20:25	58.0	52.0	23:20-23:25	51.7	50.1
14:25-14:30	53.1	44.9	17:25-17:30	68.3	65.5	20:25-20:30	58.0	51.9	23:25-23:30	49.9	49.2
14:30-14:35	51.3	44.5	17:30-17:35	67.2	65.5	20:30-20:35	58.2	51.9	23:30-23:35	49.7	48.5
14:35-14:40	51.6	44.1	17:35-17:40	66.1	63.5	20:35-20:40	59.6	52.3	23:35-23:40	50.5	49.1
14:40-14:45	48.2	44.9	17:40-17:45	65.4	51.3	20:40-20:45	59.5	53.2	23:40-23:45	50.2	48.3
14:45-14:50	54.7	45.4	17:45-17:50	62.7	50.7	20:45-20:50	55.1	50.7	23:45-23:50	50.0	48.5
14:50-14:55	59.3	46.4	17:50-17:55	56.7	48.1	20:50-20:55	57.0	51.9	23:50-23:55	50.7	49.4
14:55-15:00	57.2	47.7	17:55-18:00	53.3	46.8	20:55-21:00	57.2	51.9	23:55-00:00	51.0	49.6
15:00-15:05	56.1	45.2	18:00-18:05	53.6	47.1	21:00-21:05	56.4	51.7	00:00-00:05	51.3	50.0
15:05-15:10	57.2	46.8	18:05-18:10	56.0	46.6	21:05-21:10	53.5	50.7	00:05-00:10	52.1	50.2
15:10-15:15	54.5	43.6	18:10-18:15	52.8	47.0	21:10-21:15	52.0	50.9	00:10-00:15	53.2	51.8
15:15-15:20	51.1	43.8	18:15-18:20	52.3	48.2	21:15-21:20	52.2	51.1	00:15-00:20	53.4	52.0
15:20-15:25	54.3	45.2	18:20-18:25	52.0	48.3	21:20-21:25	55.0	51.3	00:20-00:25	53.0	51.2
15:25-15:30	53.7	45.9	18:25-18:30	54.2	49.5	21:25-21:30	52.4	51.4	00:25-00:30	55.3	50.9
15:30-15:35	52.7	44.8	18:30-18:35	52.6	50.8	21:30-21:35	53.1	51.7	00:30-00:35	51.9	50.1
15:35-15:40	53.7	45.5	18:35-18:40	53.1	49.7	21:35-21:40	53.5	51.4	00:35-00:40	51.7	49.4
15:40-15:45	52.4	45.0	18:40-18:45	52.1	49.7	21:40-21:45	54.7	51.3	00:40-00:45	51.0	49.4
15:45-15:50	50.4	44.4	18:45-18:50	52.5	49.1	21:45-21:50	54.3	51.6	00:45-00:50	51.0	49.3
15:50-15:55	49.0	44.3	18:50-18:55	56.7	50.8	21:50-21:55	55.3	52.1	00:50-00:55	49.4	48.3
15:55-16:00	53.9	44.5	18:55-19:00	51.2	50.0	21:55-22:00	53.6	51.5	00:55-01:00	49.8	48.7
16:00-16:05	51.6	44.3	19:00-19:05	53.8	50.1	22:00-22:05	54.2	52.8	01:00-01:05	49.9	48.9
16:05-16:10	54.3	44.5	19:05-19:10	53.0	50.5	22:05-22:10	56.0	52.7	01:05-01:10	49.7	48.6
16:10-16:15	56.9	44.7	19:10-19:15	57.0	50.7	22:10-22:15	56.1	52.7	01:10-01:15	49.6	48.5
16:15-16:20	51.2	43.9	19:15-19:20	54.1	50.8	22:15-22:20	54.7	52.7	01:15-01:20	49.3	48.4
16:20-16:25	55.4	44.5	19:20-19:25	52.9	52.0	22:20-22:25	53.3	52.1	01:20-01:25	49.3	48.4
16:25-16:30	56.4	45.3	19:25-19:30	53.3	52.2	22:25-22:30	53.1	51.6	01:25-01:30	49.1	48.2
16:30-16:35	55.6	46.9	19:30-19:35	54.3	52.3	22:30-22:35	53.4	51.3	01:30-01:35	49.1	48.2
16:35-16:40	59.7	47.6	19:35-19:40	53.5	52.2	22:35-22:40	53.5	51.4	01:35-01:40	50.4	48.7
16:40-16:45	52.8	47.6	19:40-19:45	54.7	52.4	22:40-22:45	55.7	51.8	01:40-01:45	50.0	48.7
16:45-16:50	54.4	48.2	19:45-19:50	53.2	51.7	22:45-22:50	53.7	50.6	01:45-01:50	51.3	49.5
16:50-16:55	55.5	47.2	19:50-19:55	55.3	52.3	22:50-22:55	52.7	51.1	01:50-01:55	52.3	49.2
16:55-17:00	54.5	46.4	19:55-20:00	55.4	52.4	22:55-23:00	53.0	51.2	01:55-02:00	52.1	50.3

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 27, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
02:00-02:05	51.5	50.3	05:00-05:05	54.1	51.0	08:00-08:05	54.9	47.7	11:00-11:05	51.3	43.4
02:05-02:10	52.6	51.2	05:05-05:10	53.4	51.0	08:05-08:10	53.0	46.9	11:05-11:10	52.5	43.8
02:10-02:15	52.1	50.1	05:10-05:15	53.0	51.5	08:10-08:15	56.6	48.3	11:10-11:15	52.0	44.2
02:15-02:20	53.1	51.3	05:15-05:20	53.1	51.4	08:15-08:20	53.3	44.9	11:15-11:20	49.5	44.0
02:20-02:25	53.1	51.4	05:20-05:25	54.8	51.7	08:20-08:25	52.7	46.0	11:20-11:25	53.3	38.2
02:25-02:30	52.7	50.8	05:25-05:30	53.5	51.6	08:25-08:30	55.6	46.0	11:25-11:30	52.2	40.5
02:30-02:35	53.1	51.3	05:30-05:35	55.8	52.0	08:30-08:35	55.1	44.4	11:30-11:35	51.8	44.7
02:35-02:40	53.4	51.8	05:35-05:40	54.4	51.4	08:35-08:40	57.2	45.7	11:35-11:40	56.8	44.8
02:40-02:45	53.6	51.9	05:40-05:45	53.7	51.5	08:40-08:45	54.0	45.0	11:40-11:45	52.3	45.0
02:45-02:50	53.9	52.3	05:45-05:50	53.5	51.5	08:45-08:50	52.9	44.6	11:45-11:50	56.3	47.2
02:50-02:55	53.6	52.0	05:50-05:55	54.1	51.1	08:50-08:55	51.7	45.2	11:50-11:55	55.8	48.9
02:55-03:00	54.3	52.7	05:55-06:00	53.5	51.0	08:55-09:00	54.3	47.5	11:55-12:00	55.1	46.8
03:00-03:05	54.0	52.5	06:00-06:05	52.8	49.6	09:00-09:05	54.4	46.7	12:00-12:05	57.5	45.5
03:05-03:10	53.7	52.3	06:05-06:10	57.0	50.5	09:05-09:10	52.8	46.2	12:05-12:10	54.2	44.9
03:10-03:15	53.0	51.6	06:10-06:15	55.7	49.3	09:10-09:15	55.2	45.7	12:10-12:15	55.0	47.3
03:15-03:20	53.0	51.3	06:15-06:20	52.9	48.1	09:15-09:20	55.1	45.3	12:15-12:20	53.5	44.9
03:20-03:25	52.9	51.4	06:20-06:25	53.4	46.6	09:20-09:25	55.3	44.3	12:20-12:25	50.7	44.8
03:25-03:30	53.2	51.5	06:25-06:30	52.3	47.0	09:25-09:30	56.1	46.4	12:25-12:30	53.2	45.2
03:30-03:35	54.1	52.7	06:30-06:35	53.5	47.5	09:30-09:35	53.4	44.7	12:30-12:35	54.5	45.0
03:35-03:40	53.5	52.1	06:35-06:40	53.2	48.3	09:35-09:40	56.4	50.5	12:35-12:40	53.1	46.2
03:40-03:45	54.6	52.0	06:40-06:45	53.1	47.9	09:40-09:45	53.5	50.0	12:40-12:45	59.9	47.2
03:45-03:50	53.4	51.9	06:45-06:50	50.9	45.6	09:45-09:50	54.7	49.3	12:45-12:50	63.1	59.6
03:50-03:55	53.9	52.3	06:50-06:55	54.4	47.2	09:50-09:55	54.8	46.4	12:50-12:55	61.6	57.7
03:55-04:00	53.6	52.2	06:55-07:00	58.1	45.9	09:55-10:00	54.6	45.6	12:55-13:00	58.4	53.1
04:00-04:05	53.5	51.6	07:00-07:05	53.7	45.9	10:00-10:05	53.5	46.4	13:00-13:05	57.6	53.9
04:05-04:10	52.7	51.7	07:05-07:10	51.5	46.1	10:05-10:10	52.8	48.0	13:05-13:10	56.6	49.9
04:10-04:15	52.6	51.2	07:10-07:15	56.9	47.0	10:10-10:15	54.7	50.8	13:10-13:15	53.3	48.7
04:15-04:20	53.7	52.4	07:15-07:20	53.4	46.4	10:15-10:20	57.3	48.8	13:15-13:20	56.3	48.2
04:20-04:25	54.0	52.5	07:20-07:25	51.7	46.2	10:20-10:25	54.9	46.0	13:20-13:25	56.1	47.5
04:25-04:30	54.6	52.6	07:25-07:30	53.4	46.3	10:25-10:30	57.8	47.0	13:25-13:30	57.6	49.3
04:30-04:35	54.2	52.7	07:30-07:35	56.2	48.6	10:30-10:35	55.6	45.3	13:30-13:35	55.8	46.0
04:35-04:40	53.4	51.3	07:35-07:40	55.6	48.1	10:35-10:40	51.5	46.2	13:35-13:40	52.0	46.4
04:40-04:45	53.6	51.8	07:40-07:45	55.9	49.1	10:40-10:45	58.2	46.0	13:40-13:45	57.2	47.3
04:45-04:50	52.9	50.9	07:45-07:50	54.3	46.7	10:45-10:50	53.6	46.9	13:45-13:50	55.7	46.9
04:50-04:55	54.0	51.7	07:50-07:55	54.0	46.0	10:50-10:55	55.4	45.7	13:50-13:55	53.5	45.3
04:55-05:00	54.2	51.8	07:55-08:00	58.0	46.8	10:55-11:00	56.2	44.1	13:55-14:00	53.3	44.9

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 27-28, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
14:00-14:05	56.3	45.2	17:00-17:05	54.7	46.9	20:00-20:05	54.5	52.3	23:00-23:05	53.4	51.9
14:05-14:10	56.5	45.4	17:05-17:10	60.1	47.4	20:05-20:10	54.1	52.6	23:05-23:10	53.4	51.9
14:10-14:15	50.5	44.6	17:10-17:15	57.2	47.3	20:10-20:15	55.0	53.7	23:10-23:15	52.9	51.7
14:15-14:20	49.6	44.7	17:15-17:20	56.2	46.7	20:15-20:20	56.1	54.5	23:15-23:20	52.0	50.8
14:20-14:25	53.9	45.0	17:20-17:25	55.7	46.4	20:20-20:25	57.0	54.3	23:20-23:25	52.3	51.1
14:25-14:30	55.7	45.2	17:25-17:30	60.5	49.2	20:25-20:30	55.1	53.5	23:25-23:30	52.3	50.9
14:30-14:35	53.2	46.1	17:30-17:35	54.0	45.6	20:30-20:35	55.9	53.5	23:30-23:35	55.3	52.2
14:35-14:40	52.8	45.9	17:35-17:40	53.6	47.8	20:35-20:40	56.5	53.9	23:35-23:40	56.1	54.2
14:40-14:45	55.4	46.1	17:40-17:45	54.4	47.4	20:40-20:45	54.8	52.7	23:40-23:45	56.0	53.4
14:45-14:50	54.7	47.6	17:45-17:50	57.5	46.4	20:45-20:50	56.3	53.4	23:45-23:50	55.6	52.5
14:50-14:55	52.3	46.4	17:50-17:55	59.8	45.7	20:50-20:55	55.3	53.4	23:50-23:55	52.7	51.3
14:55-15:00	54.6	47.7	17:55-18:00	54.2	45.7	20:55-21:00	56.1	52.3	23:55-00:00	52.6	51.1
15:00-15:05	55.6	46.7	18:00-18:05	56.3	45.8	21:00-21:05	55.9	53.8	00:00-00:05	52.8	51.2
15:05-15:10	56.2	46.6	18:05-18:10	59.2	46.1	21:05-21:10	56.3	53.8	00:05-00:10	52.5	51.1
15:10-15:15	55.6	45.4	18:10-18:15	51.3	48.6	21:10-21:15	55.4	53.5	00:10-00:15	52.3	50.9
15:15-15:20	57.1	46.2	18:15-18:20	54.0	51.3	21:15-21:20	55.4	52.8	00:15-00:20	52.5	51.1
15:20-15:25	54.7	45.8	18:20-18:25	52.3	49.7	21:20-21:25	54.6	51.8	00:20-00:25	52.9	51.3
15:25-15:30	55.9	47.5	18:25-18:30	52.3	49.4	21:25-21:30	54.3	51.8	00:25-00:30	53.2	51.7
15:30-15:35	55.2	47.9	18:30-18:35	55.2	51.5	21:30-21:35	54.6	51.7	00:30-00:35	52.6	51.1
15:35-15:40	48.9	44.7	18:35-18:40	54.0	52.4	21:35-21:40	55.4	51.5	00:35-00:40	52.6	51.1
15:40-15:45	53.8	45.0	18:40-18:45	56.8	52.4	21:40-21:45	53.2	51.7	00:40-00:45	50.8	49.0
15:45-15:50	52.4	45.5	18:45-18:50	53.0	52.2	21:45-21:50	54.3	51.2	00:45-00:50	52.2	50.8
15:50-15:55	54.9	44.9	18:50-18:55	54.7	51.7	21:50-21:55	54.4	51.3	00:50-00:55	52.7	51.4
15:55-16:00	53.3	46.6	18:55-19:00	55.8	53.2	21:55-22:00	52.6	50.5	00:55-01:00	52.4	51.1
16:00-16:05	57.1	46.0	19:00-19:05	54.8	53.5	22:00-22:05	53.0	50.8	01:00-01:05	52.6	51.2
16:05-16:10	60.8	45.9	19:05-19:10	55.7	52.6	22:05-22:10	54.1	52.3	01:05-01:10	52.7	51.3
16:10-16:15	59.1	45.5	19:10-19:15	54.4	52.7	22:10-22:15	53.9	52.5	01:10-01:15	52.5	51.0
16:15-16:20	54.5	46.1	19:15-19:20	54.2	53.3	22:15-22:20	53.7	52.3	01:15-01:20	52.2	50.4
16:20-16:25	57.3	49.8	19:20-19:25	59.9	53.7	22:20-22:25	54.7	52.4	01:20-01:25	51.9	50.4
16:25-16:30	62.6	50.5	19:25-19:30	57.2	54.2	22:25-22:30	54.5	52.4	01:25-01:30	51.0	49.6
16:30-16:35	57.5	48.9	19:30-19:35	56.4	54.1	22:30-22:35	54.1	51.8	01:30-01:35	51.3	49.9
16:35-16:40	59.7	48.9	19:35-19:40	54.9	54.1	22:35-22:40	53.4	51.7	01:35-01:40	50.4	48.7
16:40-16:45	64.0	49.6	19:40-19:45	55.0	53.9	22:40-22:45	52.8	51.5	01:40-01:45	52.4	48.7
16:45-16:50	60.4	48.2	19:45-19:50	54.9	53.8	22:45-22:50	53.5	51.3	01:45-01:50	50.1	48.7
16:50-16:55	60.2	47.8	19:50-19:55	54.7	53.5	22:50-22:55	52.0	50.6	01:50-01:55	50.0	48.7
16:55-17:00	56.4	46.6	19:55-20:00	55.1	53.6	22:55-23:00	53.0	51.5	01:55-02:00	51.1	49.7

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 28, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
02:00-02:05	51.8	50.3	05:00-05:05	53.2	51.5	08:00-08:05	56.8	48.6	11:00-11:05	55.0	46.6
02:05-02:10	52.8	50.9	05:05-05:10	55.3	51.8	08:05-08:10	52.1	46.0	11:05-11:10	52.8	45.7
02:10-02:15	53.7	51.7	05:10-05:15	54.3	51.8	08:10-08:15	55.0	46.4	11:10-11:15	55.3	44.5
02:15-02:20	53.6	51.4	05:15-05:20	54.2	51.3	08:15-08:20	54.3	48.3	11:15-11:20	48.0	43.8
02:20-02:25	55.0	50.5	05:20-05:25	53.7	50.7	08:20-08:25	54.7	48.6	11:20-11:25	50.6	43.7
02:25-02:30	52.2	50.9	05:25-05:30	53.8	50.9	08:25-08:30	51.3	46.4	11:25-11:30	50.0	43.7
02:30-02:35	52.2	50.7	05:30-05:35	52.5	50.6	08:30-08:35	52.0	46.3	11:30-11:35	53.7	42.5
02:35-02:40	52.1	50.8	05:35-05:40	51.3	49.6	08:35-08:40	52.1	45.2	11:35-11:40	48.6	43.1
02:40-02:45	52.4	50.9	05:40-05:45	51.1	48.0	08:40-08:45	53.1	45.8	11:40-11:45	47.1	42.8
02:45-02:50	53.3	51.2	05:45-05:50	49.4	47.7	08:45-08:50	54.2	46.2	11:45-11:50	52.1	44.9
02:50-02:55	53.0	51.1	05:50-05:55	53.6	47.8	08:50-08:55	54.2	45.2	11:50-11:55	49.1	42.4
02:55-03:00	54.4	52.3	05:55-06:00	49.3	47.4	08:55-09:00	53.2	46.2	11:55-12:00	51.0	47.6
03:00-03:05	53.6	51.1	06:00-06:05	50.5	47.5	09:00-09:05	54.0	46.3	12:00-12:05	53.5	44.4
03:05-03:10	54.3	52.1	06:05-06:10	54.4	47.6	09:05-09:10	50.0	44.9	12:05-12:10	51.0	43.6
03:10-03:15	54.1	52.2	06:10-06:15	54.1	45.7	09:10-09:15	54.5	45.0	12:10-12:15	51.1	44.1
03:15-03:20	53.8	51.8	06:15-06:20	49.0	45.8	09:15-09:20	57.0	46.5	12:15-12:20	54.3	43.3
03:20-03:25	54.0	52.0	06:20-06:25	52.4	45.4	09:20-09:25	51.8	44.2	12:20-12:25	49.8	43.7
03:25-03:30	53.9	51.7	06:25-06:30	49.0	45.4	09:25-09:30	54.1	46.3	12:25-12:30	54.1	43.4
03:30-03:35	54.3	52.5	06:30-06:35	54.5	46.2	09:30-09:35	53.2	46.3	12:30-12:35	49.8	43.7
03:35-03:40	53.5	51.1	06:35-06:40	52.5	46.0	09:35-09:40	53.7	46.3	12:35-12:40	50.4	43.2
03:40-03:45	53.0	50.6	06:40-06:45	55.2	48.9	09:40-09:45	58.0	46.1	12:40-12:45	56.0	43.7
03:45-03:50	53.2	50.8	06:45-06:50	54.3	46.7	09:45-09:50	59.0	45.7	12:45-12:50	53.0	43.6
03:50-03:55	53.3	50.4	06:50-06:55	53.5	45.5	09:50-09:55	56.5	45.1	12:50-12:55	51.5	43.4
03:55-04:00	53.0	50.5	06:55-07:00	53.4	45.5	09:55-10:00	57.2	48.3	12:55-13:00	48.9	42.2
04:00-04:05	53.7	50.5	07:00-07:05	50.2	45.7	10:00-10:05	57.7	47.2	13:00-13:05	53.1	43.2
04:05-04:10	53.5	50.9	07:05-07:10	51.0	45.6	10:05-10:10	52.8	45.2	13:05-13:10	55.0	42.9
04:10-04:15	53.0	50.3	07:10-07:15	53.5	46.2	10:10-10:15	55.1	43.8	13:10-13:15	50.6	42.5
04:15-04:20	55.5	50.9	07:15-07:20	51.8	45.8	10:15-10:20	50.4	44.3	13:15-13:20	50.8	42.8
04:20-04:25	53.2	50.4	07:20-07:25	51.8	46.1	10:20-10:25	48.4	44.6	13:20-13:25	54.5	43.4
04:25-04:30	56.2	52.0	07:25-07:30	54.8	46.4	10:25-10:30	49.4	44.3	13:25-13:30	53.2	42.7
04:30-04:35	54.0	51.0	07:30-07:35	57.2	47.4	10:30-10:35	52.4	44.9	13:30-13:35	50.9	43.7
04:35-04:40	56.9	52.3	07:35-07:40	53.8	46.8	10:35-10:40	49.9	43.5	13:35-13:40	50.5	46.0
04:40-04:45	54.3	51.7	07:40-07:45	55.3	47.7	10:40-10:45	50.2	43.3	13:40-13:45	49.9	46.9
04:45-04:50	53.2	50.9	07:45-07:50	52.5	45.8	10:45-10:50	57.8	43.8	13:45-13:50	53.0	43.3
04:50-04:55	52.6	50.5	07:50-07:55	53.0	46.0	10:50-10:55	53.8	43.9	13:50-13:55	48.0	42.5
04:55-05:00	52.2	50.5	07:55-08:00	54.5	47.1	10:55-11:00	54.2	45.1	13:55-14:00	47.4	42.9

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 28-29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
14:00-14:05	49.5	43.0	17:00-17:05	57.4	50.7	20:00-20:05	56.4	54.0	23:00-23:05	50.9	49.5
14:05-14:10	48.3	43.2	17:05-17:10	56.9	47.5	20:05-20:10	55.3	54.2	23:05-23:10	52.2	49.8
14:10-14:15	49.3	43.1	17:10-17:15	60.0	50.4	20:10-20:15	55.4	54.2	23:10-23:15	52.8	49.5
14:15-14:20	49.6	43.1	17:15-17:20	59.8	47.7	20:15-20:20	55.8	53.5	23:15-23:20	52.2	50.5
14:20-14:25	52.2	48.0	17:20-17:25	53.7	46.6	20:20-20:25	53.5	52.2	23:20-23:25	51.6	50.2
14:25-14:30	53.2	44.0	17:25-17:30	55.4	49.8	20:25-20:30	53.9	52.8	23:25-23:30	51.5	50.1
14:30-14:35	50.3	44.4	17:30-17:35	57.2	49.5	20:30-20:35	53.6	52.5	23:30-23:35	50.4	49.0
14:35-14:40	53.2	43.6	17:35-17:40	53.8	48.9	20:35-20:40	54.1	52.4	23:35-23:40	51.2	49.5
14:40-14:45	49.4	43.9	17:40-17:45	54.0	49.2	20:40-20:45	54.1	52.5	23:40-23:45	51.6	49.9
14:45-14:50	49.0	43.4	17:45-17:50	58.1	50.5	20:45-20:50	52.9	51.9	23:45-23:50	51.2	49.3
14:50-14:55	52.9	43.9	17:50-17:55	54.3	50.5	20:50-20:55	52.6	50.7	23:50-23:55	51.0	49.6
14:55-15:00	53.8	45.3	17:55-18:00	59.4	52.2	20:55-21:00	52.0	50.6	23:55-00:00	50.5	49.0
15:00-15:05	54.1	45.2	18:00-18:05	57.6	52.4	21:00-21:05	52.1	51.1	00:00-00:05	53.0	48.2
15:05-15:10	53.4	43.6	18:05-18:10	59.2	53.1	21:05-21:10	52.5	51.3	00:05-00:10	50.3	48.2
15:10-15:15	51.9	43.9	18:10-18:15	54.4	46.6	21:10-21:15	52.2	51.2	00:10-00:15	50.0	48.5
15:15-15:20	53.7	44.0	18:15-18:20	56.2	47.6	21:15-21:20	52.3	51.4	00:15-00:20	50.6	49.1
15:20-15:25	49.1	43.9	18:20-18:25	53.0	47.6	21:20-21:25	51.5	50.2	00:20-00:25	51.1	49.6
15:25-15:30	50.7	45.4	18:25-18:30	54.3	46.9	21:25-21:30	51.0	49.6	00:25-00:30	51.4	49.7
15:30-15:35	52.5	45.3	18:30-18:35	54.1	47.8	21:30-21:35	52.6	50.1	00:30-00:35	51.2	49.6
15:35-15:40	51.0	45.9	18:35-18:40	50.9	48.4	21:35-21:40	52.7	50.5	00:35-00:40	51.9	49.6
15:40-15:45	52.0	45.8	18:40-18:45	51.9	49.3	21:40-21:45	54.8	51.5	00:40-00:45	52.3	50.8
15:45-15:50	52.3	47.0	18:45-18:50	51.1	49.5	21:45-21:50	53.0	51.6	00:45-00:50	52.9	51.3
15:50-15:55	56.9	48.1	18:50-18:55	53.2	50.8	21:50-21:55	55.0	52.4	00:50-00:55	53.8	49.9
15:55-16:00	52.8	46.5	18:55-19:00	57.2	52.4	21:55-22:00	55.5	52.7	00:55-01:00	52.1	50.2
16:00-16:05	54.0	47.7	19:00-19:05	59.6	53.8	22:00-22:05	55.0	51.2	01:00-01:05	51.9	49.8
16:05-16:10	52.9	46.3	19:05-19:10	56.1	53.6	22:05-22:10	55.2	51.5	01:05-01:10	51.9	49.6
16:10-16:15	53.3	47.0	19:10-19:15	54.7	53.3	22:10-22:15	55.0	51.8	01:10-01:15	51.9	49.8
16:15-16:20	53.0	47.2	19:15-19:20	54.9	53.3	22:15-22:20	54.1	51.2	01:15-01:20	51.5	49.8
16:20-16:25	52.7	48.4	19:20-19:25	56.3	53.5	22:20-22:25	54.6	51.6	01:20-01:25	51.0	49.1
16:25-16:30	55.9	46.6	19:25-19:30	54.7	52.6	22:25-22:30	51.5	50.2	01:25-01:30	50.6	48.9
16:30-16:35	54.1	48.7	19:30-19:35	54.6	52.5	22:30-22:35	51.0	49.5	01:30-01:35	50.8	49.2
16:35-16:40	55.4	47.7	19:35-19:40	53.6	52.3	22:35-22:40	51.0	49.4	01:35-01:40	50.0	48.4
16:40-16:45	54.6	46.9	19:40-19:45	53.6	52.5	22:40-22:45	53.9	49.7	01:40-01:45	50.5	49.0
16:45-16:50	50.4	45.5	19:45-19:50	54.1	52.6	22:45-22:50	56.0	50.0	01:45-01:50	52.1	49.9
16:50-16:55	55.2	47.0	19:50-19:55	54.6	53.5	22:50-22:55	52.6	47.9	01:50-01:55	52.6	50.7
16:55-17:00	56.1	48.5	19:55-20:00	54.9	53.3	22:55-23:00	50.3	48.5	01:55-02:00	53.0	51.0

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
02:00-02:05	52.4	50.5	05:00-05:05	52.4	50.4	08:00-08:05	52.6	47.1	11:00-11:05	56.2	45.1
02:05-02:10	52.4	50.6	05:05-05:10	52.0	50.1	08:05-08:10	53.7	47.1	11:05-11:10	53.6	45.0
02:10-02:15	51.7	49.9	05:10-05:15	54.5	51.2	08:10-08:15	53.3	46.8	11:10-11:15	52.8	44.6
02:15-02:20	52.1	50.0	05:15-05:20	52.6	51.2	08:15-08:20	50.7	45.9	11:15-11:20	54.7	43.7
02:20-02:25	50.7	49.2	05:20-05:25	53.3	51.6	08:20-08:25	51.3	45.0	11:20-11:25	51.7	43.8
02:25-02:30	50.9	49.4	05:25-05:30	53.2	51.6	08:25-08:30	51.1	45.4	11:25-11:30	52.0	44.4
02:30-02:35	51.9	50.2	05:30-05:35	52.8	51.4	08:30-08:35	55.1	45.0	11:30-11:35	55.5	44.0
02:35-02:40	52.9	51.4	05:35-05:40	53.1	51.9	08:35-08:40	52.3	45.7	11:35-11:40	55.6	45.7
02:40-02:45	53.4	52.1	05:40-05:45	53.8	52.2	08:40-08:45	54.1	45.4	11:40-11:45	49.8	45.2
02:45-02:50	53.3	51.9	05:45-05:50	54.1	52.5	08:45-08:50	49.2	44.7	11:45-11:50	52.3	45.4
02:50-02:55	52.6	50.7	05:50-05:55	52.9	50.5	08:50-08:55	52.9	44.7	11:50-11:55	49.6	44.7
02:55-03:00	52.9	51.2	05:55-06:00	52.8	49.7	08:55-09:00	52.4	45.4	11:55-12:00	52.4	46.0
03:00-03:05	52.7	51.1	06:00-06:05	52.4	48.3	09:00-09:05	52.3	45.7	12:00-12:05	51.8	45.9
03:05-03:10	52.6	50.5	06:05-06:10	47.7	45.5	09:05-09:10	52.0	44.9	12:05-12:10	53.5	45.1
03:10-03:15	53.6	51.7	06:10-06:15	50.1	45.9	09:10-09:15	53.4	44.8	12:10-12:15	55.2	46.2
03:15-03:20	53.5	51.8	06:15-06:20	51.9	46.1	09:15-09:20	50.3	44.2	12:15-12:20	52.5	45.5
03:20-03:25	53.7	51.9	06:20-06:25	53.1	46.3	09:20-09:25	51.2	44.8	12:20-12:25	57.8	45.4
03:25-03:30	54.0	52.1	06:25-06:30	53.4	46.2	09:25-09:30	56.1	45.9	12:25-12:30	51.5	48.1
03:30-03:35	53.5	51.8	06:30-06:35	55.2	46.2	09:30-09:35	55.7	46.0	12:30-12:35	50.5	47.8
03:35-03:40	53.2	50.8	06:35-06:40	55.4	48.1	09:35-09:40	53.2	47.3	12:35-12:40	51.7	48.0
03:40-03:45	52.2	49.6	06:40-06:45	54.1	46.5	09:40-09:45	55.2	47.4	12:40-12:45	52.5	48.6
03:45-03:50	52.1	49.9	06:45-06:50	53.0	46.0	09:45-09:50	51.3	46.2	12:45-12:50	53.8	48.8
03:50-03:55	52.7	50.5	06:50-06:55	54.0	45.2	09:50-09:55	55.1	45.9	12:50-12:55	51.9	48.3
03:55-04:00	52.2	49.9	06:55-07:00	55.1	45.4	09:55-10:00	52.6	45.5	12:55-13:00	53.2	48.3
04:00-04:05	51.2	48.9	07:00-07:05	52.0	45.5	10:00-10:05	50.4	45.0	13:00-13:05	49.8	48.0
04:05-04:10	50.5	48.7	07:05-07:10	52.9	45.3	10:05-10:10	54.4	46.2	13:05-13:10	51.2	47.9
04:10-04:15	50.6	48.5	07:10-07:15	51.7	44.9	10:10-10:15	55.6	46.2	13:10-13:15	51.9	48.1
04:15-04:20	50.8	48.4	07:15-07:20	49.0	45.0	10:15-10:20	51.6	45.4	13:15-13:20	49.8	47.7
04:20-04:25	51.9	49.8	07:20-07:25	51.5	45.1	10:20-10:25	50.4	45.0	13:20-13:25	55.8	47.7
04:25-04:30	51.4	48.7	07:25-07:30	52.8	45.5	10:25-10:30	50.8	44.1	13:25-13:30	50.5	47.7
04:30-04:35	50.6	48.3	07:30-07:35	54.4	46.7	10:30-10:35	54.7	45.1	13:30-13:35	52.5	47.8
04:35-04:40	51.7	48.6	07:35-07:40	52.6	45.3	10:35-10:40	53.9	46.2	13:35-13:40	50.9	47.5
04:40-04:45	50.3	48.7	07:40-07:45	59.4	45.7	10:40-10:45	52.0	45.2	13:40-13:45	54.2	47.2
04:45-04:50	50.8	49.2	07:45-07:50	56.2	47.4	10:45-10:50	56.4	45.5	13:45-13:50	51.8	46.5
04:50-04:55	51.6	49.7	07:50-07:55	52.5	45.7	10:50-10:55	57.3	44.4	13:50-13:55	50.2	37.4
04:55-05:00	51.5	50.0	07:55-08:00	55.5	46.6	10:55-11:00	52.2	44.3	13:55-14:00	49.2	38.4

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 29-30, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
14:00-14:05	48.6	36.5	17:00-17:05	57.3	48.2	20:00-20:05	52.7	51.0	23:00-23:05	53.6	50.7
14:05-14:10	50.7	39.8	17:05-17:10	55.0	45.9	20:05-20:10	52.4	50.5	23:05-23:10	52.4	50.7
14:10-14:15	50.2	36.3	17:10-17:15	56.0	47.4	20:10-20:15	51.6	50.0	23:10-23:15	52.4	50.4
14:15-14:20	55.6	37.9	17:15-17:20	57.0	48.4	20:15-20:20	53.7	50.4	23:15-23:20	53.4	51.2
14:20-14:25	49.3	35.9	17:20-17:25	54.9	48.4	20:20-20:25	51.9	50.1	23:20-23:25	54.3	53.0
14:25-14:30	52.2	35.0	17:25-17:30	59.8	54.9	20:25-20:30	51.8	50.1	23:25-23:30	53.8	51.5
14:30-14:35	49.7	36.1	17:30-17:35	60.8	55.8	20:30-20:35	50.6	48.8	23:30-23:35	53.9	51.7
14:35-14:40	55.2	36.4	17:35-17:40	59.9	55.8	20:35-20:40	50.6	49.1	23:35-23:40	54.3	52.7
14:40-14:45	50.2	35.4	17:40-17:45	58.9	55.3	20:40-20:45	50.8	49.5	23:40-23:45	54.6	52.7
14:45-14:50	54.0	36.7	17:45-17:50	60.5	50.4	20:45-20:50	50.6	48.1	23:45-23:50	54.2	52.3
14:50-14:55	53.5	37.3	17:50-17:55	55.2	48.1	20:50-20:55	49.4	47.4	23:50-23:55	54.4	52.5
14:55-15:00	48.6	38.9	17:55-18:00	54.9	39.1	20:55-21:00	49.7	47.8	23:55-00:00	54.1	52.1
15:00-15:05	47.2	40.1	18:00-18:05	54.1	43.6	21:00-21:05	50.1	48.4	00:00-00:05	54.0	51.7
15:05-15:10	48.4	39.5	18:05-18:10	50.9	43.3	21:05-21:10	52.5	48.2	00:05-00:10	53.4	50.8
15:10-15:15	52.4	38.9	18:10-18:15	50.8	46.6	21:10-21:15	49.9	48.1	00:10-00:15	53.1	48.2
15:15-15:20	54.6	35.5	18:15-18:20	50.7	46.9	21:15-21:20	48.9	46.9	00:15-00:20	49.9	46.8
15:20-15:25	55.2	39.4	18:20-18:25	55.2	48.2	21:20-21:25	51.5	48.2	00:20-00:25	53.3	48.1
15:25-15:30	49.6	36.4	18:25-18:30	52.0	49.2	21:25-21:30	51.6	48.5	00:25-00:30	50.3	46.5
15:30-15:35	52.2	37.0	18:30-18:35	52.8	49.4	21:30-21:35	51.7	48.3	00:30-00:35	52.6	49.3
15:35-15:40	57.6	40.9	18:35-18:40	53.4	50.2	21:35-21:40	50.2	47.9	00:35-00:40	54.0	50.1
15:40-15:45	56.0	37.8	18:40-18:45	51.8	49.9	21:40-21:45	49.6	47.0	00:40-00:45	51.4	49.2
15:45-15:50	51.4	36.3	18:45-18:50	54.6	49.9	21:45-21:50	50.0	45.8	00:45-00:50	51.6	50.3
15:50-15:55	52.1	37.2	18:50-18:55	51.8	50.1	21:50-21:55	49.3	46.5	00:50-00:55	50.0	47.4
15:55-16:00	52.1	39.1	18:55-19:00	51.9	49.8	21:55-22:00	49.5	46.5	00:55-01:00	50.7	47.7
16:00-16:05	51.2	41.2	19:00-19:05	51.8	49.8	22:00-22:05	49.6	47.5	01:00-01:05	51.0	48.2
16:05-16:10	53.6	44.8	19:05-19:10	51.4	50.0	22:05-22:10	50.9	48.1	01:05-01:10	52.0	49.9
16:10-16:15	57.5	45.5	19:10-19:15	52.1	49.7	22:10-22:15	50.3	47.7	01:10-01:15	51.7	47.0
16:15-16:20	56.2	44.1	19:15-19:20	50.9	49.4	22:15-22:20	51.7	47.6	01:15-01:20	48.4	44.2
16:20-16:25	53.0	44.0	19:20-19:25	52.3	50.1	22:20-22:25	51.0	48.5	01:20-01:25	48.3	43.9
16:25-16:30	54.5	45.0	19:25-19:30	51.9	50.3	22:25-22:30	50.1	47.7	01:25-01:30	48.0	44.0
16:30-16:35	52.8	45.2	19:30-19:35	53.7	51.0	22:30-22:35	49.6	46.7	01:30-01:35	51.1	48.9
16:35-16:40	53.0	45.6	19:35-19:40	52.9	50.7	22:35-22:40	49.6	46.8	01:35-01:40	51.1	48.8
16:40-16:45	56.0	47.8	19:40-19:45	52.0	50.6	22:40-22:45	49.0	46.3	01:40-01:45	50.8	48.4
16:45-16:50	58.9	48.3	19:45-19:50	54.1	50.3	22:45-22:50	48.5	45.3	01:45-01:50	50.8	48.5
16:50-16:55	57.4	47.4	19:50-19:55	52.0	50.4	22:50-22:55	49.1	45.6	01:50-01:55	50.9	47.3
16:55-17:00	56.2	48.3	19:55-20:00	52.7	51.0	22:55-23:00	49.3	45.2	01:55-02:00	51.1	49.2

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 30, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
02:00-02:05	51.1	49.2	05:00-05:05	52.5	44.1	08:00-08:05	58.7	55.3	11:00-11:05	56.0	38.5
02:05-02:10	50.2	45.1	05:05-05:10	59.3	49.4	08:05-08:10	59.0	55.0	11:05-11:10	57.3	40.4
02:10-02:15	50.4	45.6	05:10-05:15	57.4	45.1	08:10-08:15	58.4	53.8	11:10-11:15	51.9	39.3
02:15-02:20	49.7	44.7	05:15-05:20	51.5	46.2	08:15-08:20	55.8	52.2	11:15-11:20	51.3	39.0
02:20-02:25	49.8	45.8	05:20-05:25	53.4	47.7	08:20-08:25	53.1	50.4	11:20-11:25	56.0	37.4
02:25-02:30	51.1	48.7	05:25-05:30	50.4	44.5	08:25-08:30	56.5	48.6	11:25-11:30	53.6	39.1
02:30-02:35	51.1	49.2	05:30-05:35	52.8	43.2	08:30-08:35	57.3	48.2	11:30-11:35	53.2	37.1
02:35-02:40	49.9	47.7	05:35-05:40	60.1	44.4	08:35-08:40	52.8	46.7	11:35-11:40	50.1	38.0
02:40-02:45	49.7	47.2	05:40-05:45	55.9	46.4	08:40-08:45	55.1	44.7	11:40-11:45	50.2	37.7
02:45-02:50	48.9	44.9	05:45-05:50	48.8	42.3	08:45-08:50	56.6	41.1	11:45-11:50	49.5	41.2
02:50-02:55	49.2	45.6	05:50-05:55	49.4	43.5	08:50-08:55	48.3	38.8	11:50-11:55	53.7	43.5
02:55-03:00	49.4	45.1	05:55-06:00	51.3	44.5	08:55-09:00	51.1	41.6	11:55-12:00	54.8	46.6
03:00-03:05	49.3	45.6	06:00-06:05	52.9	45.4	09:00-09:05	52.2	41.2	12:00-12:05	51.0	40.3
03:05-03:10	49.5	46.6	06:05-06:10	56.5	44.8	09:05-09:10	52.9	38.3	12:05-12:10	51.3	40.8
03:10-03:15	49.7	46.8	06:10-06:15	54.9	44.5	09:10-09:15	53.9	43.3	12:10-12:15	52.8	40.7
03:15-03:20	50.0	48.3	06:15-06:20	50.8	44.1	09:15-09:20	52.4	39.6	12:15-12:20	55.4	42.0
03:20-03:25	49.7	48.2	06:20-06:25	53.1	47.3	09:20-09:25	57.0	47.8	12:20-12:25	57.0	42.2
03:25-03:30	50.0	48.2	06:25-06:30	51.0	45.5	09:25-09:30	60.4	44.4	12:25-12:30	50.8	40.5
03:30-03:35	49.5	46.5	06:30-06:35	51.4	43.2	09:30-09:35	56.2	39.9	12:30-12:35	54.0	41.9
03:35-03:40	50.3	47.1	06:35-06:40	50.0	40.4	09:35-09:40	49.1	40.2	12:35-12:40	53.0	39.8
03:40-03:45	49.3	44.4	06:40-06:45	48.7	38.4	09:40-09:45	52.7	43.7	12:40-12:45	51.0	41.7
03:45-03:50	44.6	42.1	06:45-06:50	53.5	42.9	09:45-09:50	52.0	41.7	12:45-12:50	55.2	42.2
03:50-03:55	43.8	41.6	06:50-06:55	54.2	51.8	09:50-09:55	52.9	42.0	12:50-12:55	48.2	42.2
03:55-04:00	47.0	42.1	06:55-07:00	55.5	52.0	09:55-10:00	54.2	40.0	12:55-13:00	47.3	40.2
04:00-04:05	46.8	41.6	07:00-07:05	53.3	51.7	10:00-10:05	47.7	40.1	13:00-13:05	49.6	41.0
04:05-04:10	44.4	40.9	07:05-07:10	57.3	54.2	10:05-10:10	48.9	37.1	13:05-13:10	49.6	40.7
04:10-04:15	44.6	40.7	07:10-07:15	56.4	55.1	10:10-10:15	52.3	39.6	13:10-13:15	46.5	41.0
04:15-04:20	46.1	41.6	07:15-07:20	56.6	52.4	10:15-10:20	55.1	48.6	13:15-13:20	54.3	42.2
04:20-04:25	43.6	41.8	07:20-07:25	55.2	50.9	10:20-10:25	54.8	40.2	13:20-13:25	57.7	43.5
04:25-04:30	44.9	41.9	07:25-07:30	57.9	51.8	10:25-10:30	50.1	40.9	13:25-13:30	56.4	43.5
04:30-04:35	43.4	41.8	07:30-07:35	58.5	55.3	10:30-10:35	54.9	43.8	13:30-13:35	50.2	42.0
04:35-04:40	43.0	39.3	07:35-07:40	58.1	56.2	10:35-10:40	54.2	46.4	13:35-13:40	50.9	42.2
04:40-04:45	42.5	40.8	07:40-07:45	58.9	54.8	10:40-10:45	55.3	45.7	13:40-13:45	53.4	42.4
04:45-04:50	44.3	41.8	07:45-07:50	58.8	56.0	10:45-10:50	55.7	47.8	13:45-13:50	51.0	42.2
04:50-04:55	47.7	41.4	07:50-07:55	60.1	57.4	10:50-10:55	51.2	47.8	13:50-13:55	52.0	41.6
04:55-05:00	47.3	41.2	07:55-08:00	58.9	56.4	10:55-11:00	55.5	47.6	13:55-14:00	53.6	40.7

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 30-31, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
14:00-14:05	49.1	41.2	17:00-17:05	47.7	37.8	20:00-20:05	49.9	46.8	23:00-23:05	50.8	48.0
14:05-14:10	52.4	42.1	17:05-17:10	50.2	38.0	20:05-20:10	47.6	46.2	23:05-23:10	49.9	47.3
14:10-14:15	47.9	40.9	17:10-17:15	56.5	44.9	20:10-20:15	47.8	46.5	23:10-23:15	49.1	46.9
14:15-14:20	49.3	41.0	17:15-17:20	56.6	37.4	20:15-20:20	47.5	46.1	23:15-23:20	49.9	46.8
14:20-14:25	55.9	43.3	17:20-17:25	53.9	38.4	20:20-20:25	48.5	46.2	23:20-23:25	49.5	47.3
14:25-14:30	53.1	42.0	17:25-17:30	53.9	38.3	20:25-20:30	49.4	45.8	23:25-23:30	49.3	47.2
14:30-14:35	51.6	42.5	17:30-17:35	53.6	38.5	20:30-20:35	52.0	45.3	23:30-23:35	49.0	46.9
14:35-14:40	55.6	44.4	17:35-17:40	52.7	37.5	20:35-20:40	49.1	45.0	23:35-23:40	48.9	46.8
14:40-14:45	56.2	48.4	17:40-17:45	52.8	41.8	20:40-20:45	50.2	45.0	23:40-23:45	49.3	47.2
14:45-14:50	50.6	45.0	17:45-17:50	53.6	37.4	20:45-20:50	47.9	45.7	23:45-23:50	52.8	45.8
14:50-14:55	51.2	41.8	17:50-17:55	54.6	35.5	20:50-20:55	47.8	46.3	23:50-23:55	49.8	47.8
14:55-15:00	54.8	42.6	17:55-18:00	52.3	38.8	20:55-21:00	48.8	46.0	23:55-00:00	49.2	46.4
15:00-15:05	58.0	43.6	18:00-18:05	55.7	37.7	21:00-21:05	48.8	44.4	00:00-00:05	48.1	45.2
15:05-15:10	56.0	45.5	18:05-18:10	51.6	42.1	21:05-21:10	45.3	44.2	00:05-00:10	46.9	44.0
15:10-15:15	53.8	42.7	18:10-18:15	49.4	42.1	21:10-21:15	46.5	45.3	00:10-00:15	46.1	43.7
15:15-15:20	56.6	49.1	18:15-18:20	50.4	42.9	21:15-21:20	46.9	44.6	00:15-00:20	49.8	44.1
15:20-15:25	52.3	48.2	18:20-18:25	51.2	44.6	21:20-21:25	46.0	44.4	00:20-00:25	46.7	43.7
15:25-15:30	52.2	47.9	18:25-18:30	50.9	45.3	21:25-21:30	48.3	44.3	00:25-00:30	48.7	43.7
15:30-15:35	54.0	45.8	18:30-18:35	54.3	46.5	21:30-21:35	46.0	44.4	00:30-00:35	46.9	43.0
15:35-15:40	55.3	44.0	18:35-18:40	52.8	47.3	21:35-21:40	47.0	44.4	00:35-00:40	46.8	43.1
15:40-15:45	53.5	41.7	18:40-18:45	55.2	48.0	21:40-21:45	47.8	45.4	00:40-00:45	46.4	43.8
15:45-15:50	55.8	39.1	18:45-18:50	50.9	48.0	21:45-21:50	48.0	44.7	00:45-00:50	46.3	43.8
15:50-15:55	55.0	40.6	18:50-18:55	51.0	48.0	21:50-21:55	51.9	45.5	00:50-00:55	46.9	43.8
15:55-16:00	55.2	41.4	18:55-19:00	50.7	47.5	21:55-22:00	47.7	45.0	00:55-01:00	46.4	43.9
16:00-16:05	51.2	36.2	19:00-19:05	49.1	47.2	22:00-22:05	47.9	45.1	01:00-01:05	48.1	42.9
16:05-16:10	53.5	43.0	19:05-19:10	52.6	47.1	22:05-22:10	47.6	44.7	01:05-01:10	45.7	42.5
16:10-16:15	55.5	43.7	19:10-19:15	49.9	46.8	22:10-22:15	48.9	44.1	01:10-01:15	46.0	42.9
16:15-16:20	51.5	40.3	19:15-19:20	49.4	46.6	22:15-22:20	46.5	43.7	01:15-01:20	46.5	42.9
16:20-16:25	53.8	41.3	19:20-19:25	50.0	47.0	22:20-22:25	45.4	43.8	01:20-01:25	46.1	42.5
16:25-16:30	54.5	42.0	19:25-19:30	52.3	47.1	22:25-22:30	46.6	43.4	01:25-01:30	46.3	43.3
16:30-16:35	52.9	39.6	19:30-19:35	48.3	47.0	22:30-22:35	49.9	43.6	01:30-01:35	45.1	42.4
16:35-16:40	52.6	41.7	19:35-19:40	49.6	47.3	22:35-22:40	46.3	44.2	01:35-01:40	45.6	42.6
16:40-16:45	55.1	41.9	19:40-19:45	48.7	47.5	22:40-22:45	48.2	44.2	01:40-01:45	45.8	43.3
16:45-16:50	54.1	40.2	19:45-19:50	54.1	47.8	22:45-22:50	46.4	44.3	01:45-01:50	47.5	43.7
16:50-16:55	52.1	39.5	19:50-19:55	49.7	47.7	22:50-22:55	49.9	46.5	01:50-01:55	45.8	43.2
16:55-17:00	51.7	41.2	19:55-20:00	51.2	47.1	22:55-23:00	50.6	47.9	01:55-02:00	46.1	43.2

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
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E-mail : envi@enviresearch.co.th
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 31, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV285
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
02:00-02:05	45.7	43.2	05:00-05:05	47.3	45.3	08:00-08:05	50.8	41.0	11:00-11:05	48.5	41.0
02:05-02:10	45.5	42.9	05:05-05:10	47.3	45.3	08:05-08:10	53.3	42.6	11:05-11:10	51.8	43.0
02:10-02:15	45.3	42.7	05:10-05:15	47.5	45.5	08:10-08:15	57.4	44.5	11:10-11:15	49.7	40.5
02:15-02:20	45.2	42.7	05:15-05:20	52.3	46.2	08:15-08:20	59.3	48.0	11:15-11:20	48.1	41.6
02:20-02:25	44.5	41.9	05:20-05:25	53.2	47.0	08:20-08:25	53.4	44.5	11:20-11:25	51.0	44.1
02:25-02:30	44.9	42.6	05:25-05:30	48.7	47.1	08:25-08:30	57.1	46.9	11:25-11:30	55.5	43.0
02:30-02:35	44.1	41.4	05:30-05:35	49.1	47.4	08:30-08:35	53.1	44.3	11:30-11:35	53.0	42.7
02:35-02:40	44.3	42.2	05:35-05:40	51.4	47.7	08:35-08:40	54.7	46.4	11:35-11:40	50.2	43.3
02:40-02:45	44.9	42.9	05:40-05:45	52.0	47.7	08:40-08:45	56.4	46.0	11:40-11:45	52.0	43.8
02:45-02:50	44.7	42.8	05:45-05:50	53.1	48.1	08:45-08:50	53.5	42.9	11:45-11:50	57.7	42.7
02:50-02:55	44.8	42.8	05:50-05:55	54.3	47.2	08:50-08:55	55.4	43.7	11:50-11:55	52.2	41.9
02:55-03:00	44.9	43.1	05:55-06:00	52.9	47.2	08:55-09:00	58.1	47.8	11:55-12:00	54.3	45.6
03:00-03:05	44.6	42.5	06:00-06:05	54.5	48.9	09:00-09:05	52.7	42.0	12:00-12:05	51.7	42.9
03:05-03:10	44.7	43.1	06:05-06:10	51.0	44.3	09:05-09:10	55.3	45.3	12:05-12:10	54.1	43.1
03:10-03:15	44.2	42.5	06:10-06:15	48.5	43.3	09:10-09:15	52.2	42.4	12:10-12:15	53.5	42.6
03:15-03:20	47.9	42.7	06:15-06:20	50.1	42.2	09:15-09:20	50.5	41.9	12:15-12:20	50.1	42.9
03:20-03:25	44.5	41.8	06:20-06:25	51.8	44.8	09:20-09:25	52.0	43.1	12:20-12:25	50.1	41.4
03:25-03:30	44.4	41.7	06:25-06:30	52.6	43.5	09:25-09:30	53.8	42.6	12:25-12:30	50.6	42.7
03:30-03:35	44.0	41.4	06:30-06:35	53.7	44.6	09:30-09:35	57.8	44.4	12:30-12:35	53.9	45.8
03:35-03:40	45.7	41.4	06:35-06:40	56.1	41.0	09:35-09:40	53.9	41.8	12:35-12:40	50.9	41.8
03:40-03:45	46.7	40.2	06:40-06:45	53.5	44.2	09:40-09:45	51.7	40.4	12:40-12:45	49.5	40.4
03:45-03:50	44.3	40.6	06:45-06:50	56.2	42.3	09:45-09:50	54.3	45.1	12:45-12:50	55.5	40.3
03:50-03:55	46.4	41.6	06:50-06:55	51.3	41.9	09:50-09:55	56.4	44.3	12:50-12:55	53.2	41.8
03:55-04:00	44.5	41.9	06:55-07:00	52.4	41.1	09:55-10:00	51.3	41.7	12:55-13:00	52.0	41.4
04:00-04:05	44.2	41.7	07:00-07:05	54.7	42.5	10:00-10:05	52.1	42.0	13:00-13:05	49.0	40.9
04:05-04:10	44.2	41.3	07:05-07:10	50.8	39.6	10:05-10:10	50.9	41.2	13:05-13:10	54.0	48.1
04:10-04:15	44.1	41.6	07:10-07:15	52.9	43.2	10:10-10:15	53.9	39.9	13:10-13:15	52.6	48.1
04:15-04:20	45.0	42.8	07:15-07:20	54.7	44.2	10:15-10:20	52.4	41.8	13:15-13:20	54.6	48.9
04:20-04:25	45.9	43.0	07:20-07:25	55.9	46.0	10:20-10:25	53.2	42.5	13:20-13:25	51.4	48.2
04:25-04:30	45.6	43.2	07:25-07:30	52.5	42.7	10:25-10:30	52.4	41.3	13:25-13:30	53.8	48.8
04:30-04:35	45.9	43.6	07:30-07:35	57.1	44.9	10:30-10:35	53.1	41.4	13:30-13:35	50.9	42.5
04:35-04:40	45.0	43.4	07:35-07:40	52.9	41.4	10:35-10:40	51.5	40.1	13:35-13:40	51.5	42.6
04:40-04:45	44.4	42.7	07:40-07:45	52.0	40.5	10:40-10:45	55.8	43.6	13:40-13:45	50.6	41.2
04:45-04:50	44.7	43.1	07:45-07:50	59.1	42.0	10:45-10:50	55.6	41.6	13:45-13:50	48.9	41.3
04:50-04:55	45.7	44.2	07:50-07:55	54.3	44.9	10:50-10:55	52.7	39.9	13:50-13:55	51.7	43.8
04:55-05:00	46.1	44.5	07:55-08:00	58.2	42.1	10:55-11:00	48.7	40.1	13:55-14:00	49.3	44.4

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 24-25, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV287
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
14:00-15:00	52.5	72.1	57.9	55.7	49.0	44.1
15:00-16:00	54.1	71.9	60.2	58.6	50.8	48.6
16:00-17:00	53.7	76.3	59.3	57.0	50.0	44.8
17:00-18:00	54.3	78.6	60.6	57.3	48.6	43.7
18:00-19:00	52.2	71.0	56.3	53.9	49.8	48.5
19:00-20:00	51.4	70.3	53.7	52.0	50.4	49.5
20:00-21:00	51.5	72.0	53.8	52.3	50.9	49.7
21:00-22:00	52.4	70.7	53.5	52.8	51.9	50.7
22:00-23:00	51.0	76.7	55.4	52.7	50.5	49.2
23:00-00:00	50.0	68.1	52.7	50.8	49.1	47.7
00:00-01:00	51.3	73.8	54.5	54.0	50.2	48.1
01:00-02:00	48.8	74.7	50.9	49.3	47.7	46.3
02:00-03:00	52.8	76.7	62.9	61.4	50.9	48.6
03:00-04:00	49.7	70.4	52.3	50.7	48.9	47.5
04:00-05:00	50.1	64.7	52.1	51.5	49.5	48.3
05:00-06:00	51.9	68.8	54.7	53.4	51.1	49.0
06:00-07:00	52.7	69.2	58.4	55.8	49.0	45.3
07:00-08:00	55.2	80.6	61.0	57.9	50.3	45.5
08:00-09:00	55.5	83.9	60.2	57.6	50.9	46.2
09:00-10:00	56.1	79.1	61.0	57.9	52.0	47.6
10:00-11:00	55.6	82.5	59.9	56.5	49.0	44.9
11:00-12:00	53.6	78.5	59.0	56.5	48.2	44.8
12:00-13:00	53.5	75.9	59.5	56.3	47.7	44.4
13:00-14:00	52.9	70.3	59.1	56.2	48.9	46.7
24 Hours Measurement	**53.0**	**83.9**	**58.2**	**55.9**	**50.0**	**47.5**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**58.0**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Environment Research & Technology Company Limited
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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 25-26, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV287
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
14:00-15:00	55.0	83.3	60.6	58.0	50.4	45.5
15:00-16:00	52.7	75.7	58.1	56.0	48.5	44.5
16:00-17:00	56.4	79.8	61.9	59.0	51.5	46.8
17:00-18:00	58.5	84.2	63.1	60.3	53.0	47.9
18:00-19:00	53.5	80.2	61.4	57.3	50.2	47.7
19:00-20:00	51.4	71.4	56.6	52.6	48.6	47.9
20:00-21:00	52.6	69.8	55.5	53.6	51.6	49.7
21:00-22:00	55.4	78.6	57.4	56.2	54.7	52.5
22:00-23:00	53.9	69.1	55.1	54.7	53.7	52.0
23:00-00:00	54.2	69.1	56.5	55.3	54.0	52.4
00:00-01:00	54.5	76.0	55.3	55.1	54.3	53.0
01:00-02:00	54.0	60.5	55.3	55.0	53.6	52.5
02:00-03:00	53.4	69.8	57.0	53.9	52.4	51.2
03:00-04:00	51.8	70.7	54.2	52.2	50.9	49.4
04:00-05:00	54.7	61.3	56.5	56.3	54.3	50.8
05:00-06:00	53.3	72.9	56.6	55.3	52.1	49.1
06:00-07:00	52.7	71.7	57.7	55.3	49.9	47.2
07:00-08:00	55.1	84.2	60.0	56.6	50.4	46.5
08:00-09:00	55.0	77.3	60.2	57.8	50.5	46.2
09:00-10:00	55.0	81.8	60.1	57.3	50.2	46.1
10:00-11:00	54.3	81.2	60.0	56.6	48.7	45.1
11:00-12:00	54.7	76.4	59.7	56.6	48.4	45.7
12:00-13:00	53.7	78.8	58.4	55.6	48.3	45.7
13:00-14:00	51.7	71.6	56.5	54.0	48.7	46.8
24 Hours Measurement	**54.4**	**84.2**	**58.7**	**56.3**	**51.7**	**49.3**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**60.3**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 26-27, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV287
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
14:00-15:00	53.9	84.3	59.5	56.1	48.6	45.2
15:00-16:00	53.8	76.3	60.3	57.9	49.9	45.0
16:00-17:00	55.5	81.6	60.5	58.0	50.4	46.2
17:00-18:00	64.5	84.1	70.3	67.6	61.6	59.3
18:00-19:00	53.6	73.6	58.0	55.9	51.0	49.1
19:00-20:00	54.4	76.3	58.2	56.0	52.7	51.7
20:00-21:00	57.5	75.8	61.6	60.7	55.8	51.9
21:00-22:00	54.0	71.3	57.7	56.3	52.7	51.4
22:00-23:00	54.3	66.4	58.3	57.0	53.5	51.9
23:00-00:00	51.8	74.7	52.8	52.5	51.3	49.9
00:00-01:00	52.2	71.5	53.4	53.0	51.7	50.3
01:00-02:00	50.3	63.7	52.8	51.4	49.8	48.8
02:00-03:00	53.1	61.6	54.4	54.2	52.6	51.5
03:00-04:00	53.6	70.0	54.9	54.6	53.5	52.0
04:00-05:00	53.7	66.0	55.5	54.9	53.3	51.9
05:00-06:00	54.0	70.9	56.4	55.3	53.2	51.4
06:00-07:00	54.4	84.2	59.8	56.9	51.0	48.0
07:00-08:00	55.0	75.2	60.7	58.4	50.9	47.1
08:00-09:00	54.6	74.8	61.4	58.3	50.1	46.2
09:00-10:00	54.8	73.8	61.6	58.9	50.9	47.2
10:00-11:00	55.6	88.0	60.8	57.5	50.1	47.1
11:00-12:00	53.8	76.4	59.6	56.2	49.0	45.1
12:00-13:00	57.9	77.3	62.1	60.1	55.3	52.3
13:00-14:00	55.8	81.9	61.0	58.0	51.9	48.6
24 Hours Measurement	**55.9**	**88.0**	**60.9**	**58.6**	**53.3**	**51.0**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**60.4**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 27-28, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV287
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
14:00-15:00	54.3	75.8	59.9	56.9	49.3	45.9
15:00-16:00	54.9	78.7	60.0	57.0	49.9	46.2
16:00-17:00	59.9	85.2	65.3	62.2	53.8	48.1
17:00-18:00	57.2	83.8	64.5	59.5	51.4	47.0
18:00-19:00	55.1	74.9	59.2	57.1	52.3	50.9
19:00-20:00	55.9	75.4	60.8	59.1	54.4	53.6
20:00-21:00	55.6	73.9	59.2	57.6	54.5	53.4
21:00-22:00	54.8	69.6	59.3	57.0	53.4	52.2
22:00-23:00	53.6	66.2	56.3	54.5	53.0	51.8
23:00-00:00	54.0	61.1	55.3	55.0	53.7	52.0
00:00-01:00	52.5	63.1	53.9	53.6	52.4	51.0
01:00-02:00	51.6	70.5	52.9	52.5	51.3	50.0
02:00-03:00	53.1	68.5	55.0	54.1	52.8	51.1
03:00-04:00	53.7	64.8	55.0	54.7	53.0	51.5
04:00-05:00	54.3	76.5	56.0	54.7	53.3	51.0
05:00-06:00	53.0	72.5	56.2	54.5	51.9	50.2
06:00-07:00	53.2	86.1	58.6	56.0	49.7	46.5
07:00-08:00	53.7	72.6	59.1	57.0	50.8	46.4
08:00-09:00	53.9	74.0	59.2	57.1	50.6	46.8
09:00-10:00	55.6	84.5	60.3	57.2	50.3	46.0
10:00-11:00	53.8	77.4	58.6	55.6	47.9	44.6
11:00-12:00	51.9	76.1	57.3	54.4	47.7	44.6
12:00-13:00	52.5	76.1	58.1	54.8	47.3	43.6
13:00-14:00	52.0	73.8	57.2	53.9	46.4	43.8
24 Hours Measurement	**54.6**	**86.1**	**59.3**	**56.7**	**51.8**	**49.7**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**60.0**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 28-29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV287
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
14:00-15:00	51.3	71.4	57.1	54.0	47.4	44.3
15:00-16:00	53.0	72.1	58.5	56.3	49.3	45.6
16:00-17:00	54.2	78.1	59.3	56.7	50.7	47.4
17:00-18:00	57.3	80.7	61.7	59.4	53.7	49.7
18:00-19:00	55.2	74.4	59.8	57.7	52.3	49.9
19:00-20:00	55.5	70.7	58.7	57.4	54.3	53.1
20:00-21:00	54.3	69.1	56.1	55.1	53.7	52.8
21:00-22:00	53.2	76.8	55.6	54.1	52.8	51.2
22:00-23:00	53.7	73.3	56.0	54.7	53.1	50.4
23:00-00:00	51.5	68.3	53.0	52.4	51.1	49.7
00:00-01:00	51.9	69.4	53.6	52.8	51.3	49.7
01:00-02:00	51.6	62.6	53.4	53.0	51.5	49.7
02:00-03:00	52.3	61.6	54.0	53.7	52.2	50.7
03:00-04:00	53.0	59.8	54.9	54.6	52.9	51.0
04:00-05:00	51.1	61.9	53.4	52.7	50.8	49.0
05:00-06:00	53.2	67.0	55.5	54.4	52.7	51.3
06:00-07:00	53.4	89.4	58.3	56.0	49.7	46.4
07:00-08:00	54.2	78.3	59.3	56.8	49.8	45.8
08:00-09:00	52.7	87.9	57.2	55.2	49.3	45.8
09:00-10:00	53.6	72.0	59.5	56.6	49.7	45.8
10:00-11:00	53.9	87.7	60.4	57.4	48.8	45.3
11:00-12:00	53.5	81.8	58.8	55.1	47.9	44.9
12:00-13:00	53.5	82.6	60.4	56.9	49.6	47.4
13:00-14:00	51.9	73.3	58.0	54.2	48.3	46.9
24 Hours Measurement	**53.5**	**89.4**	**57.9**	**55.7**	**51.4**	**49.2**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**59.2**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 29-30, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV287
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
14:00-15:00	52.2	80.2	58.6	54.5	42.0	37.1
15:00-16:00	53.4	81.3	58.3	54.6	44.7	38.5
16:00-17:00	55.6	77.8	61.3	57.9	50.6	46.0
17:00-18:00	58.1	78.6	62.3	60.2	55.8	52.0
18:00-19:00	52.8	75.1	57.2	54.2	50.2	48.6
19:00-20:00	52.4	70.3	54.4	53.2	51.6	50.3
20:00-21:00	51.5	66.0	53.9	52.7	51.1	49.5
21:00-22:00	50.5	69.3	52.4	51.5	49.6	47.6
22:00-23:00	50.0	70.7	52.1	51.5	49.5	47.0
23:00-00:00	53.8	68.9	55.3	54.9	53.2	51.9
00:00-01:00	52.3	81.4	55.8	53.7	51.8	49.1
01:00-02:00	50.6	72.0	52.2	51.7	50.2	47.8
02:00-03:00	50.1	66.2	52.3	51.8	49.6	46.9
03:00-04:00	49.0	64.0	50.8	50.2	48.6	46.2
04:00-05:00	45.2	72.7	52.1	48.1	43.2	41.3
05:00-06:00	55.2	72.0	60.6	59.4	51.9	45.6
06:00-07:00	53.3	77.0	58.8	56.7	49.1	46.8
07:00-08:00	57.8	74.2	61.7	59.5	56.4	54.8
08:00-09:00	56.2	73.2	61.7	58.7	52.4	50.7
09:00-10:00	54.9	91.1	60.9	57.5	48.9	42.7
10:00-11:00	53.7	86.7	58.8	56.2	49.8	45.3
11:00-12:00	53.8	71.7	60.1	56.8	46.8	40.9
12:00-13:00	53.1	83.0	59.8	55.7	46.7	41.3
13:00-14:00	53.2	76.0	59.2	54.9	46.1	42.0
24 Hours Measurement	**53.7**	**91.1**	**58.5**	**55.9**	**50.8**	**48.2**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**58.8**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงพยาบาลส่งเสริมสุขภาพตำบลหนองกระทุ่ม หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0591323 E, 1644721 N
Measured Date : October 30-31, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820939

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-011
Report No. : 2023-RAAV287
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
14:00-15:00	53.1	80.7	60.0	57.1	48.6	43.5
15:00-16:00	55.1	72.5	61.3	58.1	50.4	45.2
16:00-17:00	53.4	72.4	59.2	56.9	49.0	41.2
17:00-18:00	53.8	73.1	60.0	56.4	46.9	39.5
18:00-19:00	52.5	76.2	56.6	53.9	47.9	45.9
19:00-20:00	50.8	70.4	55.2	51.5	48.5	47.2
20:00-21:00	49.1	68.5	52.0	49.8	47.0	45.9
21:00-22:00	47.9	68.8	50.4	48.9	46.6	44.7
22:00-23:00	48.2	76.4	54.3	51.9	47.0	44.8
23:00-00:00	49.9	68.7	52.8	51.0	49.1	47.1
00:00-01:00	47.3	66.2	51.7	49.2	46.1	43.8
01:00-02:00	46.3	66.4	50.6	48.9	45.2	43.0
02:00-03:00	44.9	61.2	47.8	47.0	44.3	42.6
03:00-04:00	45.3	67.2	51.2	48.9	43.5	41.9
04:00-05:00	45.1	63.1	47.7	47.1	44.6	43.0
05:00-06:00	51.4	69.9	55.9	53.5	49.0	46.9
06:00-07:00	53.2	88.6	58.6	55.7	48.7	44.1
07:00-08:00	55.3	90.4	63.2	58.9	49.6	43.2
08:00-09:00	55.9	82.8	61.3	58.9	51.5	45.4
09:00-10:00	54.0	78.1	59.2	56.5	49.0	43.2
10:00-11:00	53.1	72.5	59.1	56.3	47.5	41.4
11:00-12:00	52.9	81.5	60.1	56.6	47.9	43.0
12:00-13:00	52.5	74.5	57.4	54.8	46.5	42.5
13:00-14:00	51.9	70.5	57.6	55.4	48.9	46.0
24 Hours Measurement	**52.0**	**90.4**	**57.8**	**54.9**	**48.0**	**44.4**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**56.3**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Head Office/Tax ID 0105 542 064 981

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Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 24-25, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
15:00-15:05	49.6	35.1	18:00-18:05	54.2	46.5	21:00-21:05	48.3	47.1	00:00-00:05	50.0	44.0
15:05-15:10	47.0	34.6	18:05-18:10	53.6	42.3	21:05-21:10	47.6	46.5	00:05-00:10	55.4	46.2
15:10-15:15	47.6	38.5	18:10-18:15	52.9	42.1	21:10-21:15	49.0	46.4	00:10-00:15	50.9	45.9
15:15-15:20	48.2	36.0	18:15-18:20	54.8	44.5	21:15-21:20	48.5	47.5	00:15-00:20	48.2	42.9
15:20-15:25	49.5	33.8	18:20-18:25	55.0	44.9	21:20-21:25	48.3	47.3	00:20-00:25	50.8	43.2
15:25-15:30	49.4	37.4	18:25-18:30	49.1	44.8	21:25-21:30	48.8	47.8	00:25-00:30	43.6	43.1
15:30-15:35	48.6	35.9	18:30-18:35	48.4	45.5	21:30-21:35	48.8	47.8	00:30-00:35	44.4	43.6
15:35-15:40	49.4	37.8	18:35-18:40	50.1	45.9	21:35-21:40	48.8	48.0	00:35-00:40	44.3	43.5
15:40-15:45	51.1	40.6	18:40-18:45	49.7	46.3	21:40-21:45	48.9	48.1	00:40-00:45	45.2	43.8
15:45-15:50	48.0	40.1	18:45-18:50	51.0	48.0	21:45-21:50	49.8	47.7	00:45-00:50	46.0	44.6
15:50-15:55	49.3	41.9	18:50-18:55	49.5	47.8	21:50-21:55	48.8	47.9	00:50-00:55	47.5	45.8
15:55-16:00	47.7	39.8	18:55-19:00	50.1	49.0	21:55-22:00	48.4	47.4	00:55-01:00	50.8	47.1
16:00-16:05	47.6	41.6	19:00-19:05	51.5	48.7	22:00-22:05	49.5	47.5	01:00-01:05	47.1	44.4
16:05-16:10	48.0	41.1	19:05-19:10	50.1	48.9	22:05-22:10	49.1	48.1	01:05-01:10	49.5	43.9
16:10-16:15	48.4	40.4	19:10-19:15	50.1	48.7	22:10-22:15	50.6	47.9	01:10-01:15	44.8	43.5
16:15-16:20	48.0	39.8	19:15-19:20	49.3	47.9	22:15-22:20	47.9	46.4	01:15-01:20	44.0	43.3
16:20-16:25	45.6	38.9	19:20-19:25	49.9	47.6	22:20-22:25	50.8	44.9	01:20-01:25	46.6	43.6
16:25-16:30	50.6	39.0	19:25-19:30	50.0	46.4	22:25-22:30	49.4	46.6	01:25-01:30	45.9	43.8
16:30-16:35	50.5	41.9	19:30-19:35	50.7	46.9	22:30-22:35	47.2	45.9	01:30-01:35	45.3	44.0
16:35-16:40	53.2	41.5	19:35-19:40	51.2	47.3	22:35-22:40	48.1	45.7	01:35-01:40	47.5	46.1
16:40-16:45	56.7	42.1	19:40-19:45	50.6	46.9	22:40-22:45	46.7	44.5	01:40-01:45	47.7	46.7
16:45-16:50	50.4	41.9	19:45-19:50	50.0	47.3	22:45-22:50	46.6	45.1	01:45-01:50	47.8	46.7
16:50-16:55	60.2	44.7	19:50-19:55	50.3	49.0	22:50-22:55	48.3	46.0	01:50-01:55	46.3	44.8
16:55-17:00	58.1	46.1	19:55-20:00	49.3	46.6	22:55-23:00	48.1	46.4	01:55-02:00	46.4	45.5
17:00-17:05	54.9	43.0	20:00-20:05	49.3	46.4	23:00-23:05	47.1	45.9	02:00-02:05	46.6	45.3
17:05-17:10	51.3	43.4	20:05-20:10	48.2	47.2	23:05-23:10	47.3	45.6	02:05-02:10	46.8	46.2
17:10-17:15	58.0	46.9	20:10-20:15	49.5	47.7	23:10-23:15	47.9	46.2	02:10-02:15	46.6	46.0
17:15-17:20	55.2	48.2	20:15-20:20	49.7	48.5	23:15-23:20	47.5	45.9	02:15-02:20	46.3	45.5
17:20-17:25	54.3	47.5	20:20-20:25	50.4	49.0	23:20-23:25	47.4	46.4	02:20-02:25	49.4	45.6
17:25-17:30	53.3	45.3	20:25-20:30	53.0	47.3	23:25-23:30	48.4	46.6	02:25-02:30	46.3	45.5
17:30-17:35	53.7	45.5	20:30-20:35	49.1	47.4	23:30-23:35	48.5	44.5	02:30-02:35	46.0	45.3
17:35-17:40	53.9	46.4	20:35-20:40	48.8	48.0	23:35-23:40	47.2	44.1	02:35-02:40	46.7	45.3
17:40-17:45	55.1	46.6	20:40-20:45	48.7	47.9	23:40-23:45	47.2	43.7	02:40-02:45	46.0	45.0
17:45-17:50	52.4	44.6	20:45-20:50	49.4	48.1	23:45-23:50	47.7	44.0	02:45-02:50	45.8	44.9
17:50-17:55	52.8	44.3	20:50-20:55	55.3	46.5	23:50-23:55	49.4	44.0	02:50-02:55	45.9	44.9
17:55-18:00	50.6	45.0	20:55-21:00	57.4	46.3	23:55-00:00	43.6	42.6	02:55-03:00	46.5	45.7

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 25, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
03:00-03:05	46.6	46.0	06:00-06:05	49.0	45.8	09:00-09:05	49.2	44.4	12:00-12:05	49.7	42.1
03:05-03:10	47.1	46.2	06:05-06:10	48.9	46.5	09:05-09:10	54.0	44.5	12:05-12:10	55.2	41.7
03:10-03:15	48.9	46.7	06:10-06:15	48.3	44.4	09:10-09:15	53.0	44.8	12:10-12:15	48.5	42.8
03:15-03:20	48.0	46.3	06:15-06:20	49.4	43.1	09:15-09:20	49.9	45.3	12:15-12:20	51.4	42.7
03:20-03:25	48.3	47.0	06:20-06:25	48.9	45.4	09:20-09:25	47.6	43.4	12:20-12:25	52.9	42.4
03:25-03:30	47.9	46.5	06:25-06:30	52.3	43.6	09:25-09:30	48.2	43.1	12:25-12:30	50.7	42.4
03:30-03:35	47.8	45.8	06:30-06:35	50.7	46.0	09:30-09:35	45.9	43.4	12:30-12:35	52.5	42.8
03:35-03:40	47.6	45.2	06:35-06:40	53.7	45.4	09:35-09:40	49.5	42.5	12:35-12:40	51.1	44.1
03:40-03:45	48.6	46.8	06:40-06:45	53.3	43.5	09:40-09:45	48.9	43.6	12:40-12:45	48.8	42.4
03:45-03:50	47.3	45.9	06:45-06:50	45.6	42.7	09:45-09:50	46.6	44.0	12:45-12:50	49.4	41.3
03:50-03:55	50.1	43.8	06:50-06:55	46.8	42.4	09:50-09:55	46.6	43.0	12:50-12:55	48.9	41.6
03:55-04:00	55.4	45.1	06:55-07:00	51.0	44.2	09:55-10:00	50.7	43.2	12:55-13:00	51.9	41.9
04:00-04:05	51.2	44.8	07:00-07:05	51.7	46.3	10:00-10:05	52.9	43.4	13:00-13:05	48.4	42.7
04:05-04:10	45.7	44.7	07:05-07:10	51.2	46.6	10:05-10:10	50.0	42.4	13:05-13:10	50.3	42.9
04:10-04:15	46.2	45.2	07:10-07:15	48.3	45.6	10:10-10:15	49.2	42.8	13:10-13:15	52.9	43.7
04:15-04:20	47.5	45.2	07:15-07:20	51.4	46.4	10:15-10:20	49.8	42.6	13:15-13:20	50.2	44.4
04:20-04:25	46.1	44.7	07:20-07:25	54.6	43.4	10:20-10:25	46.7	42.8	13:20-13:25	49.5	43.2
04:25-04:30	46.4	45.4	07:25-07:30	54.3	45.0	10:25-10:30	49.2	43.1	13:25-13:30	51.4	42.4
04:30-04:35	46.7	45.6	07:30-07:35	50.6	43.7	10:30-10:35	47.5	41.9	13:30-13:35	49.1	40.9
04:35-04:40	47.3	45.8	07:35-07:40	52.5	44.0	10:35-10:40	49.0	42.7	13:35-13:40	51.5	41.5
04:40-04:45	47.4	46.2	07:40-07:45	51.4	45.4	10:40-10:45	45.9	42.4	13:40-13:45	48.9	40.9
04:45-04:50	46.7	45.8	07:45-07:50	52.5	46.3	10:45-10:50	48.7	42.6	13:45-13:50	49.5	41.7
04:50-04:55	47.0	45.9	07:50-07:55	48.4	43.5	10:50-10:55	47.9	42.6	13:50-13:55	48.0	41.7
04:55-05:00	46.7	45.7	07:55-08:00	48.2	41.7	10:55-11:00	47.2	42.3	13:55-14:00	51.3	41.8
05:00-05:05	46.8	45.2	08:00-08:05	47.2	41.6	11:00-11:05	49.3	42.3	14:00-14:05	45.9	42.1
05:05-05:10	46.9	45.9	08:05-08:10	48.1	42.8	11:05-11:10	48.2	43.2	14:05-14:10	45.6	41.8
05:10-05:15	48.1	46.2	08:10-08:15	48.0	42.6	11:10-11:15	49.6	41.9	14:10-14:15	45.1	41.7
05:15-05:20	49.7	47.5	08:15-08:20	51.0	43.9	11:15-11:20	46.7	41.1	14:15-14:20	48.6	42.4
05:20-05:25	49.5	46.2	08:20-08:25	48.0	42.6	11:20-11:25	48.6	43.7	14:20-14:25	50.2	41.9
05:25-05:30	46.9	45.9	08:25-08:30	46.5	41.2	11:25-11:30	52.1	44.6	14:25-14:30	49.6	42.4
05:30-05:35	47.3	45.2	08:30-08:35	49.4	41.4	11:30-11:35	49.3	41.1	14:30-14:35	47.1	41.6
05:35-05:40	47.9	45.1	08:35-08:40	48.4	41.9	11:35-11:40	53.6	42.7	14:35-14:40	49.3	42.3
05:40-05:45	51.1	46.1	08:40-08:45	47.2	41.2	11:40-11:45	52.4	41.9	14:40-14:45	52.8	42.6
05:45-05:50	49.1	46.2	08:45-08:50	46.2	42.7	11:45-11:50	46.5	42.8	14:45-14:50	49.9	43.9
05:50-05:55	49.8	46.7	08:50-08:55	46.4	42.4	11:50-11:55	44.9	41.2	14:50-14:55	51.1	42.9
05:55-06:00	47.3	43.6	08:55-09:00	51.0	45.1	11:55-12:00	45.9	42.0	14:55-15:00	49.5	42.6

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 25-26, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
15:00-15:05	52.1	43.0	18:00-18:05	52.7	40.2	21:00-21:05	45.6	44.7	00:00-00:05	47.1	45.8
15:05-15:10	50.5	43.5	18:05-18:10	55.1	40.7	21:05-21:10	49.8	44.8	00:05-00:10	47.6	46.6
15:10-15:15	55.1	44.5	18:10-18:15	58.1	41.2	21:10-21:15	46.7	44.5	00:10-00:15	48.0	46.5
15:15-15:20	53.2	44.9	18:15-18:20	53.9	40.5	21:15-21:20	45.7	44.6	00:15-00:20	48.6	44.6
15:20-15:25	54.8	42.7	18:20-18:25	51.4	42.4	21:20-21:25	45.9	44.5	00:20-00:25	47.0	45.6
15:25-15:30	48.2	43.3	18:25-18:30	53.9	42.8	21:25-21:30	45.2	44.2	00:25-00:30	47.5	46.2
15:30-15:35	52.1	45.1	18:30-18:35	51.1	46.6	21:30-21:35	46.0	44.8	00:30-00:35	48.4	46.4
15:35-15:40	47.8	43.2	18:35-18:40	51.2	49.4	21:35-21:40	47.1	45.5	00:35-00:40	50.3	45.8
15:40-15:45	48.5	43.2	18:40-18:45	51.5	49.7	21:40-21:45	47.4	46.1	00:40-00:45	48.5	45.6
15:45-15:50	49.6	43.1	18:45-18:50	48.7	46.9	21:45-21:50	48.1	47.1	00:45-00:50	48.7	46.6
15:50-15:55	49.4	44.1	18:50-18:55	50.7	49.1	21:50-21:55	49.2	46.2	00:50-00:55	47.4	46.1
15:55-16:00	49.8	43.0	18:55-19:00	50.5	48.8	21:55-22:00	48.2	46.9	00:55-01:00	47.6	46.0
16:00-16:05	49.2	43.8	19:00-19:05	51.6	47.0	22:00-22:05	47.2	45.9	01:00-01:05	46.2	45.4
16:05-16:10	48.0	44.9	19:05-19:10	49.4	45.3	22:05-22:10	50.2	46.2	01:05-01:10	46.4	44.9
16:10-16:15	49.0	43.3	19:10-19:15	49.2	46.9	22:10-22:15	47.2	45.6	01:10-01:15	46.8	45.8
16:15-16:20	50.7	43.7	19:15-19:20	46.4	44.9	22:15-22:20	45.6	44.4	01:15-01:20	47.8	45.9
16:20-16:25	52.7	44.2	19:20-19:25	48.0	44.8	22:20-22:25	48.7	46.1	01:20-01:25	46.8	45.5
16:25-16:30	55.9	43.9	19:25-19:30	47.1	45.1	22:25-22:30	47.8	45.5	01:25-01:30	47.3	45.7
16:30-16:35	54.9	45.4	19:30-19:35	47.9	45.1	22:30-22:35	46.5	45.5	01:30-01:35	46.9	46.0
16:35-16:40	53.1	44.3	19:35-19:40	49.3	44.9	22:35-22:40	47.1	45.7	01:35-01:40	46.9	46.0
16:40-16:45	52.7	46.7	19:40-19:45	48.0	45.0	22:40-22:45	46.9	45.9	01:40-01:45	46.1	45.0
16:45-16:50	58.6	47.2	19:45-19:50	47.0	44.9	22:45-22:50	47.2	46.4	01:45-01:50	45.3	44.2
16:50-16:55	53.2	48.1	19:50-19:55	47.7	46.3	22:50-22:55	47.3	45.7	01:50-01:55	46.8	44.1
16:55-17:00	54.0	46.7	19:55-20:00	48.5	47.2	22:55-23:00	46.1	44.9	01:55-02:00	45.2	44.1
17:00-17:05	54.2	48.3	20:00-20:05	48.2	47.3	23:00-23:05	46.6	44.9	02:00-02:05	45.6	44.6
17:05-17:10	57.7	47.1	20:05-20:10	51.2	46.6	23:05-23:10	46.2	45.1	02:05-02:10	45.5	44.7
17:10-17:15	54.6	48.2	20:10-20:15	50.8	48.8	23:10-23:15	46.0	45.0	02:10-02:15	44.8	43.7
17:15-17:20	57.5	49.1	20:15-20:20	50.6	49.0	23:15-23:20	48.3	45.4	02:15-02:20	43.6	42.5
17:20-17:25	53.8	47.0	20:20-20:25	51.5	48.4	23:20-23:25	46.6	45.1	02:20-02:25	44.2	43.1
17:25-17:30	54.9	45.9	20:25-20:30	50.0	47.9	23:25-23:30	46.7	45.7	02:25-02:30	44.4	43.0
17:30-17:35	57.2	48.4	20:30-20:35	49.6	48.4	23:30-23:35	46.0	45.1	02:30-02:35	45.3	43.7
17:35-17:40	55.6	48.1	20:35-20:40	50.8	48.5	23:35-23:40	47.6	46.0	02:35-02:40	45.2	44.2
17:40-17:45	56.8	48.2	20:40-20:45	50.2	48.3	23:40-23:45	47.1	45.6	02:40-02:45	45.8	44.9
17:45-17:50	56.7	46.8	20:45-20:50	47.4	43.5	23:45-23:50	47.3	46.2	02:45-02:50	46.3	44.6
17:50-17:55	54.5	44.2	20:50-20:55	49.3	43.9	23:50-23:55	47.2	45.6	02:50-02:55	46.3	45.1
17:55-18:00	54.4	42.7	20:55-21:00	45.2	43.7	23:55-00:00	46.3	44.9	02:55-03:00	46.5	45.3

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 26, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
03:00-03:05	46.6	45.6	06:00-06:05	52.7	46.0	09:00-09:05	49.4	46.2	12:00-12:05	48.4	43.4
03:05-03:10	46.5	45.5	06:05-06:10	48.9	45.7	09:05-09:10	49.2	46.0	12:05-12:10	50.7	41.9
03:10-03:15	46.7	44.5	06:10-06:15	48.5	45.7	09:10-09:15	48.9	46.1	12:10-12:15	45.8	40.7
03:15-03:20	45.6	44.6	06:15-06:20	46.2	43.9	09:15-09:20	50.3	45.9	12:15-12:20	44.7	41.0
03:20-03:25	45.9	44.8	06:20-06:25	47.4	43.9	09:20-09:25	52.3	46.3	12:20-12:25	48.3	41.1
03:25-03:30	46.3	44.1	06:25-06:30	50.9	45.6	09:25-09:30	53.1	47.9	12:25-12:30	46.4	40.9
03:30-03:35	45.8	43.5	06:30-06:35	49.5	45.4	09:30-09:35	53.5	49.3	12:30-12:35	48.5	41.5
03:35-03:40	45.1	43.8	06:35-06:40	51.1	45.4	09:35-09:40	55.9	46.8	12:35-12:40	47.4	40.8
03:40-03:45	45.3	44.0	06:40-06:45	46.5	43.9	09:40-09:45	50.6	45.0	12:40-12:45	50.2	42.6
03:45-03:50	45.3	44.1	06:45-06:50	46.4	43.9	09:45-09:50	51.5	43.5	12:45-12:50	49.7	43.6
03:50-03:55	45.0	43.4	06:50-06:55	49.1	44.8	09:50-09:55	48.8	44.9	12:50-12:55	49.0	42.8
03:55-04:00	45.2	43.6	06:55-07:00	49.3	44.3	09:55-10:00	51.7	43.6	12:55-13:00	44.9	41.3
04:00-04:05	49.6	44.6	07:00-07:05	48.3	45.2	10:00-10:05	51.3	43.5	13:00-13:05	50.1	42.2
04:05-04:10	47.9	44.6	07:05-07:10	52.9	45.6	10:05-10:10	48.8	44.5	13:05-13:10	52.0	42.3
04:10-04:15	45.5	44.4	07:10-07:15	50.4	44.6	10:10-10:15	51.7	44.3	13:10-13:15	48.5	41.5
04:15-04:20	45.4	42.7	07:15-07:20	51.1	44.7	10:15-10:20	50.1	43.4	13:15-13:20	45.4	40.3
04:20-04:25	45.2	43.8	07:20-07:25	49.8	44.9	10:20-10:25	48.0	43.7	13:20-13:25	44.9	38.1
04:25-04:30	44.8	43.1	07:25-07:30	49.8	45.2	10:25-10:30	53.9	44.5	13:25-13:30	47.3	39.5
04:30-04:35	45.3	43.2	07:30-07:35	49.5	45.9	10:30-10:35	49.7	43.8	13:30-13:35	41.9	38.7
04:35-04:40	44.9	42.4	07:35-07:40	56.1	46.0	10:35-10:40	51.4	44.3	13:35-13:40	45.3	38.4
04:40-04:45	45.7	43.4	07:40-07:45	51.6	43.2	10:40-10:45	49.6	43.8	13:40-13:45	47.0	38.8
04:45-04:50	47.4	45.1	07:45-07:50	53.2	45.6	10:45-10:50	48.8	44.0	13:45-13:50	46.6	38.2
04:50-04:55	50.1	45.2	07:50-07:55	55.6	46.1	10:50-10:55	50.4	43.1	13:50-13:55	45.5	37.5
04:55-05:00	46.5	45.5	07:55-08:00	52.5	44.2	10:55-11:00	49.0	43.6	13:55-14:00	44.2	38.2
05:00-05:05	46.2	44.8	08:00-08:05	49.4	46.0	11:00-11:05	54.5	44.5	14:00-14:05	47.2	39.0
05:05-05:10	47.5	45.0	08:05-08:10	48.6	45.1	11:05-11:10	50.6	45.1	14:05-14:10	48.5	42.8
05:10-05:15	46.0	44.4	08:10-08:15	49.0	44.8	11:10-11:15	46.4	43.4	14:10-14:15	48.6	40.6
05:15-05:20	46.1	43.5	08:15-08:20	46.7	44.8	11:15-11:20	47.3	43.4	14:15-14:20	47.9	39.8
05:20-05:25	46.8	43.8	08:20-08:25	49.2	45.6	11:20-11:25	47.0	44.3	14:20-14:25	48.9	40.8
05:25-05:30	44.3	42.4	08:25-08:30	50.9	45.5	11:25-11:30	50.3	44.1	14:25-14:30	45.8	40.9
05:30-05:35	46.2	42.9	08:30-08:35	52.2	46.3	11:30-11:35	47.3	44.6	14:30-14:35	47.7	41.2
05:35-05:40	46.6	42.6	08:35-08:40	51.7	45.7	11:35-11:40	48.2	43.5	14:35-14:40	45.8	39.9
05:40-05:45	46.3	44.3	08:40-08:45	51.3	46.1	11:40-11:45	53.5	44.1	14:40-14:45	46.1	40.6
05:45-05:50	48.1	46.5	08:45-08:50	49.2	45.7	11:45-11:50	49.3	44.1	14:45-14:50	50.6	40.1
05:50-05:55	50.6	45.4	08:50-08:55	49.2	45.8	11:50-11:55	47.2	43.2	14:50-14:55	44.1	40.2
05:55-06:00	52.3	45.1	08:55-09:00	49.4	46.4	11:55-12:00	50.9	42.9	14:55-15:00	45.6	41.1

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 26-27, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
15:00-15:05	49.8	41.4	18:00-18:05	47.6	42.1	21:00-21:05	52.8	51.1	00:00-00:05	56.7	53.9
15:05-15:10	45.7	41.6	18:05-18:10	51.2	42.3	21:05-21:10	53.2	51.1	00:05-00:10	56.9	54.1
15:10-15:15	50.9	42.8	18:10-18:15	47.9	42.0	21:10-21:15	53.1	50.7	00:10-00:15	56.3	53.9
15:15-15:20	53.0	39.8	18:15-18:20	48.4	41.8	21:15-21:20	52.5	50.2	00:15-00:20	56.3	54.0
15:20-15:25	47.9	36.7	18:20-18:25	47.6	41.8	21:20-21:25	51.6	49.9	00:20-00:25	57.2	54.6
15:25-15:30	47.3	40.8	18:25-18:30	45.8	42.2	21:25-21:30	52.7	50.5	00:25-00:30	56.9	54.1
15:30-15:35	44.9	40.7	18:30-18:35	45.5	43.4	21:30-21:35	51.4	49.7	00:30-00:35	56.6	54.1
15:35-15:40	48.7	41.6	18:35-18:40	48.6	44.8	21:35-21:40	51.7	49.8	00:35-00:40	57.4	54.5
15:40-15:45	50.6	41.2	18:40-18:45	49.9	44.8	21:40-21:45	54.0	50.5	00:40-00:45	55.3	46.2
15:45-15:50	52.3	47.1	18:45-18:50	48.1	43.2	21:45-21:50	52.6	50.3	00:45-00:50	56.9	53.0
15:50-15:55	53.6	49.9	18:50-18:55	48.3	44.9	21:50-21:55	52.2	49.5	00:50-00:55	57.1	54.1
15:55-16:00	53.8	50.1	18:55-19:00	48.5	43.4	21:55-22:00	50.9	49.1	00:55-01:00	56.8	54.0
16:00-16:05	51.7	45.9	19:00-19:05	46.2	45.0	22:00-22:05	56.0	50.6	01:00-01:05	56.9	53.9
16:05-16:10	48.1	42.7	19:05-19:10	50.0	44.8	22:05-22:10	56.1	54.0	01:05-01:10	57.3	54.4
16:10-16:15	46.7	40.1	19:10-19:15	46.1	44.5	22:10-22:15	56.8	53.4	01:10-01:15	57.1	54.3
16:15-16:20	47.4	39.6	19:15-19:20	46.1	45.0	22:15-22:20	56.9	54.6	01:15-01:20	57.1	53.4
16:20-16:25	49.8	41.5	19:20-19:25	49.3	44.8	22:20-22:25	55.8	53.8	01:20-01:25	58.7	54.4
16:25-16:30	49.2	40.8	19:25-19:30	53.9	44.1	22:25-22:30	55.8	53.7	01:25-01:30	57.3	54.2
16:30-16:35	48.6	41.3	19:30-19:35	48.4	45.6	22:30-22:35	55.6	53.7	01:30-01:35	54.0	43.3
16:35-16:40	52.5	44.2	19:35-19:40	49.3	46.3	22:35-22:40	55.6	53.1	01:35-01:40	48.1	42.6
16:40-16:45	50.1	43.0	19:40-19:45	48.5	46.5	22:40-22:45	54.9	52.3	01:40-01:45	50.6	43.1
16:45-16:50	51.9	42.6	19:45-19:50	48.0	46.5	22:45-22:50	56.1	54.1	01:45-01:50	48.6	43.5
16:50-16:55	50.6	42.6	19:50-19:55	50.3	47.0	22:50-22:55	56.2	54.3	01:50-01:55	50.6	44.0
16:55-17:00	49.9	45.5	19:55-20:00	50.1	47.4	22:55-23:00	56.4	54.5	01:55-02:00	49.2	44.0
17:00-17:05	54.4	46.8	20:00-20:05	48.7	47.2	23:00-23:05	56.3	54.4	02:00-02:05	53.5	45.3
17:05-17:10	56.7	47.6	20:05-20:10	48.9	47.5	23:05-23:10	56.1	54.1	02:05-02:10	52.9	44.3
17:10-17:15	52.4	46.7	20:10-20:15	49.6	47.8	23:10-23:15	56.2	54.2	02:10-02:15	54.9	44.6
17:15-17:20	58.9	49.8	20:15-20:20	51.7	47.4	23:15-23:20	56.5	54.3	02:15-02:20	53.4	45.8
17:20-17:25	60.7	58.7	20:20-20:25	48.4	46.8	23:20-23:25	56.2	54.2	02:20-02:25	57.3	49.4
17:25-17:30	59.1	52.0	20:25-20:30	48.5	46.7	23:25-23:30	55.2	50.0	02:25-02:30	56.0	47.4
17:30-17:35	55.1	45.7	20:30-20:35	51.0	47.8	23:30-23:35	53.7	50.3	02:30-02:35	55.9	45.3
17:35-17:40	57.2	48.0	20:35-20:40	51.9	50.2	23:35-23:40	52.0	48.9	02:35-02:40	59.5	51.2
17:40-17:45	58.6	55.9	20:40-20:45	52.6	50.7	23:40-23:45	55.4	44.3	02:40-02:45	63.3	59.5
17:45-17:50	56.8	51.3	20:45-20:50	52.7	49.8	23:45-23:50	55.6	52.8	02:45-02:50	62.5	59.4
17:50-17:55	50.7	46.6	20:50-20:55	54.3	51.6	23:50-23:55	56.8	54.3	02:50-02:55	62.6	60.5
17:55-18:00	53.4	43.5	20:55-21:00	53.5	51.4	23:55-00:00	56.8	53.7	02:55-03:00	62.6	59.6

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบดิดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 27, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
03:00-03:05	63.7	62.0	06:00-06:05	57.0	54.2	09:00-09:05	51.4	44.2	12:00-12:05	44.6	40.9
03:05-03:10	63.1	59.7	06:05-06:10	57.3	54.4	09:05-09:10	48.9	44.2	12:05-12:10	46.1	42.4
03:10-03:15	62.7	60.1	06:10-06:15	58.4	54.8	09:10-09:15	48.0	44.2	12:10-12:15	44.4	41.7
03:15-03:20	61.6	58.0	06:15-06:20	57.4	54.1	09:15-09:20	47.5	42.3	12:15-12:20	43.3	40.6
03:20-03:25	62.3	59.8	06:20-06:25	56.2	45.9	09:20-09:25	47.8	42.5	12:20-12:25	50.2	40.7
03:25-03:30	62.0	60.2	06:25-06:30	52.6	44.0	09:25-09:30	51.3	41.5	12:25-12:30	49.4	41.6
03:30-03:35	62.0	59.7	06:30-06:35	55.5	44.3	09:30-09:35	50.0	40.6	12:30-12:35	55.1	53.1
03:35-03:40	62.3	60.5	06:35-06:40	58.3	48.6	09:35-09:40	52.2	41.2	12:35-12:40	55.1	46.5
03:40-03:45	61.5	59.1	06:40-06:45	62.2	56.4	09:40-09:45	51.6	41.2	12:40-12:45	50.1	42.4
03:45-03:50	60.9	57.7	06:45-06:50	60.8	57.2	09:45-09:50	48.5	41.7	12:45-12:50	50.6	41.2
03:50-03:55	61.4	58.7	06:50-06:55	59.6	53.8	09:50-09:55	47.1	41.5	12:50-12:55	55.0	43.2
03:55-04:00	60.7	57.2	06:55-07:00	62.7	60.0	09:55-10:00	49.7	42.7	12:55-13:00	51.0	41.1
04:00-04:05	58.6	49.9	07:00-07:05	61.3	53.9	10:00-10:05	53.3	41.4	13:00-13:05	47.0	43.4
04:05-04:10	56.8	48.9	07:05-07:10	53.0	43.9	10:05-10:10	47.6	42.8	13:05-13:10	46.2	41.0
04:10-04:15	60.0	57.4	07:10-07:15	48.1	43.5	10:10-10:15	50.1	42.8	13:10-13:15	47.8	39.4
04:15-04:20	59.7	56.3	07:15-07:20	52.6	44.8	10:15-10:20	48.2	42.3	13:15-13:20	45.2	40.1
04:20-04:25	59.3	55.8	07:20-07:25	58.4	47.0	10:20-10:25	51.8	42.6	13:20-13:25	46.2	39.7
04:25-04:30	58.9	54.1	07:25-07:30	61.8	58.8	10:25-10:30	47.7	42.7	13:25-13:30	50.7	40.1
04:30-04:35	59.5	55.9	07:30-07:35	61.2	56.0	10:30-10:35	46.3	43.1	13:30-13:35	45.9	39.7
04:35-04:40	58.5	52.1	07:35-07:40	58.1	54.7	10:35-10:40	49.0	44.0	13:35-13:40	45.6	39.5
04:40-04:45	59.5	55.9	07:40-07:45	53.5	44.7	10:40-10:45	48.1	41.8	13:40-13:45	45.7	39.5
04:45-04:50	57.7	50.3	07:45-07:50	52.6	44.0	10:45-10:50	46.2	42.4	13:45-13:50	45.5	39.9
04:50-04:55	58.3	52.2	07:50-07:55	50.9	44.1	10:50-10:55	47.9	42.8	13:50-13:55	45.5	39.1
04:55-05:00	58.2	53.5	07:55-08:00	50.7	43.3	10:55-11:00	50.3	42.1	13:55-14:00	47.7	40.7
05:00-05:05	57.4	52.7	08:00-08:05	52.7	41.9	11:00-11:05	54.1	43.0	14:00-14:05	45.8	39.1
05:05-05:10	57.8	52.9	08:05-08:10	49.1	42.5	11:05-11:10	48.6	42.5	14:05-14:10	49.1	40.1
05:10-05:15	57.7	45.0	08:10-08:15	49.9	43.5	11:10-11:15	47.5	41.4	14:10-14:15	50.4	38.2
05:15-05:20	53.4	43.9	08:15-08:20	53.1	42.6	11:15-11:20	47.8	34.7	14:15-14:20	46.7	37.4
05:20-05:25	55.2	44.8	08:20-08:25	54.9	41.9	11:20-11:25	45.0	32.2	14:20-14:25	45.1	40.2
05:25-05:30	55.3	44.7	08:25-08:30	59.0	52.8	11:25-11:30	43.9	34.4	14:25-14:30	53.1	39.0
05:30-05:35	52.4	43.3	08:30-08:35	53.0	45.1	11:30-11:35	48.5	35.6	14:30-14:35	48.0	41.8
05:35-05:40	50.7	43.3	08:35-08:40	50.9	42.7	11:35-11:40	52.0	42.2	14:35-14:40	48.8	38.7
05:40-05:45	49.3	43.6	08:40-08:45	54.8	41.8	11:40-11:45	45.3	43.0	14:40-14:45	47.9	38.9
05:45-05:50	48.0	42.6	08:45-08:50	50.7	42.4	11:45-11:50	46.9	43.5	14:45-14:50	48.8	42.7
05:50-05:55	50.2	42.4	08:50-08:55	54.8	43.8	11:50-11:55	53.8	44.3	14:50-14:55	51.7	45.1
05:55-06:00	55.2	49.0	08:55-09:00	50.6	43.8	11:55-12:00	45.8	41.7	14:55-15:00	51.9	46.3

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 27-28, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
15:00-15:05	52.2	46.4	18:00-18:05	48.9	40.0	21:00-21:05	53.8	50.3	00:00-00:05	57.2	54.2
15:05-15:10	52.1	45.5	18:05-18:10	49.7	42.3	21:05-21:10	54.1	51.2	00:05-00:10	57.0	54.7
15:10-15:15	52.4	46.4	18:10-18:15	55.2	42.6	21:10-21:15	53.9	51.9	00:10-00:15	57.2	54.8
15:15-15:20	50.8	45.5	18:15-18:20	53.2	43.8	21:15-21:20	54.1	52.0	00:15-00:20	56.7	54.4
15:20-15:25	53.0	47.1	18:20-18:25	52.7	46.2	21:20-21:25	54.0	50.9	00:20-00:25	57.7	55.2
15:25-15:30	52.2	46.6	18:25-18:30	52.7	50.1	21:25-21:30	54.1	51.0	00:25-00:30	56.0	48.0
15:30-15:35	50.7	46.2	18:30-18:35	53.6	51.0	21:30-21:35	54.0	50.5	00:30-00:35	55.9	53.3
15:35-15:40	50.0	45.2	18:35-18:40	54.4	51.7	21:35-21:40	53.7	51.1	00:35-00:40	54.5	51.6
15:40-15:45	49.5	43.4	18:40-18:45	52.4	48.7	21:40-21:45	53.5	50.9	00:40-00:45	54.3	52.0
15:45-15:50	51.5	43.6	18:45-18:50	54.4	48.6	21:45-21:50	51.9	45.2	00:45-00:50	53.3	47.4
15:50-15:55	50.6	43.2	18:50-18:55	54.5	51.5	21:50-21:55	51.3	46.3	00:50-00:55	53.8	50.2
15:55-16:00	51.7	41.6	18:55-19:00	54.2	52.4	21:55-22:00	51.5	47.0	00:55-01:00	54.3	52.0
16:00-16:05	56.7	42.1	19:00-19:05	52.4	47.3	22:00-22:05	51.8	47.5	01:00-01:05	52.1	43.6
16:05-16:10	50.9	39.7	19:05-19:10	52.8	49.2	22:05-22:10	49.0	45.4	01:05-01:10	45.9	43.6
16:10-16:15	52.6	42.0	19:10-19:15	54.1	52.0	22:10-22:15	49.6	44.9	01:10-01:15	44.6	43.6
16:15-16:20	51.0	39.9	19:15-19:20	54.9	52.4	22:15-22:20	48.9	45.0	01:15-01:20	44.8	43.6
16:20-16:25	50.6	40.4	19:20-19:25	53.8	51.5	22:20-22:25	54.5	45.8	01:20-01:25	44.7	43.7
16:25-16:30	52.2	41.4	19:25-19:30	53.5	49.6	22:25-22:30	55.5	53.1	01:25-01:30	44.6	43.3
16:30-16:35	55.6	45.4	19:30-19:35	53.8	51.3	22:30-22:35	55.8	53.4	01:30-01:35	49.9	43.3
16:35-16:40	49.5	44.7	19:35-19:40	54.3	52.0	22:35-22:40	53.9	47.6	01:35-01:40	44.2	43.1
16:40-16:45	49.6	44.1	19:40-19:45	54.2	51.6	22:40-22:45	57.6	47.4	01:40-01:45	44.1	42.6
16:45-16:50	53.2	44.5	19:45-19:50	56.8	51.7	22:45-22:50	53.1	46.3	01:45-01:50	47.3	42.8
16:50-16:55	47.6	40.1	19:50-19:55	54.4	51.6	22:50-22:55	52.5	46.9	01:50-01:55	48.4	46.6
16:55-17:00	45.7	39.2	19:55-20:00	59.3	52.2	22:55-23:00	53.2	47.6	01:55-02:00	47.9	46.2
17:00-17:05	52.7	40.2	20:00-20:05	56.9	50.1	23:00-23:05	53.3	47.6	02:00-02:05	49.6	44.1
17:05-17:10	52.3	41.2	20:05-20:10	53.3	50.0	23:05-23:10	52.9	45.9	02:05-02:10	48.5	45.4
17:10-17:15	49.1	39.4	20:10-20:15	53.7	51.2	23:10-23:15	52.4	44.9	02:10-02:15	47.9	46.5
17:15-17:20	52.0	41.2	20:15-20:20	53.3	50.7	23:15-23:20	54.9	48.4	02:15-02:20	48.1	42.6
17:20-17:25	50.2	39.7	20:20-20:25	54.5	52.0	23:20-23:25	56.9	54.6	02:20-02:25	50.0	43.8
17:25-17:30	49.4	40.1	20:25-20:30	54.4	51.6	23:25-23:30	56.5	54.3	02:25-02:30	45.7	44.4
17:30-17:35	55.2	39.9	20:30-20:35	54.2	51.9	23:30-23:35	57.3	55.4	02:30-02:35	45.3	43.6
17:35-17:40	53.0	40.3	20:35-20:40	54.4	52.3	23:35-23:40	55.6	48.9	02:35-02:40	50.8	44.2
17:40-17:45	49.5	40.4	20:40-20:45	54.6	52.1	23:40-23:45	55.1	52.4	02:40-02:45	47.0	45.4
17:45-17:50	51.5	40.3	20:45-20:50	54.0	51.5	23:45-23:50	55.7	53.3	02:45-02:50	47.4	46.0
17:50-17:55	47.7	39.5	20:50-20:55	53.9	51.6	23:50-23:55	56.2	53.9	02:50-02:55	51.3	46.2
17:55-18:00	48.2	39.0	20:55-21:00	54.5	52.0	23:55-00:00	56.7	53.9	02:55-03:00	48.9	46.4

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 28, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
03:00-03:05	47.5	46.1	06:00-06:05	47.3	45.3	09:00-09:05	49.7	41.9	12:00-12:05	43.7	37.9
03:05-03:10	47.7	46.0	06:05-06:10	48.8	45.7	09:05-09:10	52.3	42.9	12:05-12:10	45.9	40.3
03:10-03:15	45.3	43.4	06:10-06:15	52.4	44.7	09:10-09:15	50.5	41.0	12:10-12:15	47.1	38.8
03:15-03:20	45.0	43.7	06:15-06:20	49.8	44.5	09:15-09:20	53.0	40.0	12:15-12:20	45.0	37.8
03:20-03:25	51.2	44.7	06:20-06:25	47.4	43.9	09:20-09:25	49.3	39.5	12:20-12:25	47.4	37.5
03:25-03:30	48.3	45.2	06:25-06:30	48.2	44.4	09:25-09:30	45.4	39.7	12:25-12:30	47.0	37.8
03:30-03:35	47.1	45.3	06:30-06:35	48.5	43.6	09:30-09:35	43.5	39.3	12:30-12:35	49.5	37.9
03:35-03:40	49.1	45.8	06:35-06:40	47.8	44.2	09:35-09:40	46.1	39.1	12:35-12:40	47.1	38.1
03:40-03:45	46.3	44.9	06:40-06:45	54.7	45.6	09:40-09:45	46.5	39.0	12:40-12:45	43.1	39.0
03:45-03:50	45.9	43.6	06:45-06:50	54.4	46.0	09:45-09:50	54.0	39.0	12:45-12:50	46.6	38.4
03:50-03:55	52.5	45.9	06:50-06:55	51.3	46.2	09:50-09:55	48.0	39.3	12:50-12:55	50.2	39.5
03:55-04:00	53.9	45.6	06:55-07:00	47.6	45.0	09:55-10:00	52.0	40.2	12:55-13:00	49.0	39.4
04:00-04:05	52.3	45.7	07:00-07:05	52.9	43.6	10:00-10:05	53.9	49.7	13:00-13:05	45.9	38.8
04:05-04:10	47.3	45.4	07:05-07:10	51.7	43.1	10:05-10:10	54.1	47.0	13:05-13:10	48.1	39.1
04:10-04:15	50.0	45.6	07:10-07:15	49.5	42.2	10:10-10:15	50.4	46.0	13:10-13:15	49.2	38.2
04:15-04:20	46.9	45.6	07:15-07:20	48.5	42.9	10:15-10:20	49.5	44.4	13:15-13:20	47.4	38.8
04:20-04:25	46.0	43.8	07:20-07:25	48.2	42.5	10:20-10:25	50.9	44.2	13:20-13:25	44.6	38.3
04:25-04:30	49.5	46.1	07:25-07:30	52.3	42.8	10:25-10:30	47.9	44.0	13:25-13:30	40.9	37.7
04:30-04:35	47.0	45.1	07:30-07:35	53.8	44.8	10:30-10:35	47.4	42.1	13:30-13:35	45.7	38.6
04:35-04:40	45.9	44.3	07:35-07:40	58.0	48.1	10:35-10:40	50.8	45.7	13:35-13:40	45.3	38.5
04:40-04:45	51.2	44.8	07:40-07:45	50.1	44.1	10:40-10:45	53.4	47.9	13:40-13:45	45.1	38.6
04:45-04:50	49.4	44.9	07:45-07:50	51.0	46.9	10:45-10:50	53.1	49.2	13:45-13:50	45.7	38.4
04:50-04:55	51.5	44.4	07:50-07:55	51.9	47.4	10:50-10:55	56.6	50.7	13:50-13:55	47.5	40.0
04:55-05:00	47.2	45.6	07:55-08:00	51.3	46.5	10:55-11:00	52.0	39.1	13:55-14:00	42.1	39.0
05:00-05:05	51.0	45.1	08:00-08:05	50.9	41.9	11:00-11:05	45.6	38.2	14:00-14:05	46.6	39.1
05:05-05:10	49.3	43.5	08:05-08:10	50.7	43.3	11:05-11:10	47.1	38.2	14:05-14:10	44.5	38.3
05:10-05:15	49.8	44.1	08:10-08:15	49.5	42.5	11:10-11:15	46.6	38.6	14:10-14:15	43.2	38.6
05:15-05:20	44.9	42.3	08:15-08:20	46.3	40.1	11:15-11:20	53.8	39.4	14:15-14:20	49.1	37.9
05:20-05:25	45.5	41.3	08:20-08:25	49.9	39.4	11:20-11:25	50.7	39.7	14:20-14:25	47.0	37.8
05:25-05:30	47.2	43.2	08:25-08:30	48.3	39.8	11:25-11:30	48.5	40.5	14:25-14:30	45.2	36.9
05:30-05:35	47.6	43.6	08:30-08:35	49.2	41.2	11:30-11:35	47.3	39.7	14:30-14:35	50.9	36.9
05:35-05:40	48.8	42.2	08:35-08:40	49.9	43.1	11:35-11:40	46.1	38.8	14:35-14:40	50.3	36.8
05:40-05:45	47.5	43.1	08:40-08:45	50.5	45.6	11:40-11:45	45.9	39.3	14:40-14:45	44.3	37.0
05:45-05:50	47.1	43.5	08:45-08:50	50.6	39.9	11:45-11:50	44.7	39.4	14:45-14:50	44.4	36.5
05:50-05:55	48.6	42.6	08:50-08:55	44.4	39.5	11:50-11:55	42.1	38.4	14:50-14:55	47.0	38.6
05:55-06:00	50.9	44.6	08:55-09:00	49.0	41.0	11:55-12:00	44.6	38.6	14:55-15:00	48.4	39.4

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Environment Research & Technology Company Limited
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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบดิดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 28-29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
15:00-15:05	48.1	37.3	18:00-18:05	50.0	40.7	21:00-21:05	54.5	52.5	00:00-00:05	54.9	48.5
15:05-15:10	41.5	36.6	18:05-18:10	46.5	39.6	21:05-21:10	53.8	52.2	00:05-00:10	54.8	48.4
15:10-15:15	44.8	36.3	18:10-18:15	48.3	40.6	21:10-21:15	54.3	52.7	00:10-00:15	53.6	43.5
15:15-15:20	47.0	41.7	18:15-18:20	53.6	41.2	21:15-21:20	52.8	50.5	00:15-00:20	51.8	41.7
15:20-15:25	50.6	38.8	18:20-18:25	54.0	42.1	21:20-21:25	50.3	47.8	00:20-00:25	53.6	40.8
15:25-15:30	47.3	38.1	18:25-18:30	53.7	45.1	21:25-21:30	50.7	47.9	00:25-00:30	54.0	46.1
15:30-15:35	46.4	38.8	18:30-18:35	53.0	48.1	21:30-21:35	50.1	46.8	00:30-00:35	54.5	49.0
15:35-15:40	46.0	38.7	18:35-18:40	55.5	48.8	21:35-21:40	54.6	47.1	00:35-00:40	55.1	49.6
15:40-15:45	48.3	37.8	18:40-18:45	53.1	49.9	21:40-21:45	53.1	50.6	00:40-00:45	55.6	49.6
15:45-15:50	46.4	38.0	18:45-18:50	53.0	51.0	21:45-21:50	51.1	49.0	00:45-00:50	56.1	51.9
15:50-15:55	48.2	37.6	18:50-18:55	53.4	51.6	21:50-21:55	51.4	49.4	00:50-00:55	56.1	51.9
15:55-16:00	49.8	38.0	18:55-19:00	52.9	50.4	21:55-22:00	52.4	50.5	00:55-01:00	54.5	45.3
16:00-16:05	48.5	38.0	19:00-19:05	52.9	50.2	22:00-22:05	51.0	48.6	01:00-01:05	51.4	43.7
16:05-16:10	48.2	37.5	19:05-19:10	53.0	50.1	22:05-22:10	50.6	49.3	01:05-01:10	54.2	45.2
16:10-16:15	51.2	39.3	19:10-19:15	54.0	52.0	22:10-22:15	50.1	47.7	01:10-01:15	54.5	46.2
16:15-16:20	48.6	36.1	19:15-19:20	53.4	51.5	22:15-22:20	50.3	48.7	01:15-01:20	54.7	47.5
16:20-16:25	45.8	36.8	19:20-19:25	53.0	50.8	22:20-22:25	50.1	48.3	01:20-01:25	56.1	52.1
16:25-16:30	50.3	36.2	19:25-19:30	53.6	51.7	22:25-22:30	50.0	48.1	01:25-01:30	55.1	48.2
16:30-16:35	52.1	36.2	19:30-19:35	53.1	51.1	22:30-22:35	48.3	45.5	01:30-01:35	55.6	51.4
16:35-16:40	50.4	38.0	19:35-19:40	53.2	51.4	22:35-22:40	48.2	45.4	01:35-01:40	54.5	48.1
16:40-16:45	48.5	38.7	19:40-19:45	54.0	50.5	22:40-22:45	48.8	46.8	01:40-01:45	51.8	46.1
16:45-16:50	48.4	38.5	19:45-19:50	54.3	52.4	22:45-22:50	48.6	46.8	01:45-01:50	50.5	46.9
16:50-16:55	46.6	39.1	19:50-19:55	54.5	52.9	22:50-22:55	47.7	42.9	01:50-01:55	47.4	45.7
16:55-17:00	51.2	39.7	19:55-20:00	54.0	52.5	22:55-23:00	49.5	47.4	01:55-02:00	49.4	46.2
17:00-17:05	60.7	38.1	20:00-20:05	54.1	52.6	23:00-23:05	48.8	46.9	02:00-02:05	48.7	46.1
17:05-17:10	69.4	64.6	20:05-20:10	54.2	52.4	23:05-23:10	49.2	47.0	02:05-02:10	46.7	45.5
17:10-17:15	69.4	65.3	20:10-20:15	54.6	53.1	23:10-23:15	50.2	45.9	02:10-02:15	46.7	45.6
17:15-17:20	68.6	56.4	20:15-20:20	54.9	53.6	23:15-23:20	50.0	47.6	02:15-02:20	47.7	45.4
17:20-17:25	67.3	59.8	20:20-20:25	54.6	52.9	23:20-23:25	50.2	47.8	02:20-02:25	48.5	46.0
17:25-17:30	67.6	62.4	20:25-20:30	54.2	52.7	23:25-23:30	50.0	47.9	02:25-02:30	50.0	46.1
17:30-17:35	68.2	63.4	20:30-20:35	54.7	53.1	23:30-23:35	50.2	47.9	02:30-02:35	50.5	45.0
17:35-17:40	57.3	40.8	20:35-20:40	54.6	52.9	23:35-23:40	49.5	47.6	02:35-02:40	51.2	45.8
17:40-17:45	51.4	41.1	20:40-20:45	54.9	52.6	23:40-23:45	49.6	47.5	02:40-02:45	48.4	44.3
17:45-17:50	47.8	40.5	20:45-20:50	54.5	52.9	23:45-23:50	52.4	48.2	02:45-02:50	50.1	44.9
17:50-17:55	46.9	40.0	20:50-20:55	54.4	53.0	23:50-23:55	50.9	47.3	02:50-02:55	48.7	44.9
17:55-18:00	47.8	40.6	20:55-21:00	55.3	53.7	23:55-00:00	53.6	48.7	02:55-03:00	49.2	45.0

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
03:00-03:05	46.5	44.5	06:00-06:05	66.4	58.3	09:00-09:05	46.8	40.5	12:00-12:05	50.3	39.3
03:05-03:10	47.6	43.8	06:05-06:10	64.5	53.2	09:05-09:10	45.4	40.7	12:05-12:10	47.9	38.8
03:10-03:15	53.5	44.2	06:10-06:15	66.8	62.9	09:10-09:15	48.5	41.1	12:10-12:15	44.8	39.6
03:15-03:20	55.5	44.8	06:15-06:20	66.6	62.1	09:15-09:20	49.0	40.9	12:15-12:20	49.8	38.4
03:20-03:25	50.9	43.3	06:20-06:25	67.0	62.0	09:20-09:25	52.4	41.8	12:20-12:25	52.2	38.6
03:25-03:30	47.8	43.5	06:25-06:30	66.2	60.6	09:25-09:30	47.9	39.9	12:25-12:30	46.2	38.8
03:30-03:35	49.8	43.5	06:30-06:35	66.8	60.6	09:30-09:35	51.2	40.8	12:30-12:35	48.5	39.0
03:35-03:40	49.9	43.3	06:35-06:40	68.4	44.4	09:35-09:40	47.5	43.0	12:35-12:40	49.5	39.8
03:40-03:45	45.2	42.8	06:40-06:45	66.9	44.2	09:40-09:45	49.1	42.2	12:40-12:45	47.0	38.8
03:45-03:50	49.1	43.4	06:45-06:50	65.2	44.1	09:45-09:50	48.6	39.3	12:45-12:50	41.4	38.3
03:50-03:55	49.1	43.2	06:50-06:55	69.3	56.4	09:50-09:55	51.7	40.0	12:50-12:55	40.9	37.5
03:55-04:00	45.0	41.5	06:55-07:00	65.8	43.3	09:55-10:00	56.5	49.9	12:55-13:00	43.7	37.2
04:00-04:05	49.5	42.5	07:00-07:05	64.7	43.2	10:00-10:05	54.2	49.3	13:00-13:05	48.1	38.0
04:05-04:10	52.2	42.3	07:05-07:10	65.1	44.2	10:05-10:10	55.6	50.2	13:05-13:10	47.6	38.5
04:10-04:15	44.6	41.9	07:10-07:15	63.4	43.7	10:10-10:15	57.5	44.6	13:10-13:15	48.6	38.6
04:15-04:20	43.8	41.7	07:15-07:20	66.7	50.2	10:15-10:20	54.8	49.8	13:15-13:20	46.1	40.3
04:20-04:25	43.1	40.4	07:20-07:25	64.3	45.2	10:20-10:25	56.0	49.8	13:20-13:25	43.8	38.6
04:25-04:30	41.7	39.7	07:25-07:30	52.2	45.4	10:25-10:30	53.3	47.8	13:25-13:30	44.3	38.7
04:30-04:35	42.5	41.1	07:30-07:35	58.9	45.1	10:30-10:35	51.8	45.8	13:30-13:35	47.7	40.0
04:35-04:40	43.1	40.5	07:35-07:40	62.4	47.0	10:35-10:40	52.1	47.3	13:35-13:40	44.0	39.0
04:40-04:45	42.1	40.9	07:40-07:45	68.9	52.0	10:40-10:45	52.1	42.2	13:40-13:45	43.4	38.3
04:45-04:50	46.9	41.1	07:45-07:50	66.6	48.1	10:45-10:50	48.9	40.1	13:45-13:50	49.5	40.0
04:50-04:55	43.1	40.7	07:50-07:55	60.8	48.4	10:50-10:55	50.8	40.3	13:50-13:55	46.5	38.8
04:55-05:00	45.9	39.3	07:55-08:00	52.6	48.5	10:55-11:00	53.5	39.4	13:55-14:00	46.9	39.0
05:00-05:05	41.6	40.3	08:00-08:05	59.2	47.8	11:00-11:05	50.0	40.3	14:00-14:05	47.6	41.1
05:05-05:10	48.0	40.7	08:05-08:10	68.3	51.8	11:05-11:10	47.1	40.4	14:05-14:10	45.8	40.9
05:10-05:15	48.5	41.4	08:10-08:15	64.7	51.4	11:10-11:15	49.8	41.9	14:10-14:15	52.5	40.5
05:15-05:20	47.5	42.0	08:15-08:20	64.7	51.5	11:15-11:20	45.6	39.7	14:15-14:20	49.7	40.7
05:20-05:25	48.0	40.2	08:20-08:25	65.7	51.1	11:20-11:25	45.2	39.7	14:20-14:25	45.8	41.0
05:25-05:30	50.4	40.5	08:25-08:30	62.1	50.2	11:25-11:30	45.5	38.9	14:25-14:30	49.4	40.7
05:30-05:35	50.7	41.1	08:30-08:35	65.4	49.0	11:30-11:35	49.4	39.4	14:30-14:35	48.3	40.7
05:35-05:40	52.7	41.4	08:35-08:40	61.1	45.4	11:35-11:40	51.1	41.1	14:35-14:40	47.2	40.6
05:40-05:45	49.1	41.9	08:40-08:45	49.2	43.0	11:40-11:45	48.4	40.8	14:40-14:45	45.9	39.8
05:45-05:50	47.5	42.6	08:45-08:50	51.4	43.1	11:45-11:50	51.8	40.7	14:45-14:50	55.2	40.5
05:50-05:55	48.7	43.7	08:50-08:55	50.5	44.6	11:50-11:55	48.6	42.0	14:50-14:55	50.1	36.9
05:55-06:00	55.6	43.5	08:55-09:00	49.7	42.5	11:55-12:00	46.1	39.3	14:55-15:00	44.4	32.8

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 29-30, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
15:00-15:05	45.0	36.1	18:00-18:05	48.0	40.2	21:00-21:05	57.8	54.8	00:00-00:05	56.0	52.5
15:05-15:10	48.4	36.4	18:05-18:10	49.8	38.8	21:05-21:10	57.0	54.6	00:05-00:10	56.1	51.8
15:10-15:15	45.3	33.5	18:10-18:15	46.7	39.3	21:10-21:15	58.5	56.5	00:10-00:15	53.3	48.5
15:15-15:20	47.8	34.9	18:15-18:20	45.6	39.4	21:15-21:20	59.0	57.2	00:15-00:20	51.0	43.2
15:20-15:25	44.2	32.5	18:20-18:25	48.1	40.8	21:20-21:25	57.8	55.8	00:20-00:25	54.2	50.1
15:25-15:30	45.0	37.9	18:25-18:30	54.1	51.4	21:25-21:30	57.2	55.3	00:25-00:30	53.4	50.8
15:30-15:35	49.3	32.5	18:30-18:35	54.9	53.3	21:30-21:35	58.9	57.0	00:30-00:35	53.6	51.0
15:35-15:40	47.5	33.0	18:35-18:40	55.6	54.1	21:35-21:40	57.4	54.7	00:35-00:40	53.6	51.1
15:40-15:45	47.5	34.4	18:40-18:45	55.9	53.8	21:40-21:45	58.5	56.2	00:40-00:45	53.6	51.2
15:45-15:50	52.9	41.2	18:45-18:50	54.9	53.1	21:45-21:50	58.0	55.8	00:45-00:50	52.6	49.9
15:50-15:55	51.3	46.7	18:50-18:55	54.8	53.6	21:50-21:55	57.9	55.7	00:50-00:55	48.6	42.6
15:55-16:00	52.4	47.0	18:55-19:00	56.5	55.1	21:55-22:00	57.1	53.3	00:55-01:00	47.1	41.8
16:00-16:05	52.3	47.3	19:00-19:05	57.1	55.0	22:00-22:05	56.9	54.4	01:00-01:05	42.4	40.3
16:05-16:10	57.0	50.4	19:05-19:10	55.8	54.2	22:05-22:10	57.9	56.1	01:05-01:10	42.3	39.6
16:10-16:15	55.7	49.5	19:10-19:15	56.8	55.3	22:10-22:15	57.3	54.2	01:10-01:15	42.3	39.8
16:15-16:20	56.0	50.9	19:15-19:20	56.9	55.4	22:15-22:20	57.9	55.6	01:15-01:20	41.4	39.1
16:20-16:25	55.1	51.5	19:20-19:25	56.5	54.7	22:20-22:25	57.9	56.0	01:20-01:25	41.6	39.7
16:25-16:30	56.4	53.0	19:25-19:30	57.3	56.0	22:25-22:30	56.3	53.6	01:25-01:30	41.3	39.0
16:30-16:35	61.8	55.3	19:30-19:35	58.1	56.6	22:30-22:35	54.2	49.5	01:30-01:35	41.8	36.2
16:35-16:40	68.7	61.6	19:35-19:40	58.4	56.9	22:35-22:40	52.3	46.7	01:35-01:40	42.7	40.1
16:40-16:45	67.9	60.6	19:40-19:45	58.5	57.1	22:40-22:45	53.5	47.9	01:40-01:45	47.6	34.6
16:45-16:50	69.2	65.4	19:45-19:50	58.6	56.9	22:45-22:50	55.0	49.5	01:45-01:50	48.8	45.5
16:50-16:55	69.7	64.8	19:50-19:55	58.8	57.3	22:50-22:55	52.0	41.4	01:50-01:55	54.4	50.5
16:55-17:00	69.5	64.6	19:55-20:00	57.6	55.6	22:55-23:00	53.6	48.0	01:55-02:00	54.2	51.0
17:00-17:05	68.5	62.7	20:00-20:05	54.8	52.0	23:00-23:05	55.2	47.6	02:00-02:05	54.7	51.7
17:05-17:10	45.9	35.9	20:05-20:10	54.8	52.7	23:05-23:10	49.6	42.0	02:05-02:10	55.3	52.5
17:10-17:15	48.3	34.8	20:10-20:15	54.5	53.0	23:10-23:15	48.7	39.9	02:10-02:15	54.7	51.7
17:15-17:20	47.9	34.4	20:15-20:20	55.3	53.6	23:15-23:20	47.4	40.1	02:15-02:20	50.6	48.3
17:20-17:25	44.4	33.2	20:20-20:25	54.7	53.0	23:20-23:25	50.1	38.7	02:20-02:25	48.3	42.0
17:25-17:30	49.9	35.1	20:25-20:30	54.2	52.0	23:25-23:30	52.5	47.6	02:25-02:30	49.9	42.2
17:30-17:35	55.7	36.4	20:30-20:35	58.3	55.1	23:30-23:35	48.8	42.0	02:30-02:35	43.1	41.1
17:35-17:40	46.8	33.9	20:35-20:40	58.6	55.4	23:35-23:40	49.6	46.5	02:35-02:40	47.2	41.1
17:40-17:45	52.3	36.7	20:40-20:45	58.5	56.1	23:40-23:45	51.6	49.0	02:40-02:45	49.2	43.2
17:45-17:50	46.5	38.9	20:45-20:50	60.0	57.4	23:45-23:50	52.6	48.2	02:45-02:50	51.3	48.8
17:50-17:55	48.2	36.3	20:50-20:55	59.8	56.8	23:50-23:55	52.6	48.0	02:50-02:55	51.1	48.1
17:55-18:00	45.0	35.9	20:55-21:00	60.1	57.5	23:55-00:00	53.5	47.7	02:55-03:00	53.0	46.2

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 30, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
03:00-03:05	53.6	50.4	06:00-06:05	47.0	45.3	09:00-09:05	53.9	40.2	12:00-12:05	60.1	43.1
03:05-03:10	53.2	49.5	06:05-06:10	51.3	43.8	09:05-09:10	54.6	39.0	12:05-12:10	61.0	42.7
03:10-03:15	54.2	49.7	06:10-06:15	51.1	44.0	09:10-09:15	50.3	42.8	12:10-12:15	63.7	36.7
03:15-03:20	49.5	45.1	06:15-06:20	47.1	44.2	09:15-09:20	54.7	40.1	12:15-12:20	58.1	34.2
03:20-03:25	51.1	41.0	06:20-06:25	61.1	45.1	09:20-09:25	52.4	41.8	12:20-12:25	59.2	35.8
03:25-03:30	52.8	47.8	06:25-06:30	68.0	55.6	09:25-09:30	51.5	42.1	12:25-12:30	60.8	50.7
03:30-03:35	49.7	47.3	06:30-06:35	65.9	51.1	09:30-09:35	54.4	40.6	12:30-12:35	63.8	56.8
03:35-03:40	49.5	46.4	06:35-06:40	58.3	50.0	09:35-09:40	53.8	40.1	12:35-12:40	60.5	50.9
03:40-03:45	49.8	46.2	06:40-06:45	59.4	55.0	09:40-09:45	52.3	42.2	12:40-12:45	60.3	50.5
03:45-03:50	47.8	45.4	06:45-06:50	60.2	54.2	09:45-09:50	47.2	39.3	12:45-12:50	60.4	52.2
03:50-03:55	48.1	45.1	06:50-06:55	58.2	44.3	09:50-09:55	49.7	40.5	12:50-12:55	61.2	57.7
03:55-04:00	48.3	45.1	06:55-07:00	49.8	43.8	09:55-10:00	48.3	41.2	12:55-13:00	64.5	60.4
04:00-04:05	53.6	47.8	07:00-07:05	55.9	49.0	10:00-10:05	50.2	40.8	13:00-13:05	66.3	62.2
04:05-04:10	53.6	50.1	07:05-07:10	55.2	48.0	10:05-10:10	47.4	39.0	13:05-13:10	66.4	62.5
04:10-04:15	49.1	46.4	07:10-07:15	58.2	46.2	10:10-10:15	49.6	39.3	13:10-13:15	65.1	61.3
04:15-04:20	50.7	46.9	07:15-07:20	60.9	50.8	10:15-10:20	46.5	39.1	13:15-13:20	63.7	58.1
04:20-04:25	49.9	42.3	07:20-07:25	63.7	56.5	10:20-10:25	49.8	39.4	13:20-13:25	64.1	60.9
04:25-04:30	53.8	46.3	07:25-07:30	64.6	57.1	10:25-10:30	47.7	39.5	13:25-13:30	66.7	62.2
04:30-04:35	48.3	45.8	07:30-07:35	58.7	49.9	10:30-10:35	48.8	40.1	13:30-13:35	57.9	51.3
04:35-04:40	48.4	45.3	07:35-07:40	55.7	48.0	10:35-10:40	49.7	40.2	13:35-13:40	57.4	44.1
04:40-04:45	48.2	45.7	07:40-07:45	56.5	48.3	10:40-10:45	51.3	40.8	13:40-13:45	55.7	44.3
04:45-04:50	49.6	45.8	07:45-07:50	63.0	51.1	10:45-10:50	51.0	42.3	13:45-13:50	59.7	50.4
04:50-04:55	48.6	45.6	07:50-07:55	58.8	51.1	10:50-10:55	52.6	40.8	13:50-13:55	61.8	51.5
04:55-05:00	51.3	45.0	07:55-08:00	54.6	50.9	10:55-11:00	52.1	41.4	13:55-14:00	64.4	58.7
05:00-05:05	49.0	45.5	08:00-08:05	55.3	50.9	11:00-11:05	48.9	39.3	14:00-14:05	64.4	59.6
05:05-05:10	48.7	46.0	08:05-08:10	52.5	49.5	11:05-11:10	50.3	38.1	14:05-14:10	61.9	56.7
05:10-05:15	49.5	41.7	08:10-08:15	56.2	48.8	11:10-11:15	50.4	37.2	14:10-14:15	60.5	53.5
05:15-05:20	49.9	45.6	08:15-08:20	53.6	48.0	11:15-11:20	47.9	37.6	14:15-14:20	61.2	55.6
05:20-05:25	48.6	44.0	08:20-08:25	52.1	47.7	11:20-11:25	55.8	39.1	14:20-14:25	57.6	52.1
05:25-05:30	69.3	63.4	08:25-08:30	52.4	46.7	11:25-11:30	48.5	36.2	14:25-14:30	61.2	44.2
05:30-05:35	70.4	64.6	08:30-08:35	51.4	46.0	11:30-11:35	47.3	34.6	14:30-14:35	53.5	38.7
05:35-05:40	70.1	66.1	08:35-08:40	51.9	43.3	11:35-11:40	48.2	35.8	14:35-14:40	57.6	42.1
05:40-05:45	68.8	64.3	08:40-08:45	51.5	41.7	11:40-11:45	45.3	36.3	14:40-14:45	58.1	53.3
05:45-05:50	67.1	55.3	08:45-08:50	49.1	41.0	11:45-11:50	46.8	40.1	14:45-14:50	57.7	52.5
05:50-05:55	53.6	45.9	08:50-08:55	52.1	40.2	11:50-11:55	46.1	38.7	14:50-14:55	58.8	49.4
05:55-06:00	48.1	45.8	08:55-09:00	56.0	42.5	11:55-12:00	51.9	37.7	14:55-15:00	58.6	36.4

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 30-31, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
15:00-15:05	57.6	51.3	18:00-18:05	49.8	40.3	21:00-21:05	47.8	44.5	00:00-00:05	50.6	38.7
15:05-15:10	58.8	54.7	18:05-18:10	55.8	42.8	21:05-21:10	48.8	45.4	00:05-00:10	45.1	37.2
15:10-15:15	57.7	53.9	18:10-18:15	51.9	41.5	21:10-21:15	49.5	46.5	00:10-00:15	46.4	37.9
15:15-15:20	54.4	49.8	18:15-18:20	47.9	39.6	21:15-21:20	50.4	47.9	00:15-00:20	39.0	37.8
15:20-15:25	57.8	52.5	18:20-18:25	45.3	40.9	21:20-21:25	51.6	48.8	00:20-00:25	39.0	37.7
15:25-15:30	60.1	54.2	18:25-18:30	49.1	46.9	21:25-21:30	51.0	48.9	00:25-00:30	42.0	37.9
15:30-15:35	63.9	60.4	18:30-18:35	51.0	43.8	21:30-21:35	52.4	49.0	00:30-00:35	38.9	37.7
15:35-15:40	63.8	58.3	18:35-18:40	51.3	44.7	21:35-21:40	51.0	48.7	00:35-00:40	38.5	37.4
15:40-15:45	57.9	53.1	18:40-18:45	53.9	48.6	21:40-21:45	50.6	48.5	00:40-00:45	39.0	37.8
15:45-15:50	65.1	58.5	18:45-18:50	50.0	48.5	21:45-21:50	50.2	48.2	00:45-00:50	43.2	37.9
15:50-15:55	64.2	63.0	18:50-18:55	47.8	45.8	21:50-21:55	49.7	47.6	00:50-00:55	38.7	37.7
15:55-16:00	61.5	53.2	18:55-19:00	51.2	49.5	21:55-22:00	49.0	46.7	00:55-01:00	42.8	37.9
16:00-16:05	70.6	56.2	19:00-19:05	54.3	51.6	22:00-22:05	50.5	48.5	01:00-01:05	39.3	37.8
16:05-16:10	76.8	69.6	19:05-19:10	55.4	52.4	22:05-22:10	50.0	42.5	01:05-01:10	39.0	38.0
16:10-16:15	67.6	65.0	19:10-19:15	53.0	51.1	22:10-22:15	50.6	48.2	01:10-01:15	40.0	37.6
16:15-16:20	67.8	63.2	19:15-19:20	52.1	49.5	22:15-22:20	50.9	48.7	01:15-01:20	41.3	37.6
16:20-16:25	68.8	64.1	19:20-19:25	50.5	49.2	22:20-22:25	50.7	48.1	01:20-01:25	39.0	38.0
16:25-16:30	62.4	40.7	19:25-19:30	51.7	49.6	22:25-22:30	47.7	43.4	01:25-01:30	41.1	37.8
16:30-16:35	61.3	40.2	19:30-19:35	50.6	49.3	22:30-22:35	54.2	42.9	01:30-01:35	38.9	37.9
16:35-16:40	57.3	47.8	19:35-19:40	50.5	49.2	22:35-22:40	49.9	46.2	01:35-01:40	39.5	38.3
16:40-16:45	59.6	46.4	19:40-19:45	49.7	48.1	22:40-22:45	49.8	46.7	01:40-01:45	47.9	38.3
16:45-16:50	55.0	39.9	19:45-19:50	50.2	47.6	22:45-22:50	50.7	48.7	01:45-01:50	41.9	37.9
16:50-16:55	53.2	36.8	19:50-19:55	50.4	48.5	22:50-22:55	51.7	49.2	01:50-01:55	47.6	44.7
16:55-17:00	57.2	36.6	19:55-20:00	50.6	46.0	22:55-23:00	50.7	48.1	01:55-02:00	47.0	42.1
17:00-17:05	61.1	38.3	20:00-20:05	51.2	47.1	23:00-23:05	51.2	45.1	02:00-02:05	48.4	44.9
17:05-17:10	59.4	38.1	20:05-20:10	49.4	46.7	23:05-23:10	48.1	44.2	02:05-02:10	50.0	45.0
17:10-17:15	58.7	37.5	20:10-20:15	50.0	48.1	23:10-23:15	50.9	48.2	02:10-02:15	47.5	44.9
17:15-17:20	51.0	39.4	20:15-20:20	50.4	48.3	23:15-23:20	50.0	47.8	02:15-02:20	48.2	44.6
17:20-17:25	53.4	37.5	20:20-20:25	50.2	47.9	23:20-23:25	49.1	47.1	02:20-02:25	49.6	44.7
17:25-17:30	54.5	36.7	20:25-20:30	50.3	48.5	23:25-23:30	49.3	47.3	02:25-02:30	46.5	38.1
17:30-17:35	45.5	35.0	20:30-20:35	57.0	49.2	23:30-23:35	48.1	38.2	02:30-02:35	44.3	37.9
17:35-17:40	46.9	35.8	20:35-20:40	50.5	48.5	23:35-23:40	44.6	40.0	02:35-02:40	46.3	38.2
17:40-17:45	47.1	36.1	20:40-20:45	51.7	49.1	23:40-23:45	46.0	40.9	02:40-02:45	44.1	38.0
17:45-17:50	52.2	35.7	20:45-20:50	51.9	48.3	23:45-23:50	49.5	46.9	02:45-02:50	44.1	38.7
17:50-17:55	48.9	35.8	20:50-20:55	51.0	47.9	23:50-23:55	50.1	47.5	02:50-02:55	50.4	38.7
17:55-18:00	52.9	37.7	20:55-21:00	48.6	45.5	23:55-00:00	49.7	47.1	02:55-03:00	49.5	43.3

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Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 31, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV286
Report Date : November 8, 2023

Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)		Interval Time	Noise Level For 5 minutes, dB(A)	
	Leq	L90		Leq	L90		Leq	L90		Leq	L90
03:00-03:05	42.2	38.9	06:00-06:05	51.4	44.3	09:00-09:05	50.1	39.3	12:00-12:05	48.3	39.0
03:05-03:10	40.0	38.9	06:05-06:10	49.0	44.6	09:05-09:10	45.1	40.0	12:05-12:10	53.5	38.3
03:10-03:15	45.5	39.1	06:10-06:15	48.8	46.3	09:10-09:15	48.9	39.0	12:10-12:15	49.5	38.9
03:15-03:20	45.2	38.9	06:15-06:20	49.5	43.4	09:15-09:20	48.2	42.6	12:15-12:20	48.8	37.8
03:20-03:25	47.3	38.6	06:20-06:25	51.9	48.5	09:20-09:25	51.0	44.7	12:20-12:25	49.2	36.3
03:25-03:30	49.8	38.8	06:25-06:30	52.8	48.1	09:25-09:30	48.2	44.2	12:25-12:30	47.6	35.7
03:30-03:35	48.9	38.5	06:30-06:35	53.4	49.1	09:30-09:35	48.2	43.4	12:30-12:35	46.7	36.7
03:35-03:40	45.9	38.5	06:35-06:40	54.5	48.6	09:35-09:40	48.3	41.2	12:35-12:40	47.9	34.6
03:40-03:45	49.2	39.1	06:40-06:45	50.5	42.5	09:40-09:45	55.6	38.8	12:40-12:45	49.8	37.0
03:45-03:50	48.5	38.8	06:45-06:50	49.9	40.0	09:45-09:50	52.7	39.3	12:45-12:50	46.7	36.8
03:50-03:55	51.2	39.1	06:50-06:55	46.9	37.8	09:50-09:55	51.2	42.5	12:50-12:55	60.5	51.2
03:55-04:00	47.0	38.2	06:55-07:00	49.6	38.9	09:55-10:00	46.6	40.7	12:55-13:00	61.5	56.4
04:00-04:05	48.3	38.8	07:00-07:05	48.6	39.8	10:00-10:05	47.5	40.6	13:00-13:05	60.2	54.8
04:05-04:10	48.7	38.8	07:05-07:10	54.1	40.9	10:05-10:10	50.7	42.5	13:05-13:10	61.8	55.7
04:10-04:15	48.3	39.0	07:10-07:15	50.0	39.0	10:10-10:15	50.7	41.7	13:10-13:15	63.9	58.2
04:15-04:20	50.4	40.1	07:15-07:20	58.7	40.1	10:15-10:20	49.7	41.7	13:15-13:20	62.4	56.6
04:20-04:25	50.0	40.3	07:20-07:25	65.1	57.9	10:20-10:25	46.5	41.2	13:20-13:25	62.8	58.6
04:25-04:30	48.8	40.9	07:25-07:30	67.3	58.6	10:25-10:30	49.1	39.7	13:25-13:30	61.9	56.3
04:30-04:35	50.6	43.1	07:30-07:35	66.0	59.9	10:30-10:35	49.2	37.5	13:30-13:35	56.6	37.4
04:35-04:40	49.8	40.8	07:35-07:40	69.7	60.0	10:35-10:40	47.9	41.3	13:35-13:40	50.9	34.1
04:40-04:45	48.7	41.1	07:40-07:45	69.2	59.9	10:40-10:45	49.3	40.6	13:40-13:45	49.1	38.5
04:45-04:50	49.8	41.6	07:45-07:50	67.9	61.2	10:45-10:50	52.3	40.6	13:45-13:50	49.0	42.3
04:50-04:55	49.2	44.2	07:50-07:55	65.1	59.3	10:50-10:55	50.0	42.0	13:50-13:55	48.1	39.9
04:55-05:00	47.9	44.1	07:55-08:00	66.5	63.6	10:55-11:00	51.3	39.1	13:55-14:00	51.5	34.6
05:00-05:05	48.3	43.8	08:00-08:05	62.8	59.6	11:00-11:05	48.7	37.5	14:00-14:05	51.3	43.7
05:05-05:10	47.8	43.4	08:05-08:10	60.0	56.1	11:05-11:10	49.1	39.2	14:05-14:10	53.6	45.6
05:10-05:15	48.9	43.8	08:10-08:15	58.8	55.4	11:10-11:15	46.9	43.1	14:10-14:15	51.5	43.7
05:15-05:20	49.4	43.1	08:15-08:20	49.7	39.7	11:15-11:20	51.0	42.0	14:15-14:20	51.1	42.4
05:20-05:25	47.3	43.9	08:20-08:25	52.5	43.0	11:20-11:25	48.9	39.8	14:20-14:25	51.0	42.5
05:25-05:30	48.5	45.0	08:25-08:30	48.5	37.9	11:25-11:30	59.7	42.3	14:25-14:30	52.6	46.0
05:30-05:35	47.4	44.4	08:30-08:35	51.5	40.1	11:30-11:35	65.5	60.6	14:30-14:35	58.1	46.4
05:35-05:40	48.5	45.4	08:35-08:40	48.4	41.2	11:35-11:40	62.8	56.5	14:35-14:40	55.6	45.6
05:40-05:45	49.2	46.0	08:40-08:45	50.6	43.7	11:40-11:45	64.2	55.6	14:40-14:45	52.7	43.8
05:45-05:50	48.6	45.9	08:45-08:50	53.8	45.2	11:45-11:50	61.1	53.8	14:45-14:50	53.0	42.0
05:50-05:55	49.4	42.3	08:50-08:55	50.7	45.7	11:50-11:55	53.7	41.0	14:50-14:55	50.1	36.7
05:55-06:00	51.6	39.5	08:55-09:00	47.7	40.3	11:55-12:00	48.3	39.1	14:55-15:00	50.0	35.9

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Laboratory Supervisor

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 24-25, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV288
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	48.9	74.2	55.0	51.4	41.9	38.3
16:00-17:00	54.0	88.0	61.5	57.0	48.8	42.1
17:00-18:00	54.2	75.2	59.2	56.8	49.8	45.8
18:00-19:00	52.2	79.3	61.3	58.6	48.7	46.1
19:00-20:00	50.3	74.2	52.2	50.9	49.2	47.8
20:00-21:00	51.9	79.3	60.6	55.0	48.9	47.6
21:00-22:00	48.7	72.2	49.7	49.3	48.4	47.5
22:00-23:00	48.7	80.0	56.3	54.7	47.7	46.4
23:00-00:00	47.6	73.9	50.0	48.4	46.4	45.1
00:00-01:00	49.6	78.7	57.5	55.5	47.9	44.7
01:00-02:00	46.8	64.5	49.2	47.8	46.1	44.9
02:00-03:00	46.7	64.7	48.1	47.0	46.2	45.5
03:00-04:00	49.5	72.3	54.2	52.0	47.5	46.0
04:00-05:00	47.3	67.7	51.0	47.4	46.4	45.4
05:00-06:00	48.6	63.4	52.4	50.5	47.2	45.9
06:00-07:00	50.5	73.9	55.2	51.6	46.4	44.6
07:00-08:00	51.7	74.4	57.2	53.8	47.5	45.1
08:00-09:00	48.4	67.4	54.0	50.1	44.3	42.6
09:00-10:00	49.9	72.2	55.0	51.2	45.7	43.8
10:00-11:00	49.1	78.8	56.7	52.0	45.0	42.6
11:00-12:00	49.7	75.8	57.3	52.7	44.6	42.5
12:00-13:00	51.4	76.6	57.7	53.0	44.7	42.4
13:00-14:00	50.3	68.6	55.8	52.0	44.6	42.4
14:00-15:00	49.3	75.3	55.7	51.5	44.4	42.4
24 Hours Measurement	**50.3**	**88.0**	**56.6**	**53.2**	**47.0**	**45.0**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**55.4**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 25-26, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV288
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	51.6	73.8	57.5	53.5	46.0	43.7
16:00-17:00	53.7	75.9	59.8	56.9	48.4	45.5
17:00-18:00	55.9	83.9	61.3	58.4	50.8	47.3
18:00-19:00	53.2	84.1	61.2	54.9	48.9	46.3
19:00-20:00	48.6	77.9	51.7	49.6	47.6	45.7
20:00-21:00	49.9	68.4	52.0	50.7	48.9	47.4
21:00-22:00	47.3	65.9	49.7	48.6	46.5	45.4
22:00-23:00	47.5	65.2	49.5	48.6	46.7	45.7
23:00-00:00	46.9	66.3	48.3	48.0	46.6	45.4
00:00-01:00	48.2	68.6	52.8	50.0	47.4	46.0
01:00-02:00	46.6	67.4	48.2	47.3	46.3	45.3
02:00-03:00	45.4	64.4	46.7	46.3	45.2	44.2
03:00-04:00	45.8	71.3	47.9	46.7	45.6	44.3
04:00-05:00	46.9	66.6	52.0	48.6	45.6	44.1
05:00-06:00	47.9	67.2	51.6	48.8	45.9	44.4
06:00-07:00	49.3	69.9	53.5	50.5	46.6	44.9
07:00-08:00	52.4	73.1	59.9	55.9	47.3	45.2
08:00-09:00	50.0	73.9	54.3	51.8	47.3	45.7
09:00-10:00	51.8	71.1	57.0	54.1	48.8	46.3
10:00-11:00	50.5	79.2	56.2	51.8	45.7	43.9
11:00-12:00	50.2	75.3	55.7	52.0	46.0	44.0
12:00-13:00	48.2	72.1	55.5	50.4	43.8	41.9
13:00-14:00	47.4	69.0	52.4	48.7	41.8	39.8
14:00-15:00	47.6	66.6	52.8	49.0	42.6	40.7
24 Hours Measurement	**50.2**	**84.1**	**55.7**	**52.2**	**46.9**	**45.0**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**54.6**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 26-27, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV288
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	50.8	67.7	56.3	52.7	47.3	44.8
16:00-17:00	50.0	69.4	56.0	52.8	45.1	42.9
17:00-18:00	57.0	78.4	61.5	59.3	55.4	51.9
18:00-19:00	48.4	73.2	52.5	49.5	44.7	43.2
19:00-20:00	49.4	86.6	52.6	49.9	47.0	45.7
20:00-21:00	51.4	64.9	54.3	53.0	50.8	49.1
21:00-22:00	52.5	68.6	55.1	54.1	51.9	50.2
22:00-23:00	56.0	66.7	57.9	57.6	55.9	53.6
23:00-00:00	55.7	61.6	58.1	57.6	55.6	52.9
00:00-01:00	56.7	63.0	59.3	58.6	56.5	53.7
01:00-02:00	55.3	73.6	58.5	57.5	54.3	51.5
02:00-03:00	59.5	67.7	62.5	61.9	59.1	55.5
03:00-04:00	62.1	66.5	64.0	63.7	61.8	59.6
04:00-05:00	58.8	66.5	61.8	61.2	58.6	54.3
05:00-06:00	54.7	65.9	58.1	57.4	54.2	47.5
06:00-07:00	59.0	76.2	62.3	61.2	57.9	54.6
07:00-08:00	57.4	72.2	61.0	60.1	56.0	52.1
08:00-09:00	53.7	79.7	59.7	56.9	49.1	45.4
09:00-10:00	49.8	81.4	55.6	51.3	44.2	42.5
10:00-11:00	49.4	75.9	55.9	51.0	44.0	42.6
11:00-12:00	49.6	78.7	55.4	51.7	43.6	41.3
12:00-13:00	51.3	70.3	56.9	53.2	47.5	45.2
13:00-14:00	46.9	76.9	51.5	48.6	42.7	40.3
14:00-15:00	49.6	69.3	55.4	52.5	45.1	41.6
24 Hours Measurement	**55.5**	**86.6**	**58.9**	**57.6**	**54.6**	**51.6**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**64.1**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Laboratory Reviewer

Laboratory Supervisor

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ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

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E-mail : envi@enviresearch.co.th
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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 27-28, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV288
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	51.5	69.1	56.7	54.4	48.2	45.3
16:00-17:00	52.3	78.8	60.0	54.5	45.3	42.5
17:00-18:00	51.4	80.8	58.3	54.6	42.9	40.1
18:00-19:00	53.3	74.9	56.4	54.1	51.1	49.0
19:00-20:00	55.0	76.9	56.9	55.8	53.9	51.2
20:00-21:00	54.4	78.8	56.2	55.6	54.0	51.5
21:00-22:00	53.4	69.2	55.4	55.0	53.0	50.3
22:00-23:00	53.7	79.8	58.2	56.6	53.0	48.6
23:00-00:00	55.6	61.8	57.8	57.3	55.4	52.3
00:00-01:00	55.9	62.8	58.1	57.7	55.8	52.9
01:00-02:00	47.4	62.3	51.9	50.0	45.4	44.0
02:00-03:00	48.7	65.8	54.7	50.9	46.9	45.0
03:00-04:00	49.3	64.4	55.4	53.2	46.6	45.1
04:00-05:00	49.2	66.3	57.7	54.9	46.7	45.2
05:00-06:00	48.6	70.4	53.4	51.1	45.8	43.4
06:00-07:00	50.7	77.5	55.5	51.6	47.2	45.0
07:00-08:00	52.5	77.2	57.9	54.0	48.2	45.1
08:00-09:00	49.4	68.4	53.8	51.4	45.6	41.9
09:00-10:00	50.3	75.1	56.0	51.6	43.9	40.3
10:00-11:00	52.4	73.1	56.1	54.0	50.0	46.9
11:00-12:00	48.1	72.8	53.5	49.2	41.4	39.1
12:00-13:00	47.3	74.5	53.9	48.4	40.9	38.6
13:00-14:00	46.2	69.8	52.6	48.2	40.6	38.7
14:00-15:00	47.4	69.8	53.7	49.0	40.4	37.9
24 Hours Measurement	**51.9**	**80.8**	**56.3**	**53.9**	**50.0**	**47.2**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**58.5**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : **โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 28-29, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV288
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	47.6	68.4	53.6	50.4	41.4	38.4
16:00-17:00	49.5	72.2	54.6	51.2	41.4	38.0
17:00-18:00	65.7	84.8	70.5	68.9	64.6	59.9
18:00-19:00	52.8	73.1	56.9	54.9	50.7	47.7
19:00-20:00	53.6	64.6	55.0	54.6	53.3	51.5
20:00-21:00	54.6	66.1	55.8	55.5	54.3	53.0
21:00-22:00	52.7	69.3	54.3	53.9	52.3	50.2
22:00-23:00	49.6	60.3	51.4	51.0	49.4	47.4
23:00-00:00	50.6	65.3	53.6	53.0	49.9	47.6
00:00-01:00	54.7	65.6	57.1	56.8	54.2	48.4
01:00-02:00	53.6	69.5	56.3	56.0	53.0	48.0
02:00-03:00	49.1	55.2	52.0	51.6	48.6	45.4
03:00-04:00	50.3	60.9	54.6	53.9	49.0	43.6
04:00-05:00	46.2	68.8	52.4	47.6	42.3	41.1
05:00-06:00	50.2	84.7	58.9	54.4	44.7	41.8
06:00-07:00	66.8	85.8	73.1	71.4	63.8	58.7
07:00-08:00	64.3	84.2	70.5	68.7	59.7	47.6
08:00-09:00	63.0	85.2	69.2	67.1	58.8	48.9
09:00-10:00	50.7	76.7	56.8	53.6	46.4	43.0
10:00-11:00	54.0	74.5	57.6	55.8	51.3	47.0
11:00-12:00	48.8	72.5	55.9	51.9	43.4	40.5
12:00-13:00	48.0	67.9	53.8	48.9	40.9	38.7
13:00-14:00	46.8	69.1	52.8	48.6	40.9	39.0
14:00-15:00	49.7	74.1	54.9	51.5	42.3	40.1
24 Hours Measurement	**58.2**	**85.8**	**63.8**	**62.1**	**55.7**	**50.7**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**64.6**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 29-30, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV288
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	49.0	71.7	54.1	50.8	44.1	40.6
16:00-17:00	65.6	84.1	72.2	70.7	64.3	60.4
17:00-18:00	58.3	77.7	63.1	61.3	56.6	52.0
18:00-19:00	53.5	78.4	56.5	54.4	52.7	51.4
19:00-20:00	57.6	65.7	59.0	58.8	57.0	56.0
20:00-21:00	57.6	70.1	58.5	58.2	56.8	55.0
21:00-22:00	58.0	67.1	59.8	59.5	57.9	55.7
22:00-23:00	55.9	68.8	58.2	57.8	55.6	52.8
23:00-00:00	51.6	73.3	54.8	54.2	50.3	46.1
00:00-01:00	53.4	74.7	55.8	55.3	53.1	49.9
01:00-02:00	48.2	64.4	50.7	50.3	47.9	44.6
02:00-03:00	51.8	65.9	54.7	53.9	51.5	48.3
03:00-04:00	51.2	68.3	54.4	53.6	50.5	47.2
04:00-05:00	51.0	67.5	54.5	53.4	49.8	46.4
05:00-06:00	65.6	88.9	69.8	68.6	64.3	60.1
06:00-07:00	61.0	79.6	67.0	65.0	57.7	50.6
07:00-08:00	60.2	81.5	66.1	64.1	56.0	51.9
08:00-09:00	53.3	71.8	58.7	55.6	48.8	46.8
09:00-10:00	52.5	73.8	58.3	54.6	46.4	41.0
10:00-11:00	50.1	76.9	55.5	52.3	45.5	40.3
11:00-12:00	50.0	73.8	56.0	52.4	43.9	37.8
12:00-13:00	61.5	81.6	66.8	64.1	57.8	53.6
13:00-14:00	63.7	76.3	67.0	66.2	63.0	59.0
14:00-15:00	60.1	79.2	63.9	62.8	58.5	53.5
24 Hours Measurement	**59.0**	**88.9**	**63.8**	**62.3**	**57.4**	**53.7**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**64.9**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310.
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Measured Source : Ambient Noise
Measured Point : โรงเรียนบ้านหนองหิน บ้านหนองหิน หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
GPS. Coordinate : UTM (WGS84) 47P 0588676 E, 1647949 N
Measured Date : October 30-31, 2023
Measured By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Measured Instrument : Integrating Sound Level Meter Scarlet Tech Model ST-11D Serial Number 820933

Quotation No. : 2023-00689
Analysis No. : 2023-AE729-012
Report No. : 2023-RAAV288
Report Date : November 8, 2023

Interval Time	Noise Level, dB(A)					
	Leq	Lmax	L5	L10	L50	L90
15:00-16:00	61.4	81.5	68.3	66.7	60.4	57.1
16:00-17:00	68.5	89.0	73.4	72.1	66.8	61.6
17:00-18:00	55.3	86.4	70.9	68.5	50.2	37.2
18:00-19:00	51.3	87.3	56.0	53.8	49.1	45.6
19:00-20:00	52.0	70.2	53.8	52.9	51.4	49.7
20:00-21:00	51.7	73.1	56.2	53.4	50.2	48.0
21:00-22:00	50.3	69.7	52.3	51.8	50.0	47.8
22:00-23:00	50.9	77.4	54.0	52.6	49.8	47.3
23:00-00:00	49.2	64.6	51.6	50.9	48.8	46.0
00:00-01:00	43.9	66.0	49.9	46.6	39.0	37.8
01:00-02:00	43.4	62.5	48.4	46.7	41.8	39.5
02:00-03:00	47.9	66.6	52.8	51.3	45.5	42.5
03:00-04:00	47.6	70.1	54.2	52.3	41.8	38.8
04:00-05:00	49.3	70.1	55.6	54.1	44.6	41.5
05:00-06:00	48.9	68.4	52.3	50.6	47.5	44.2
06:00-07:00	51.2	70.9	55.0	52.6	49.0	45.7
07:00-08:00	65.8	88.0	75.8	74.1	64.7	58.7
08:00-09:00	56.0	77.9	60.1	58.4	54.6	51.8
09:00-10:00	50.4	77.8	55.1	51.8	44.5	41.8
10:00-11:00	49.8	75.7	56.3	52.6	43.8	40.9
11:00-12:00	59.6	77.3	63.9	62.6	58.1	52.8
12:00-13:00	54.5	76.0	59.0	57.1	52.8	47.1
13:00-14:00	59.7	75.2	63.5	62.3	58.6	54.0
14:00-15:00	53.3	73.1	58.6	56.3	48.2	43.8
24 Hours Measurement	**58.4**	**89.0**	**65.7**	**64.1**	**56.9**	**52.1**
Standard[1']	**70**	**115**	-	-	-	-
Ldn	**59.8**	-	-	-	-	-

Remark : [1'] Notification of National Environmental Board, No.15, B.E.2540 (1997) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.114 Part 27D dated April 3, B.E.2540 (1997).

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Sampling Source : Surface Water Sampling
Sampling Point : **SW1 : ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0587292 E, 1646645 N
Sampling Date : October 28, 2023
Sampling Time : 12:44
Sampling Method : Grab
Sampling By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : 2023-00689
Analysis No. : 2023-AE657-001
Received Date : October 30, 2023
Analytical Date : October 30-November 6, 2023
Report No. : 2023-RAAV508
Report Date : November 7, 2023

Parameter	Unit	Method of Analysis[1']	Result	Standard[2']	
				Class 3	Class 4
Temperature	°C	Certified Thermometer	31.5	n'	n'
pH	-	Electrometric	7.4	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Membrane Electrode	1.3	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	4.8	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	5,400	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	1,100	4,000	-
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrametric	44	-	-
Depth	m	Measuring Tape	1.4	-	-
Flow Rate	m^3/s	Flow Meter, Calculate	<0.1	-	-
Total Dissolved Solids	mg/L	In-house method: TM-LA-002	141	-	-
Total Suspended Solids	mg/L	In-house method: TM-LA-001	15	-	-
Velocity	m/s	Flow Meter	<0.1	-	-
Width	m	Measuring Tape	12	-	-

Remark : 1' Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.
2' Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
n' = naturally but changing not more than 3°C

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Sampling Source : Surface Water Sampling
Sampling Point : **SW2 : ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588239 E, 1646472 N
Sampling Date : October 28, 2023
Sampling Time : 11:27
Sampling Method : Grab
Sampling By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : 2023-00689
Analysis No. : 2023-AE657-002
Received Date : October 30, 2023
Analytical Date : October 30-November 7, 2023
Report No. : 2023-RAAV510
Report Date : November 7, 2023

Parameter	Unit	Method of Analysis[1]	Result	Standard[2]	
				Class 3	Class 4
Temperature	°C	Certified Thermometer	29.0	n'	n'
pH	-	Electrometric	7.0	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Membrane Electrode	1.7	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	4.0	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	5,400	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	790	4,000	-
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrametric	65	-	-
Depth	m	Measuring Tape	2.5	-	-
Flow Rate	m^3/s	Flow Meter, Calculate	<0.1	-	-
Total Dissolved Solids	mg/L	In-house method: TM-LA-002	141	-	-
Total Suspended Solids	mg/L	In-house method: TM-LA-001	36	-	-
Velocity	m/s	Flow Meter	<0.1	-	-
Width	m	Measuring Tape	10	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
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Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดี เวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Sampling Source : Surface Water Sampling
Sampling Point : **SW3 : ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี**
GPS. Coordinate : UTM (WGS84) 47P 0588967 E, 1646070 N
Sampling Date : October 28, 2023
Sampling Time : 10:23
Sampling Method : Grab
Sampling By : Mr.Arnon Kuanhanghong
Analyzed By : Environment Research & Technology Co., Ltd.
Physical Properties : Turbid, Light Yellow, Sediment, Odor

Quotation No. : 2023-00689
Analysis No. : 2023-AE657-003
Received Date : October 30, 2023
Analytical Date : October 30-November 6, 2023
Report No. : 2023-RAAV511
Report Date : November 7, 2023

Parameter	Unit	Method of Analysis[1]	Result	Standard[2]	
				Class 3	Class 4
Temperature	°C	Certified Thermometer	28.5	n'	n'
pH	-	Electrometric	7.0	5.0-9.0	5.0-9.0
Dissolved Oxygen	mg/L	Membrane Electrode	1.5	≥4.0	≥2.0
Biochemical Oxygen Demand	mg/L	5-Day BOD Test, Membrane Electrode	5.3	2.0	4.0
Total Coliform Bacteria	MPN/100 mL	Most Probable Number	490	20,000	-
Fecal Coliform Bacteria	MPN/100 mL	Most Probable Number	78	4,000	-
Chemical Oxygen Demand	mg/L	Closed Reflux, Titrametric	53	-	-
Depth	m	Measuring Tape	3.0	-	-
Flow Rate	m^3/s	Flow Meter, Calculate	<0.1	-	-
Total Dissolved Solids	mg/L	In-house method: TM-LA-002	155	-	-
Total Suspended Solids	mg/L	In-house method: TM-LA-001	29	-	-
Velocity	m/s	Flow Meter	<0.1	-	-
Width	m	Measuring Tape	11	-	-

Remark : [1] Standard Method for Examination of Water and Wastewater, 23rd Edition, 2017.
[2] Notification of the National Environment Board, No.8, B.E.2537 (1994), issued under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), published in the Royal Government Gazette No.111 Part 16, dated February 24, B.E.2537 (1994). (Standard Value of Surface Water for Class 3, 4)
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Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Type of Sample : Adult and Juvenile Fishes
Report Number : FLC020/2566
Sampling Date : October 28, 2023
Report Date : November 30, 2023
Sampling By : Mr.Arnon Kuanhanghong
Analysis By : ดร.สันติ พ่วงเจริญ (ภาควิชาชีววิทยาประมง คณะประมง มหาวิทยาลัยเกษตรศาสตร์)

ตารางที่ 1 จำนวนเฉพาะลูกปลา

ที่	วงศ์	ชื่อวิทยาศาสตร์	ชื่อไทย	St.1	St.2	St.3
1	Cyprinidae	*Esomus metallicus*	ซิวหนวดยาว	0	1	0
2	Osphronemidae	*Trichopodus trichopterus*	กระดี่หม้อ	47	41	21
รวม 2 วงศ์		**จำนวนตัว (ตัวต่อ 100 ตารางเมตร)**		**47**	**42**	**21**
		จำนวนชนิด (ชนิด)		**1**	**2**	**1**
ดัชนีความหลากหลาย (Diversity index)				**0**	**0.113**	**0**

Remark St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.2 = ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.3 = ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

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ตารางที่ 2 จำนวนปลารวม

ที่	วงศ์	ชื่อวิทยาศาสตร์	ชื่อไทย	St.1	St.2	St.3
1	Cyprinidae	*Amblypharyngodon chulabhornae*	ซิวเจ้าฟ้า	2	0	0
2		*Esomus metallicus*	ซิวหนวดยาว	9	6	0
3		*Rasbora borapetensis*	ซิวหางแดง	3	0	0
4		*Rasbora paviena*	ซิวควายแถบดำ	3	0	0
5	Osphronemidae	*Trichopodus trichopterus*	กระดี่หม้อ	47	43	21
6		*Trichopsis vittatus*	กริมควาย	0	2	0
รวม 2 วงศ์		**จำนวนตัว (ตัวต่อ 100 ตารางเมตร)**		**64**	**51**	**21**
		จำนวนชนิด (ชนิด)		**5**	**3**	**1**
ดัชนีความหลากหลาย (Diversity index)				**0.898**	**0.523**	**0**

Remark : St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.2 = ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.3 = ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

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ตารางที่ 3 ข้อมูลปลารวม

ที่	วงศ์	ชื่อวิทยาศาสตร์	ชื่อไทย	St.1			St.2			St.3		
				จำนวน (ตัว)	ช่วงความยาว (ซม.)	น้ำหนัก (กรัม)	จำนวน (ตัว)	ช่วงความยาว (ซม.)	น้ำหนัก (กรัม)	จำนวน (ตัว)	ช่วงความยาว (ซม.)	น้ำหนัก (กรัม)
1	Cyprinidae	*Amblypharyngodon chulabhornae*	ซิวเจ้าฟ้า	2	3.8-4.2	1.3	0	0	0	0	0	0
2		*Esomus metallicus*	ซิวหนวดยาว	9	5.9-7.4	20	6	2.1-5.5	4.6	0	0	0
3		*Rasbora borapetensis*	ซิวหางแดง	3	4.5-4.9	2.2	0	0	0	0	0	0
4		*Rasbora paviena*	ซิวควายแถบดำ	3	6.1-7.9	8.1	0	00	0	0	0	0
5	Osphronemidae	*Trichopodus trichopterus*	กระดี่หม้อ	47	2.5-3.9	14.2	43	1.7-5.5	15.2	21	1.2-2.8	5.2
6		*Trichopsis vittatus*	กริมควาย	0	0	0	2	2.7-3.0	0.3	0	0	0
รวม 2 วงศ์		**รวม 6 ชนิด**		**64**	**-**	**45.8**	**51**	**-**	**20.1**	**21**	**-**	**5.2**

Remark : St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.2 = ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.3 = ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

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ตารางที่ 4 ข้อมูลรวม

ที่	วงศ์	ชื่อวิทยาศาสตร์	ชื่อไทย	St.1				St.2				St.3			
				จำนวนลูก (ตัว)	จำนวน (ตัว)	ช่วงความยาว (ซม.)	น้ำหนัก (กรัม)	จำนวนลูก (ตัว)	จำนวน (ตัว)	ช่วงความยาว (ซม.)	น้ำหนัก (กรัม)	จำนวนลูก (ตัว)	จำนวน (ตัว)	ช่วงความยาว (ซม.)	น้ำหนัก (กรัม)
1	Cyprinidae	*Amblypharyngodon chulabhornae*	ซิวเจ้าฟ้า	0	2	3.8-4.2	1.3	0	0	0	0	0	0	0	0
2		*Esomus metallicus*	ซิวหนวดยาว	0	9	5.9-7.4	20	1	5	2.1-5.5	4.6	0	0	0	0
3		*Rasbora borapetensis*	ซิวหางแดง	0	3	4.5-4.9	2.2	0	0	0	0	0	0	0	0
4		*Rasbora paviena*	ซิวควายแถบดำ	0	3	6.1-7.9	8.1	0	0	0	0	0	0	0	0
5	Osphronemidae	*Trichopodus trichopterus*	กระดี่หม้อ	47	0	2.5-3.9	14.2	41	2	1.7-5.5	15.2	21	0	1.2-2.8	5.2
6		*Trichopsis vittatus*	กริมควาย	0	0	0	0	0	2	2.7-3.0	0.3	0	0	0	0
รวม 2 วงศ์		**รวม 6 ชนิด**		**47**	**17**	**-**	**45.8**	**42**	**9**	**-**	**20.1**	**21**		**-**	**5.2**

Remark : St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.2 = ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.3 = ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

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ตารางที่ 5 ข้อมูล F/C Ratio

ที่	วงศ์	ชื่อวิทยาศาสตร์	ชื่อไทย	ประเภทการกินอาหาร	St.1	St.2	St.3
1	Cyprinidae	*Amblypharyngodon chulabhornae*	ซิวเจ้าฟ้า	กินเนื้อ	1.3	0	0
2		*Esomus metallicus*	ซิวหนวดยาว	กินเนื้อ	20	4.6	0
3		*Rasbora borapetensis*	ซิวหางแดง	กินเนื้อ	2.2	0	0
4		*Rasbora paviena*	ซิวควายแถบดำ	กินเนื้อ	8.1	0	0
5	Osphronemidae	*Trichopodus trichopterus*	กระดี่หม้อ	กินเนื้อ	14.2	15.2	5.2
6		*Trichopsis vittatus*	กริมควาย	กินเนื้อ	0	0.3	0
รวม 2 วงศ์		รวม 6 ชนิด	น้ำหนักรวม		**45.8**	**20.1**	**5.2**
			รวมน้ำหนักปลากินพืช		**0**	**0**	**0**
			รวมน้ำหนักปลากินเนื้อ		**45.8**	**20.1**	**5.2**
			F/C Ratio		**N/A**	**N/A**	**N/A**

Remark : N/A = ไม่สามารถหาค่า F/C Ratio ได้
St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.2 = ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.3 = ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

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Head Office/Tax ID 0105 542 064 981

ANALYSIS REPORT

Customer Name : Consultants of Technology Co., Ltd.
Address : 39 Ladprao 124 Road, Phlapphla, Wang Thonglang, Bangkok 10310
Project Name : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)
Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Parameter : Phytoplankton
Type of Sample : Surface Water
Sampling Method : AWWA10200
Sampling Date : October 28, 2023
Sampling By : Mr.Arnon Kuanhanghong
Analysis By : อาจารย์ไพลิน จิตซุ่ม (อาจารย์ประจำภาควิชาชีววิทยาประมง คณะประมง มหาวิทยาลัยเกษตรศาสตร์)

Report Number : PTC017/2566
Received Date : October 30, 2023
Analytical Date : October 30 – November 24, 2023
Report Date : November 29, 2023

Parameter	Unit	Sampling Point		
		St.1	St.2	St.3
Phylum Cyanophyta				
Class Cyanophyceae (สาหร่ายสีเขียวแกมน้ำเงิน)				
Order Oscillatoriales				
Family Oscillatoriaceae				
Oscillatoria sp.	Units/L	42	48	0
Order Nostocales				
Family Nostocaceae				
Anabaena sp.	Units/L	6	0	0
Phylum Chlorophyta				
Class Chlorophyceae (สาหร่ายสีเขียว)				
Order Chlamydomonadales				
Family Volvocaceae				
Pandorina morum (Muller) Bory	Units/L	90	18	0
Volvox sp.	Units/L	0	72	0
Order Sphaeropleales				
Family Hydrodictyaceae				
Pediastrum tetras (Ehrenberg) Ralfs	Units/L	0	6	0
Class Trebouxiophyceae				
Order Chlorellales				
Family Oocystaceae				
Oocystis sp.	Units/L	42	0	0
Phylum Charophyta				
Class Zygnematophyceae				
Order Zygnematales				
Family Zygnemataceae				
Spirogyra sp.	Units/L	0	30	0

Remark : St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.2 = ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.3 = ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

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Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Parameter : Phytoplankton
Type of Sample : Surface Water
Sampling Method : AWWA10200
Sampling Date : October 28, 2023
Sampling By : Mr.Arnon Kuanhanghong
Analysis By : อาจารย์ไพลิน จิตซุ่ม (อาจารย์ประจำภาควิชาชีววิทยาประมง คณะประมง มหาวิทยาลัยเกษตรศาสตร์)

Report Number : PTC029/2566
Received Date : October 30, 2023
Analytical Date : October 30 – November 24, 2023
Report Date : November 29, 2023

Parameter	Unit	Sampling Point		
		St.1	St.2	St.3
Phylum Euglenophyta				
Class Euglenophyceae (ยูกลีนอยด์)				
Order Euglenales				
Family Euglenaceae				
Euglena acus Ehrenberg	Units/L	810	150	84
Euglena oxyuris Schmarda	Units/L	18	48	0
Euglena sp.	Units/L	372	66	90
Strombomonas gibberosa (Playfair) Deflandre	Units/L	30	60	72
Strombomonas praeliaris (Palmer) Deflandre	Units/L	0	24	0
Trachelomonas hispida (Perty) Stein	Units/L	984	66	78
Lepocinclis fusiformis (Carter) Lemmermann	Units/L	66	132	0
Lepocinclis ovum (Ehrenberg) Lemmermann	Units/L	1,146	390	168
Lepocinclis salina Fritsch	Units/L	42	0	12
Phacus acuminatus Strokes	Units/L	30	36	0
Phacus hamatus Pochmann	Units/L	1,104	84	54
Phacus helikoides Pochmann	Units/L	228	222	324
Phacus longicauda (Ehrenberg) Dujardin	Units/L	42	48	0
Phacus ranula Pochmann	Units/L	0	18	0
Phacus tortus (Lemmermann) Skvortzov	Units/L	12	48	0
Phylum Bacillariophyta				
Class Bacillariophyceae (ไดอะตอม)				
Order Bacillariales				
Family Naviculaceae				
Navicula sp.	Units/L	0	12	0
Phylum Dinophyta				
Class Dinophyceae (ไดโนแฟลเจลเลต)				
Order Peridiniales				
Family Peridiniaceae				
Peridinium sp.	Units/L	258	156	150
ปริมาณความหนาแน่นแพลงก์ตอนพืช (ยูนิตต่อลิตร)		**5,322**	**1,734**	**1,032**
จำนวนชนิดแพลงก์ตอนพืช (ชนิด)		**18**	**21**	**9**
ดัชนีความหลากหลายของชนิดแพลงก์ตอนพืช		**2.10**	**2.62**	**1.94**

Remark : St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.2 = ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.3 = ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

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Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Parameter : Zooplankton
Type of Sample : Surface Water
Sampling Method : AWWA10200
Sampling Date : October 28, 2023
Sampling By : Mr.Arnon Kuanhanghong
Analysis By : อาจารย์ไพลิน จิตชุ่ม (อาจารย์ประจำภาควิชาชีววิทยาประมง คณะประมง มหาวิทยาลัยเกษตรศาสตร์)

Report Number : PTC029/2566
Received Date : October 30, 2023
Analytical Date : October 30 – November 24, 2023
Report Date : November 29, 2023

Parameter	Unit	Sampling Point		
		St.1	St.2	St.3
Phylum Rotifera (โรติเฟอร์)				
Class Monogononta				
Order Ploima				
Family Lepadellidae				
Colurella sp.	Ind/L	0	0	6
Lepadella sp.	Ind/L	6	0	0
Family Lecanidae				
Lecane bulla (Gosse)	Ind/L	42	0	0
Lecane luna (O.F. Mueller)	Ind/L	6	0	0
Lecane papuana (Murray)	Ind/L	6	0	0
Lecane sp.	Ind/L	0	0	12
Family Trichocercidae				
Trichocerca sp.	Ind/L	0	6	0
Family Synchaetidae				
Polyarthra sp.	Ind/L	0	84	66
Order Flosculariacea				
Family Testudinellidae				
Testudinella patina (Hermann)	Ind/L	12	0	0
Phylum Arthropoda				
Subphylum Crustacea				
Class Maxillopoda				
Subclass Copepoda (โคพีพอด)				
Copepod nauplius	Ind/L	0	12	0
ปริมาณความหนาแน่นแพลงก์ตอนสัตว์ (ตัวต่อลิตร)		**72**	**102**	**84**
จำนวนชนิดแพลงก์ตอนสัตว์ (ชนิด)		**5**	**3**	**3**
ดัชนีความหลากหลายของชนิดแพลงก์ตอนสัตว์		**1.23**	**0.58**	**0.66**

Remark : St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.2 = ห้วยหิน (ด้านทิศใต้ของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
St.3 = ห้วยหิน (ด้านทิศตะวันออกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

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Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Parameter : Benthos
Type of Sample : Stream Sediment
Sampling Method : AWWA10500
Sampling Date : October 28, 2023
Sampling By : Mr.Arnon Kuanhanghong
Analysis By : นางสาวหทัยรัตน์ สุดตา

Report Number : BTC028/2566
Received Date : October 30, 2023
Analytical Date : October 30 – November 28, 2023
Report Date : November 30, 2023

Parameter	Unit	Sampling Point		
		St.1	St.2	St.3
Phylum Arthropoda				
Class Insecta				
Order Odonata				
Family Macromiidae				
Marcromia sp.	Ind./m²	15	0	0
Order Hemiptera				
Family Belosomatidae				
Diplonychus sp.	Ind./m²	0	0	15
Phylum Mollusca				
Class Gastropoda				
Order Hygrophila				
Family Lymnaeidae				
Lymnaea auricularis swinhoei	Ind./m²	0	30	0
Family Planobidae				
Indoplanorbis exutus	Ind./m²	0	15	0
Order Mesogastrpoda				
Family Viviparidae				
Filopaludina martensi martensi	Ind./m²	15	0	0
Filopaludina filosa	Ind./m²	15	15	0
Filopaludina sp.	Ind./m²	15	0	0
ปริมาณความหนาแน่นสัตว์หน้าดิน (ตัวต่อตารางเมตร)		**60**	**60**	**15**
จำนวนชนิด		**4**	**3**	**1**
ดัชนีความหลากหลายของสัตว์หน้าดิน		**1.39**	**1.04**	**0.00**

Remark : St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
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Project Location : อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
Type of Sample : Aquatic Plant
Report Number : APC018/2566
Sampling Date : October 28, 2023
Report Date : December 8, 2023
Sampling By : Mr.Arnon Kuanhanghong
Analysis By : ผศ.พงศ์เชฏฐ์ พิชิตกุล (ภาควิชาเพาะเลี้ยงสัตว์น้ำ คณะประมง มหาวิทยาลัยเกษตรศาสตร์)

ที่	วงศ์	ชื่อวิทยาศาสตร์	ชื่อไทย	ประเภท	St.1			St.2			St.3		
					ชายน้ำ	กลางน้ำ	รอบ ๆ	ชายน้ำ	กลางน้ำ	รอบ ๆ	ชายน้ำ	กลางน้ำ	รอบ ๆ
1	Commelinaceae	*Commelina benghalensis*	ผักปราบใบกว้าง	ชายน้ำ	-	-	✓	-	-	-	-	-	-
2	Convolvulaceae	*Ipomoea aquatica*	ผักบุ้ง	ลอยน้ำ	-	✓	-	-	-	-	✓	✓	✓
3	Poaceae	*Brachiaria mutica*	หญ้าขน	ชายน้ำ	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	Pontederiaceae	*Eichhornia crassipes*	ผักตบชวา	ลอยน้ำ	✓	✓	✓	-	✓	✓	-	-	✓

Remark : ✓ = พบ - = ไม่พบ
St.1 = ห้วยหิน (ด้านทิศตะวันตกของโครงการ) หมู่ที่ 3 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี
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ชื่อพรรณไม้น้ำ ผักปราบใบกว้าง
St.1 (รอบๆ) : *Commelina benghalensis*



ชื่อพรรณไม้น้ำ ผักบุ้ง
St.1 (กลางน้ำ) : *Ipomoea aquatica*



ชื่อพรรณไม้น้ำ ผักบุ้ง
St.3 (ชายน้ำ) : *Ipomoea aquatica*



ชื่อพรรณไม้น้ำ ผักบุ้ง
St.3 (กลางน้ำ) : *Ipomoea aquatica*



ชื่อพรรณไม้น้ำ ผักบุ้ง
St.3 (รอบๆ) : *Ipomoea aquatica*



ชื่อพรรณไม้น้ำ หญ้าขน
St.1 (ชายน้ำ) : *Poaceae*

รูปที่ 1 พรรณไม้น้ำที่ตรวจพบในแหล่งน้ำที่อยู่ใกล้เคียง โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี)

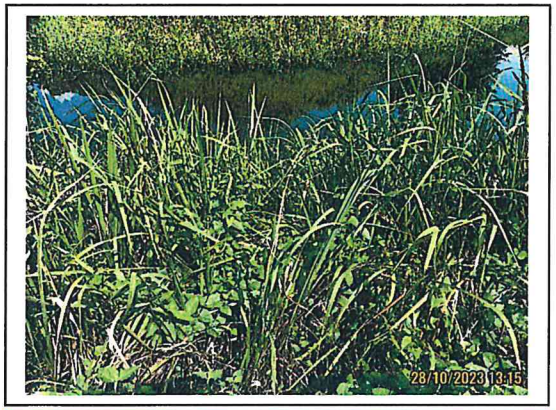
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www.enviresearch.co.th



ชื่อพรรณไม้น้ำ หญ้าขน
St.1 (กลางน้ำ) : *Poaceae*



ชื่อพรรณไม้น้ำ หญ้าขน
St.1 (รอบๆ) : *Poaceae*



ชื่อพรรณไม้น้ำ หญ้าขน
St.2 (ชายน้ำ) : *Poaceae*



ชื่อพรรณไม้น้ำ หญ้าขน
St.2 (กลางน้ำ) : *Poaceae*



ชื่อพรรณไม้น้ำ หญ้าขน
St.2 (รอบๆ) : *Poaceae*



ชื่อพรรณไม้น้ำ หญ้าขน
St.3 (ชายน้ำ) : *Poaceae*

รูปที่ 1 พรรณไม้น้ำที่ตรวจพบในแหล่งน้ำที่อยู่ใกล้เคียง โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี)

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ชื่อพรรณไม้น้ำ หญ้าขน
St.3 (กลางน้ำ) : *Poaceae*



ชื่อพรรณไม้น้ำ หญ้าขน
St.3 (รอบๆ) : *Poaceae*



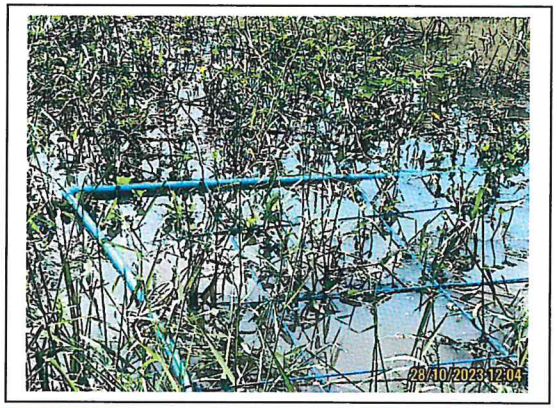
ชื่อพรรณไม้น้ำ ผักตบชวา
St.1 (ชายน้ำ) : *Eichhornia crassipes*



ชื่อพรรณไม้น้ำ ผักตบชวา
St.1 (กลางน้ำ) : *Eichhornia crassipes*



ชื่อพรรณไม้น้ำ ผักตบชวา
St.1 (รอบๆ) : *Eichhornia crassipes*



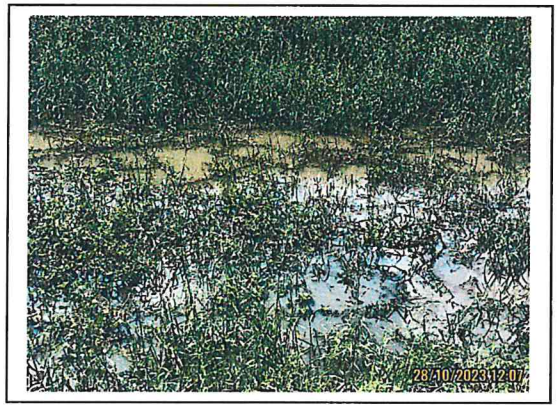
ชื่อพรรณไม้น้ำ ผักตบชวา
St.2 (กลางน้ำ) : *Eichhornia crassipes*

รูปที่ 1 พรรณไม้น้ำที่ตรวจพบในแหล่งน้ำที่อยู่ใกล้เคียง โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี)

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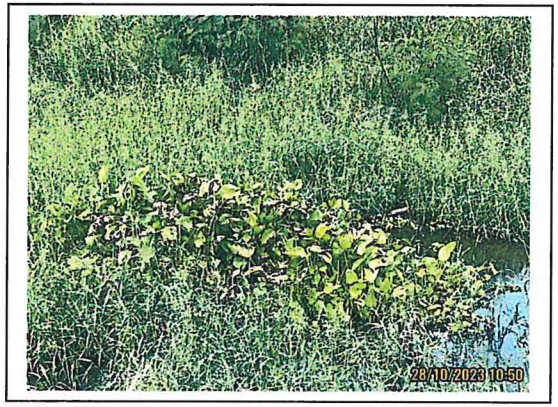
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ชื่อพรรณไม้น้ำ ผักตบชวา

St.2 (รอบๆ) : *Eichhornia crassipes*



ชื่อพรรณไม้น้ำ ผักตบชวา

St.3 (รอบๆ) : *Eichhornia crassipes*

รูปที่ 1 พรรณไม้น้ำที่ตรวจพบในแหล่งน้ำที่อยู่ใกล้เคียง โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี)

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Appendix 3-3

Lab Certificate and Equipment Calibration



ที่ อก ๐๓๑๐(๑)/ ๗ ๓ ๒๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๙ กรกฎาคม ๒๕๖๔

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๓๐ มีนาคม ๒๕๖๔

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๙๙ สถานที่ตั้งเลขที่ ๒๕/๑๑๔ หมู่ที่ ๖ ซอยชินเขต ๑ ถนนงามวงศ์วาน แขวงทุ่งสองห้อง เขตหลักสี่ กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๔๙ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๒๗ รายการ น้ำใต้ดิน จำนวน ๕๘ รายการ อากาศเสีย จำนวน ๒๖ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๒๐ รายการ และดิน จำนวน ๕๖ รายการ รวมทั้งสิ้นจำนวน ๑๘๗ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๘ พฤษภาคม ๒๕๖๗ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to information Policy.]

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๒๐๒ ๔๐๐๒ ๐ ๒๒๐๒ ๔๑๔๖
โทรสาร ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/๗๓๒๕ ลงวันที่ ๒๙ กรกฎาคม ๒๕๖๔

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖ ราย

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to information Policy.]

๑)	ทะเบียนเลขที่	ว-๐๙๙-ค-๒๔๑๔
๒)	ทะเบียนเลขที่	ว-๐๙๙-ค-๓๐๐๒
๓)	ทะเบียนเลขที่	ว-๐๙๙-ค-๕๕๐๐
๔)	ทะเบียนเลขที่	ว-๐๙๙-ค-๗๐๒๓
๕)	ทะเบียนเลขที่	ว-๐๙๙-ค-๗๖๖๔
๖)	ทะเบียนเลขที่	ว-๐๙๙-ค-๗๖๖๕
๗)	ทะเบียนเลขที่	ว-๐๙๙-ค-๗๖๖๖
๘)	ทะเบียนเลขที่	ว-๐๙๙-ค-๗๖๖๗
๙)	ทะเบียนเลขที่	ว-๐๙๙-ค-๘๘๐๑
๑๐	ทะเบียนเลขที่	ว-๐๙๙-ค-๘๘๐๒
๑๑	ทะเบียนเลขที่	ว-๐๙๙-ค-๘๘๐๓
๑๒	ทะเบียนเลขที่	ว-๐๙๙-ค-๘๘๐๔
๑๓	ทะเบียนเลขที่	ว-๐๙๙-ค-๘๘๐๕
๑๔	ทะเบียนเลขที่	ว-๐๙๙-ค-๘๘๐๖
๑๕	ทะเบียนเลขที่	ว-๐๙๙-ค-๘๘๐๗
๑๖	ทะเบียนเลขที่	ว-๐๙๙-ค-๘๘๐๘

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอ็นไวรอนเมน์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/ ลงวันที่

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๔๙ ราย

๑) น		ทะเบียนเลขที่ ว-๐๙๙-จ-๕๔๐๒
๒) น		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๒๖
๓) น		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๒๙
๔) น		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๓๗
๕) น		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๔๒
๖) น	**[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to information Policy.]**	ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๔๔
๗) น		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๔๕
๘) น		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๕๐
๙) น		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๕๔
๑๐)		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๕๖
๑๑)		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๖๗๑
๑๒)		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๖๗๒
๑๓)		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๖๗๓
๑๔)		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๖๗๕
๑๕)		ทะเบียนเลขที่ ว-๐๙๙-จ-๗๖๗๖
๑๖)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๐
๑๗)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๒
๑๘)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๓
๑๙)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๕
๒๐)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๖
๒๑)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๗
๒๒)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๘
๒๓)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๙
๒๔)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๑
๒๕)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๓
๒๖)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๔
๒๗)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๕
๒๘)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๖
๒๙)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๗
๓๐)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๘
๓๑)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๙
๓๒)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๐
๓๓)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๑
๓๔)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๓
๓๕)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๔

๓๖) นายรอมซี...

๓๖)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๕
๓๗)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๖
๓๘)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๗
๓๙)	**[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to information Policy.]**	ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๘
๔๐)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๙
๔๑)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๔๐
๔๒)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๔๑
๔๓)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๔๒
๔๔)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๔๔
๔๕)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๔๕
๔๖)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๔๗
๔๗)		ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๔๘
๔๘)		ทะเบียนเลขที่ ว-๐๙๙-จ-๙๕๒๑
๔๙)		ทะเบียนเลขที่ ว-๐๙๙-จ-๙๕๒๒

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/ ลงวันที่

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๘๗ รายการ

น้ำเสีย จำนวน 27 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[3]
		2) Digestion, Inductively Coupled Plasma Method[3]
2	Barium	Digestion, Inductively Coupled Plasma Method[3]
3	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method[3]
		2) 5-Day BOD Test, Membrane Electrode Method[3]
4	Cadmium	Digestion, Inductively Coupled Plasma Method[3]
5	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method[3]
6	Chromium	Digestion, Inductively Coupled Plasma Method[3]
7	Color	ADMI Weighted-Ordinate Spectrophotometric Method[3]
8	Copper	Digestion, Inductively Coupled Plasma Method[3]
9	Cyanide	Distillation, Colorimetric method[3]
10	Formaldehyde	Distillation, Colorimetric Method[2]
11	Free Chlorine	1) Iodometric Method[3]
		2) DPD Colorimetric Method[3]
12	Hexavalent Chromium	Colorimetric Method[3]
13	Lead	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method[3]
		2) Digestion, Inductively Coupled Plasma Method[3]
14	Manganese	Digestion, Inductively Coupled Plasma Method[3]
15	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[3]
16	Nickel	Digestion, Inductively Coupled Plasma Method[3]
17	Oil & Grease	Liquid-Liquid, Partition-Gravimetric Method[3]
18	pH	Electrometric Method[3]
19	Phenols	Distillation, Direct Photometric Method[3]
20	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[3]
		2) Digestion, Inductively Coupled Plasma Method[3]
21	Sulfide	Iodometric method[3]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

22 Temperature...

ผู้จำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
ผลทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
22	Temperature	Laboratory and Field Methods[3]
23	Total Dissolved Solids	Dried at 180 °C[3]
24	Total Kjeldahl Nitrogen	1) Macro Kjeldahl Method[3] 2) Semi-Micro Kjeldahl Method[3]
25	Total Suspended Solids	Dried at 103-105 °C[3]
26	Trivalent Chromium	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation[3]
27	Zinc	Digestion, Inductively Coupled Plasma Method[3]

น้ำใต้ดิน จำนวน 58 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acetone	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[3]
2	Antimony	Digestion, Inductively Coupled Plasma Method[3]
3	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]
4	Barium	Digestion, Inductively Coupled Plasma Method[3]
5	Benzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
6	Beryllium	Digestion, Inductively Coupled Plasma Method[3]
7	Bromodichloromethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
8	Bromoform	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
9	Cadmium	Digestion, Inductively Coupled Plasma Method[3]
10	Carbon Disulfide	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
11	Carbon Tetrachloride	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
12	Chlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
13	Chlorodibromomethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้จำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและชีวะ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Chloroform	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
15	Chromium	Digestion, Inductively Coupled Plasma Method[3]
16	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation[3]
17	Chromium (VI)	Colorimetric Method[3]
18	Cyanide	Colorimetric Method[3]
19	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
20	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[[3]
21	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
22	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
23	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
24	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
25	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
26	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
27	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
28	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
29	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
30	Ethylbenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
31	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและสอบเทียบ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
32	Lead	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]
33	Manganese	Digestion, Inductively Coupled Plasma Method[3]
34	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[3]
35	Methyl Bromide	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
36	Methylene Chloride	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
37	Methyl Tert-Butyl Ether	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
38	Naphthalene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
39	Nickel	Digestion, Inductively Coupled Plasma Method[3]
40	pH	Electrometric method[3]
41	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]
42	Silver	Digestion, Inductively Coupled Plasma Method[3]
43	Styrene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
44	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
45	Tetrachloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
46	Toluene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
47	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
48	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
49	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

50 Trichloroethylene...

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
50	Trichloroethylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
51	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
52	Vanadium	Digestion, Inductively Coupled Plasma Method[3]
53	Vinyl Chloride	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
54	m-Xylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
55	o-Xylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
56	p-Xylene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
57	Xylene (Total)	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[3]
58	Zinc	Digestion, Inductively Coupled Plasma Method[3]

<u>อากาศเสีย (ปล่องระบาย) จำนวน 26 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
4	Cadmium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
5	Carbon Monoxide	Instrumental Analyzer Method[4]
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method[4] 2) Isokinetic Sampling, Ion Chromatographic Method[4]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

7 Chromium...

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
ลงทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
7	Chromium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
8	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
9	Copper	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
10	Dioxin/Furans	Isokinetic Sampling[4]
11	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method[4] 2) Isokinetic Sampling, Ion Chromatographic Method[4]
12	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method[4] 2) Isokinetic Sampling, Ion Chromatographic Method[4]
13	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[4]
14	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[4] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
15	Manganese	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
16	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4]
17	Nickel	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
18	Opacity	Ringelmann's Method[1]
19	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method[4] 2) Instrumental Analyzer Method[4]
20	Selenium	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
21	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method[4] 2) Isokinetic Sampling, Barium-Thorin Titrimetric Method[4] 3) Instrumental Analyzer Method[4]
22	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method[4]
23	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
24	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method[4]
25	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[4]
26	Xylene	Adsorption Sampling, Gas Chromatographic Method[4]

<u>สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 20 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Digestion, Inductively Coupled Plasma Method[5,8]
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[5,9] 2) Digestion, Inductively Coupled Plasma Method[5,8]
3	Barium	Digestion, Inductively Coupled Plasma Method[5,8]
4	Beryllium	Digestion, Inductively Coupled Plasma Method[5,8]
5	Cadmium	Digestion, Inductively Coupled Plasma Method[5,8]
6	Chromium	Digestion, Inductively Coupled Plasma Method[5,8]
7	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method[5,6,8,10]
8	Chromium (VI)	Alkaline Digestion, Colorimetric Method[6,10]
9	Cobalt	Digestion, Inductively Coupled Plasma Method[5,8]
10	Copper	Digestion, Inductively Coupled Plasma Method[5,8]
11	Lead	Digestion, Inductively Coupled Plasma Method[5,8]
12	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[11]
13	Molybdenum	Digestion, Inductively Coupled Plasma Method[5,8]
14	Nickel	Digestion, Inductively Coupled Plasma Method[5,8]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

15 pH...

ผู้จำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	pH	Electrometric Method[14]
16	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[5,12] 2) Digestion, Inductively Coupled Plasma Method[5,8]
17	Silver	Digestion, Inductively Coupled Plasma Method[5,8]
18	Thallium	Digestion, Inductively Coupled Plasma Method[5,8]
19	Vanadium	Digestion, Inductively Coupled Plasma Method[5,8]
20	Zinc	Digestion, Inductively Coupled Plasma Method[5,8]

ดิน จำนวน 56 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
2	Antimony	Digestion, Inductively Coupled Plasma Method[5,8]
3	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[5,9] 2) Digestion, Inductively Coupled Plasma Method[5,8]
4	Barium	Digestion, Inductively Coupled Plasma Method[5,8]
5	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
6	Beryllium	Digestion, Inductively Coupled Plasma Method[5,8]
7	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
8	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
9	Cadmium	Digestion, Inductively Coupled Plasma Method[5,8]
10	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
11	Carbon Tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
12	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
13	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]

1

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทางสิ่งแวดล้อม
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
15	Chromium	Digestion, Inductively Coupled Plasma Method[5,8]
16	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation Method[5,7,9,11]
17	Chromium (VI)	Alkaline Digestion, Colorimetric Method[7,11]
18	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
19	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
20	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
21	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
22	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
23	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
24	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
25	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
26	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
27	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
28	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
29	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
30	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
31	Lead	Digestion, Inductively Coupled Plasma Method[5,8]
32	Manganese	Digestion, Inductively Coupled Plasma Method[5,8]
33	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[11]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้จำหน่ายตารกลุ่มมาตรฐานวิธีการวิเคราะห์ทดลองมลพิษ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
34	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
35	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
36	Methyl Tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
37	Naphthalene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
38	Nickel	Digestion, Inductively Coupled Plasma Method[5,8]
39	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[5,12] 2) Digestion, Inductively Coupled Plasma Method[5,8]
40	Silver	Digestion, Inductively Coupled Plasma Method[5,8]
41	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
42	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
43	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
44	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
45	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
46	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
47	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
48	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
49	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
50	Vanadium	Digestion, Inductively Coupled Plasma Method[5,8]
51	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

52 m-Xylene...

ผู้ช่วยเลขาธิการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและสิ่งแวดล้อม
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
52	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
53	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
54	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
55	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[7,13]
56	Zinc	Digestion, Inductively Coupled Plasma Method[5,8]

<u>เอกสารอ้างอิง</u>

1. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้แกลบเป็นเชื้อเพลิง. **ราชกิจจานุเบกษา.** 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.

2. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. **คู่มือวิเคราะห์น้ำเสีย.** พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

3. APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater.** 23rd ed. Washington, DC: APHA, 2017.

4. United States Environmental Protection Agency. **Standards of Performance for New Stationary Sources.** 40 CFR 60. Appendix A, 2019.

5. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Acid Digestion of Sediments, Sludges, and Soils. SW-846 Method 3050B,** 1996.

6. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A,** 1996.

7. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Closed-System **Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035A,** 2002.

8. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Inductively Coupled Plasma-optical Emission Spectrometry. SW-846 Method 6010D,** 2018

9. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Antimony and Arsenic (Atomic Absorption, Borohydride ReductionX. SW-846 Method 7062,** 1992.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

10. United...

ผู้จำหน่ายตารกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบ
และทะเบียนห้องปฏิบัติการ

10. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Chromium, Hexavalent (Colorimetric), SW-846 Method 7196A**, 1992.

11. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique, SW-846 Method 7471B,** 2007.

12. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Selenium (Atomic Absorption, Borohydride Reduction), SW-846 Method 7742,** 1994.

13. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS). SW-846 Method 8260D,** 2018.

14. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Solid and Waste pH. SW-846 Method 9045D,** 2004.

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ



ที่ อก ๐๓๑๐(๑)/ ๒๐๓๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๐ กุมภาพันธ์ ๒๕๖๕

เรื่อง เปลี่ยนแปลงสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๔ ธันวาคม ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๙๙ สถานที่ตั้งเลขที่ ๒๕/๑๑๔ หมู่ที่ ๖ ซอยชินเขต ๑ ถนนงามวงศ์วาน แขวงทุ่งสองห้อง เขตหลักสี่ กรุงเทพมหานคร ขอเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้วให้ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เพิ่มขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๐(๑)/๗๓๒๕ ลงวันที่ ๒๙ กรกฎาคม ๒๕๖๔ คือในวันที่ ๑๘ พฤษภาคม ๒๕๖๗ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕ โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์
บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด เลขทะเบียน ว-๐๙๙
ที่ อก ๐๓๑๐(๑)/ ๒๐๓๙ ลงวันที่ ๑๐ กุมภาพันธ์ ๒๕๖๕

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓ รายการ

ดิน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	TPH (C_5 – C_8)	Purge and Trap, Gas Chromatographic Method[2,3]
2	TPH ($C_{>8}$ – C_{16})	Ultrasonic Extraction, Gas Chromatographic Method[1,3]
3	TPH ($C_{>16}$ – C_{35})	Ultrasonic Extraction, Gas Chromatographic Method[1,3]

เอกสารอ้างอิง

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2. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Closed System Purge and Trap and Extraction for Volatile Organics in Soil and Waste Sample. SW-846 Method 5035A**, 2002.

3. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Nonhalogenated Organics Using GC/FID. SW-846 Method 8015D**, 2003



ที่ อก ๐๓๑๐(๑)/ ๑๑๕๖๗

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๔ สิงหาคม ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด

อ้างถึง ๑. คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๑ สิงหาคม ๒๕๖๕
๒. หนังสือบริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ลงวันที่ ๑๑ สิงหาคม ๒๕๖๕

ตามหนังสือที่อ้างถึง ๑ และ ๒ บริษัท เอ็นไวรอนเมนท์ รีเสริช แอนด์ เทคโนโลยี จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๙๙ สถานที่ตั้งเลขที่ ๒๕/๑๑๔ หมู่ที่ ๖ ซอยชินเขต ๑ ถนนงามวงศ์วาน แขวงทุ่งสองห้อง เขตหลักสี่ กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๙ ราย

๑) ทะเบียนเลขที่ ว-๐๙๙-จ-๗๐๕๔
๒) ทะเบียนเลขที่ ว-๐๙๙-จ-๗๖๗๑
๓) ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๒
๔) ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๑๙
๕) ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๖
๖) ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๒๘
๗) ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๗
๘) ทะเบียนเลขที่ ว-๐๙๙-จ-๘๘๓๘
๙) ทะเบียนเลขที่ ว-๐๙๙-จ-๙๕๒๑

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

๒. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๕ ราย

๑) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๑
๒) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๒
๓) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๓
๔) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๔
๕) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๕
๖) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๖
๗) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๗
๘) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๘
๙) ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๐๙
๑๐ ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๐

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

๑๑) นายพงศ์ปวีร์...

๑๑) **[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]**	ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๑
๑๒)	ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๒
๑๓)	ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๓
๑๔)	ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๔
๑๕)	ทะเบียนเลขที่ ว-๐๙๙-จ-๐๐๑๕

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๐(๑)/๗๓๒๕ ลงวันที่ ๒๙ กรกฎาคม ๒๕๖๔ คือในวันที่ ๑๘ พฤษภาคม ๒๕๖๗ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙
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Head Office/Tax ID 0105 542 064 981

TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

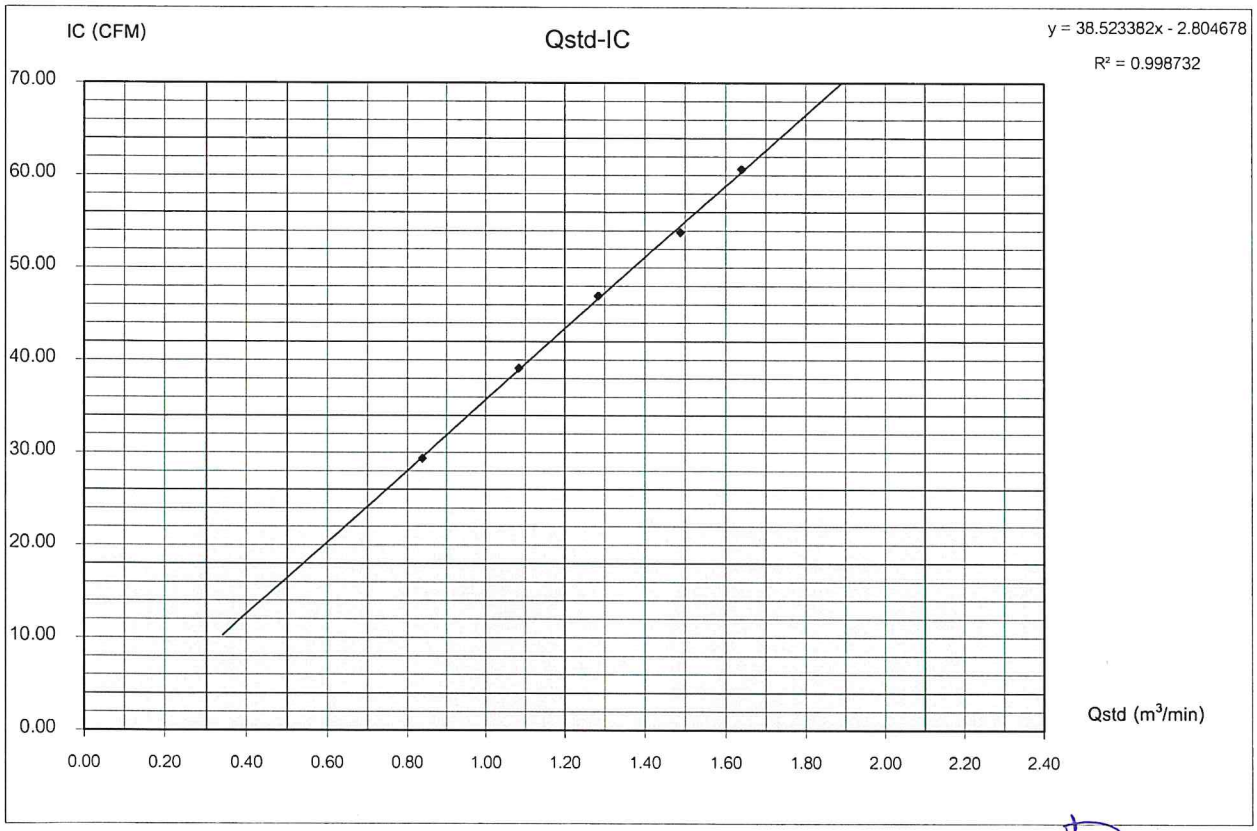
Sampler Location				*Date*	May 23, 2023
St.1 รพ.สต.หนองกระทุ่ม (2023-00689)				*Start Time*	12:16 AM
Sampler Number	TSP No.A12	Transfer Standard Type	Orifice	*Stop Time*	12:26 AM
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A	*Calibrated By*	Mr. Nuttapon Juisup
Motor Serial Number	1203-413	Calibrator Serial Number	3362		
Recorder Serial Number	610-650				

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O)			(A)	(X)	(I)	(Y)	Temparature	Barometric Pressure	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O	$[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Qstd = (1/m)[(A-b)] (m^3/min)	ample Flow Rate Indicatio (ft^3/min)	IC = I[(Pa/P_{std})(T_{std}/Ta)]$^{1/2}$	(°K = °C+273)	(mmHg)		
5	1.5	1.5	3.0	1.69534	0.83880	30.0	29.36	309.0	755.0		
7	2.5	2.5	5.0	2.18867	1.08427	40.0	39.15	309.0	755.0		
10	3.5	3.5	7.0	2.58967	1.28379	48.0	46.98	309.0	755.0		
13	4.7	4.7	9.4	3.00096	1.48843	55.0	53.83	309.0	755.0		
18	5.7	5.7	11.4	3.30482	1.63962	62.0	60.69	309.0	755.0		
Linear Regresslion Y ON X : Y= mX + b							Average	309.0	755.0		

1	Slope (m)	2.00980	Linear Equation			r^2	0.998732	Pstd(mmHg) 760.0
2	Intercept (b)	0.00951	Set Point Flow Rate (X) (m^3/min)		1.133	r	0.9993658	T_{NTP} 298.0
3	Correlation Coefficient (r)	0.99999	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.958056549
Result						C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.978803632

COMMENT

Andersen Instruments, Inc.



[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Approved By .....

ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Technician

Environmental Scientist

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

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www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

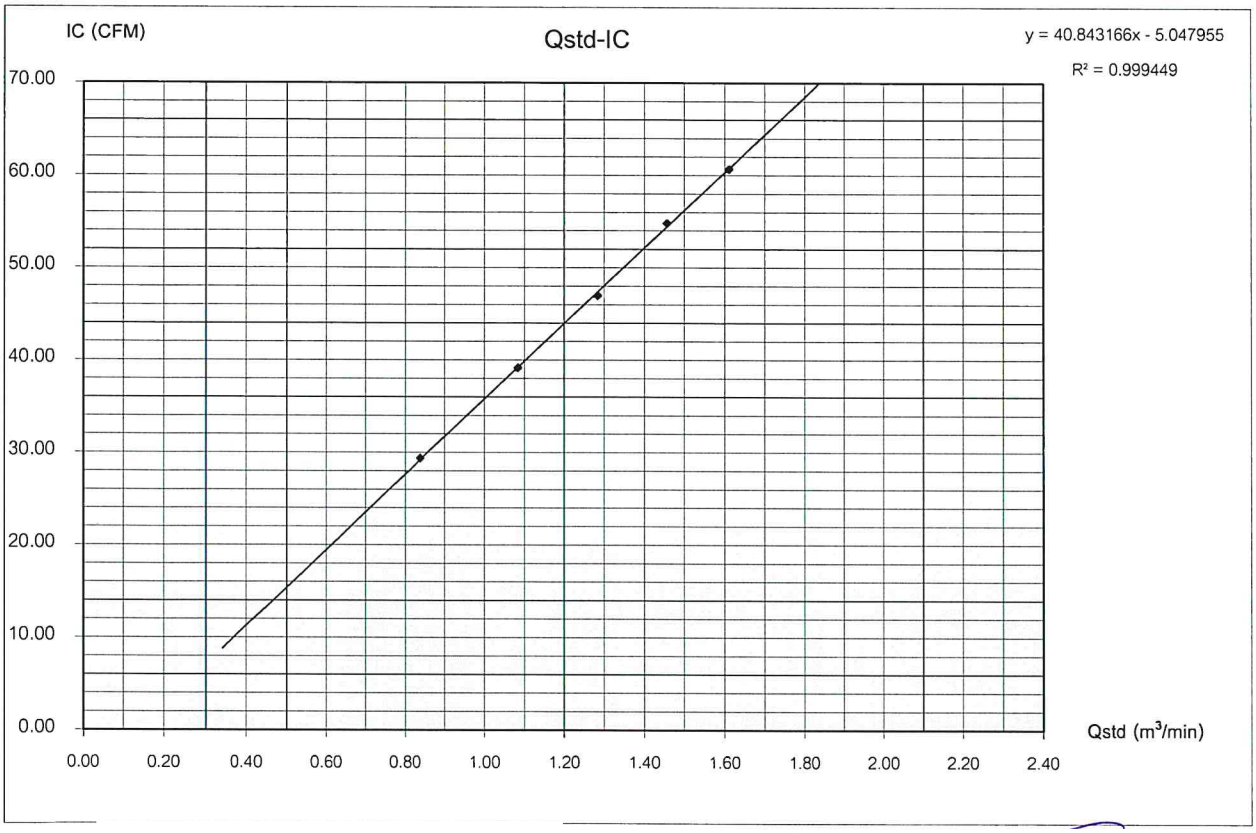
Sampler Location				*Date*	May 23, 2023
St.1 รพ.สต.หนองกระทุ่ม (2023-00689)				*Start Time*	12:05 PM
Sampler Number	PM-10 No.24	Transfer Standard Type	Orifice	*Stop Time*	12:15 PM
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A	*Calibrated By*	Mr. Nuttapon Juisup
Motor Serial Number	2149	Calibrator Serial Number	3362		
Recorder Serial Number	2407				

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O)			(A)	(X)	(I)	(Y)	Temparature	Barometric Pressure	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O	$[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Qstd = (1/m)[(A-b)] (m^3/min)	ample Flow Rate Indicatio (ft^3/min)	IC = I[(Pa/P_{std})(T_{std}/Ta)]$^{1/2}$	(°K = °C+273)	(mmHg)		
5	1.5	1.5	3.0	1.69534	0.83880	30.0	29.36	309.0	755.0		
7	2.5	2.5	5.0	2.18867	1.08427	40.0	39.15	309.0	755.0		
10	3.5	3.5	7.0	2.58967	1.28379	48.0	46.98	309.0	755.0		
13	4.5	4.5	9.0	2.93641	1.45631	56.0	54.81	309.0	755.0		
18	5.5	5.5	11.0	3.24632	1.61052	62.0	60.69	309.0	755.0		
Linear Regresstion Y ON X : Y= mX + b							Average	309.0	755.0		

1	Slope (m)	2.00980	Linear Equation			r^2	0.999449	Pstd(mmHg) 760.0
2	Intercept (b)	0.00951	Set Point Flow Rate (X) (m^3/min)		1.133	r	0.9997245	T_{NTP} 298.0
3	Correlation Coefficient (r)	0.99999	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.958056549
Result						C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.978803632

COMMENT

Andersen Instruments, Inc.



[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Technician

Approved By .....

Environmental Scientist

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
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Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
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TSP HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

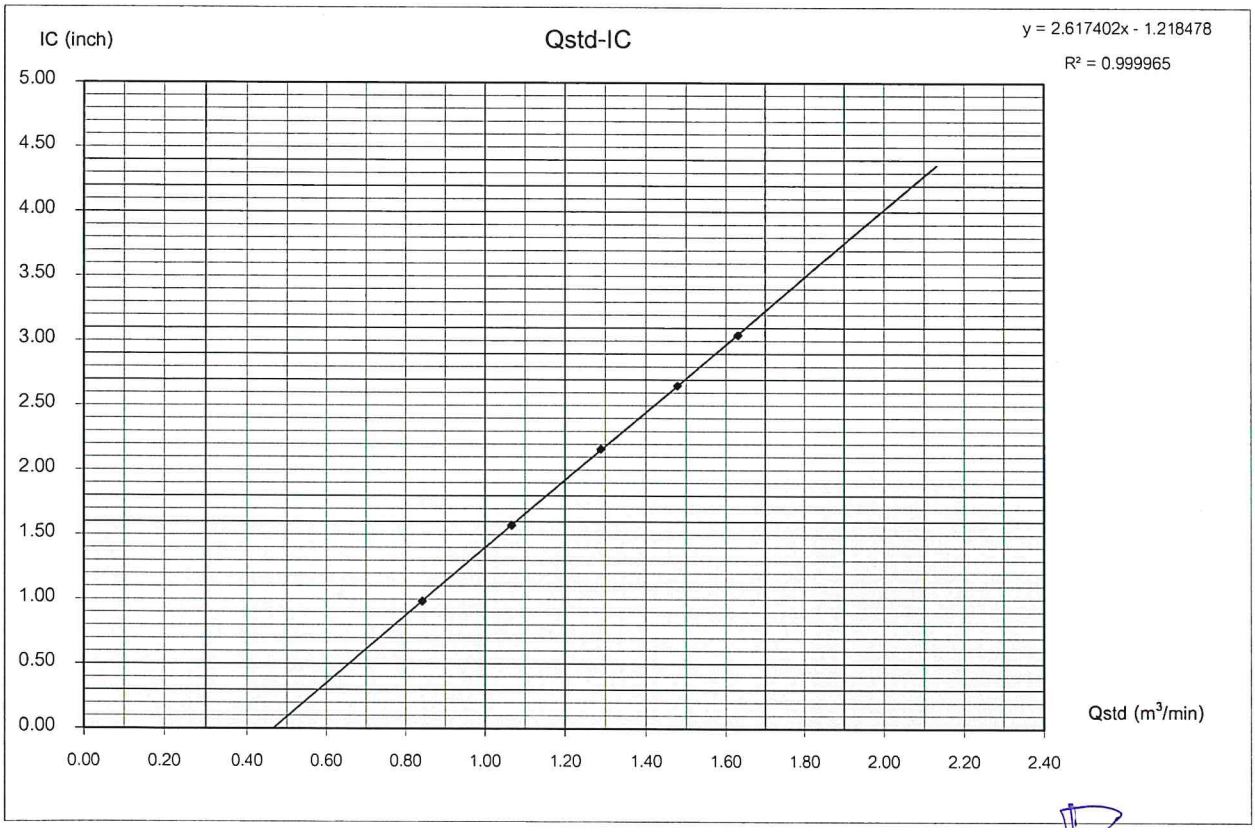
Sampler Location				*Date*	May 23, 2023
St.2 โรงเรียนบ้านหนองหิน (2023-00689)				*Start Time*	1:51 PM
Sampler Number	TSP No.C17	Transfer Standard Type	Orifice	*Stop Time*	2:01 PM
Instrument Model	HIVOL-BBCBE	Calibrator Model	TE-5025A	*Calibrated By*	Mr.Nuttapon Juisup
Motor Serial Number	202002	Calibrator Serial Number	3362		
Recorder Serial Number	-				

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O)			(A) $[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	(X) Qstd = (1/m)[(A-b)] (m^3/min)	(I) ample Flow Rate Indicatio (inch)	(Y) $IC = I[(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Temparature (°K = °C+273)	Barometric Pressure (mmHg)	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O								
5	1.5	1.5	3.0	1.70198	0.84211	1.0	0.98	307.0	756.0		
7	2.4	2.4	4.8	2.15285	1.06644	1.6	1.57	307.0	756.0		
10	3.5	3.5	7.0	2.59981	1.28884	2.2	2.16	307.0	756.0		
13	4.6	4.6	9.2	2.98049	1.47824	2.7	2.65	307.0	756.0		
18	5.6	5.6	11.2	3.28853	1.63152	3.1	3.05	307.0	756.0		
Linear Regresstion Y ON X : Y= mX + b							Average	307.0	756.0		

1	Slope (m)	2.00980	Linear Equation		r^2	0.999965	Pstd(mmHg)	760.0
2	Intercept (b)	0.00951	Set Point Flow Rate (X) (m^3/min)	1.133	r	0.9999825	T_{NTP}	298.0
3	Correlation Coefficient (r)	0.99999	Final Set Flow Rate = (I)	0	(Pa/Pstd)*(Tstd/Ta)		0.965575176	
Result					C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.982636848	

COMMENT

Andersen Instruments, Inc.



[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Technician

Approved By

Environmental Scientist

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

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Tel 0-2954-7745-6 Fax 0-2954-7747
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PM10 HIGH VOLUME AIR SAMPLER CALIBRATION REPORT

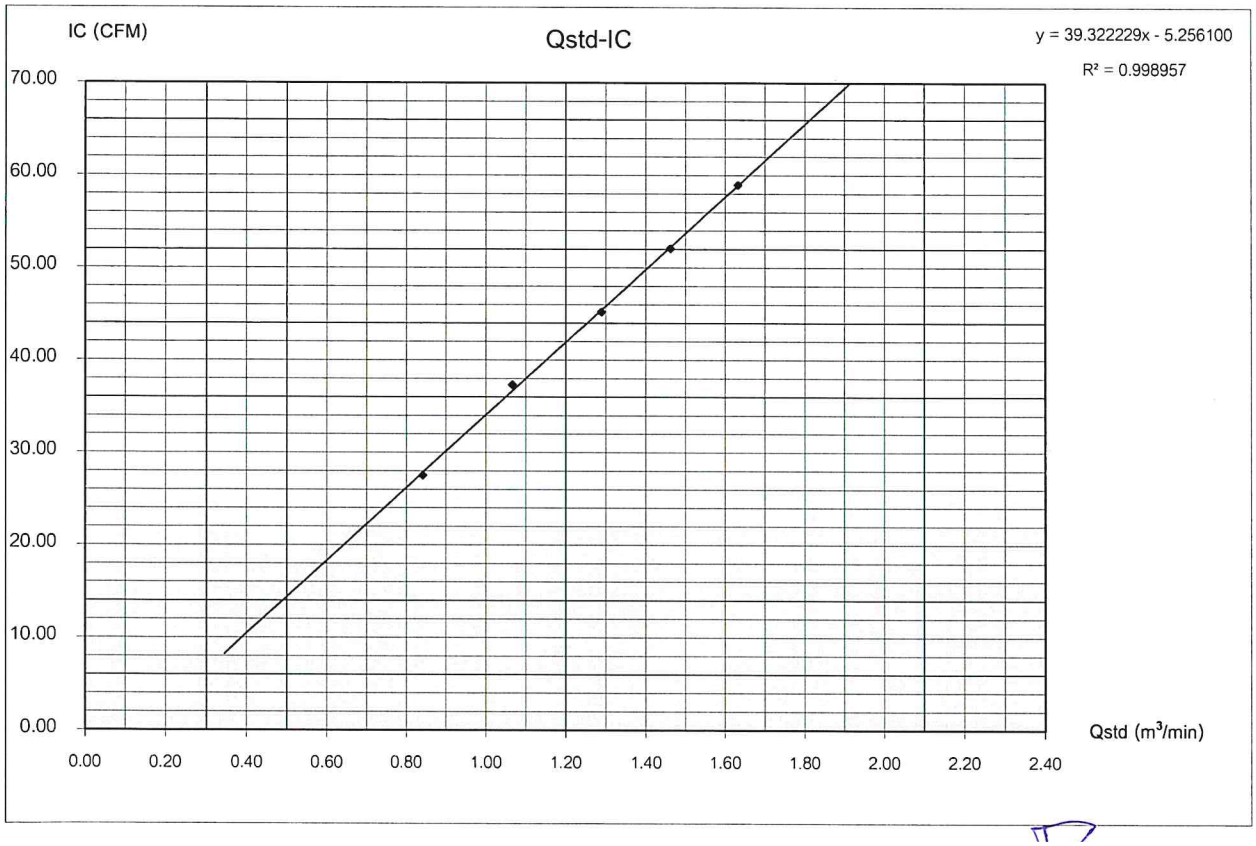
Sampler Location				*Date*	May 23, 2023
St.2 โรงเรียนบ้านหนองหิน (2023-00689)				*Start Time*	1:40 PM
Sampler Number	PM-10 No.25	Transfer Standard Type	Orifice	*Stop Time*	1:50 PM
Instrument Model	HIVOL-BMBBE	Calibrator Model	TE-5025A		
Motor Serial Number	2150	Calibrator Serial Number	3362	*Calibrated By*	Mr.Nuttapon Juisup
Recorder Serial Number	2409				

Plate No.	(Delta H) Pressure Drop Across Orifice (inH_2O)			(A)	(X)	(I)	(Y)	Temparature	Barometric Pressure	Start Meter	Stop Meter
	Positive	Negative	ΔH_2O	$[\Delta H_2O(Pa/P_{std})(T_{std}/Ta)]^{1/2}$	Qstd = (1/m)[(A-b)] (m^3/min)	ample Flow Rate Indicatio (ft^3/min)	IC = I[(Pa/P_{std})(T_{std}/Ta)]$^{1/2}$	(°K = °C+273)	(mmHg)		
5	1.5	1.5	3.0	1.70198	0.84211	28.0	27.51	307.0	756.0		
7	2.4	2.4	4.8	2.15285	1.06644	38.0	37.34	307.0	756.0		
10	3.5	3.5	7.0	2.59981	1.28884	46.0	45.20	307.0	756.0		
13	4.5	4.5	9.0	2.94791	1.46204	53.0	52.08	307.0	756.0		
18	5.6	5.6	11.2	3.28853	1.63152	60.0	58.96	307.0	756.0		
Linear Regresstion Y ON X : Y= mX + b							Average	307.0	756.0		

1	Slope (m)	2.00980	Linear Equation			r^2	0.999977	Pstd(mmHg) 760.0
2	Intercept (b)	0.00951	Set Point Flow Rate (X) (m^3/min)		1.133	r	0.9999885	T_{NTP} 298.0
3	Correlation Coefficient (r)	0.99999	Final Set Flow Rate = (I)		0	(Pa/Pstd)*(Tstd/Ta)		0.965575176
Result						C=(Pa/Pstd)*(Tstd/Ta)^0.5		0.982636848

COMMENT

Andersen Instruments, Inc.



[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Technician

Approved By

Environmental Scientist

TISCH Environmental

RECALIBRATION DUE DATE:
January 17, 2024

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	January 17, 2023	**Rootsmeter S/N:** 438320	**Ta:** 295	°K
Operator:	Jim Tisch		**Pa:** 740.2	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** 3362		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4140	3.2	2.00
2	3	4	1	0.9920	6.4	4.00
3	5	6	1	0.8930	8.0	5.00
4	7	8	1	0.8490	8.8	5.50
5	9	10	1	0.7000	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
0.9795	0.6927	1.4027	0.9957	0.7042	0.8928
0.9753	0.9832	1.9837	0.9914	0.9993	1.2626
0.9732	1.0898	2.2179	0.9892	1.1077	1.4117
0.9721	1.1450	2.3261	0.9881	1.1639	1.4806
0.9668	1.3811	2.8054	0.9827	1.4039	1.7856
QSTD	**m=**	**2.04234**	**QA**	**m=**	**1.27888**
	b=	**-0.01435**		**b=**	**-0.00913**
	r=	**0.99993**		**r=**	**0.99993**

Calculations			
Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

Qstd= $1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

ı Environmental, Inc.
South Miami Avenue
ge of Cleves, OH 45002

www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009

Calibration Certificate ID
TH2036-001-011723-ACC-TH

METTLER TOLEDO

Mettler-Toledo (Thailand) Ltd.
846/4 - 846/5 Lasalle Rd., Bangna Tai Sub-District
Bangna District, Bangkok 10260
+66 2723 0382
MT-TH.ServiceSupport@mt.com

NSC-TISI-TIS 17025
CALIBRATION 0062

Accuracy Calibration Certificate

Customer

Company:	Environment Research & Technology Co., Ltd.		
Address:	25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Rd., Toongsonghong		
City:	Laksi	**Contact:**	Ramita Taengthai
Zip / Postal:	10210		
State / Province:	Bangkok		
Order Number:	*0332617856*		

Weighing Device

Manufacturer:	Mettler Toledo	**Instrument Type:**	Weighing Instrument
Model:	AB204-S	**Asset Number:**	ERTC-L-IN-0048
Serial No.:	1123103723	**Terminal Model:**	N/A
Building:	N/A	**Terminal Serial No.:**	N/A
Floor:	4	**Terminal Asset No.:**	N/A
Room:	406		

Range	Max. Capacity	Readability (d)
1	220 g	0.0001 g

Procedure

Calibration Guideline:	EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction:	CP/W002/20

This calibration certificate contains measurements for As Found and As Left calibrations.

The sensitivity/span of the weighing instrument was adjusted before As Found and As Left calibrations with a built-in weight.

In accordance with EURAMET cg-18 (11/2015), the test loads were selected to reflect the specific use of the weighing device or to accommodate specific calibration conditions.

	Temperature		Humidity	
As Found	Start: 23.6 °C	End: 23.5 °C	Start: 34.6 %	End: 35.1 %
As Left	Start: 23.6 °C	End: 23.5 °C	Start: 35.0 %	End: 35.7 %

As Found Calibration Date:	17-Jan-2023	**Calibrator:**	**[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]**
As Left Calibration Date:	17-Jan-2023		
Issue Date:	19-Jan-2023	**Approved Signatory:**	

Technical Manager / Head of Calibration Center

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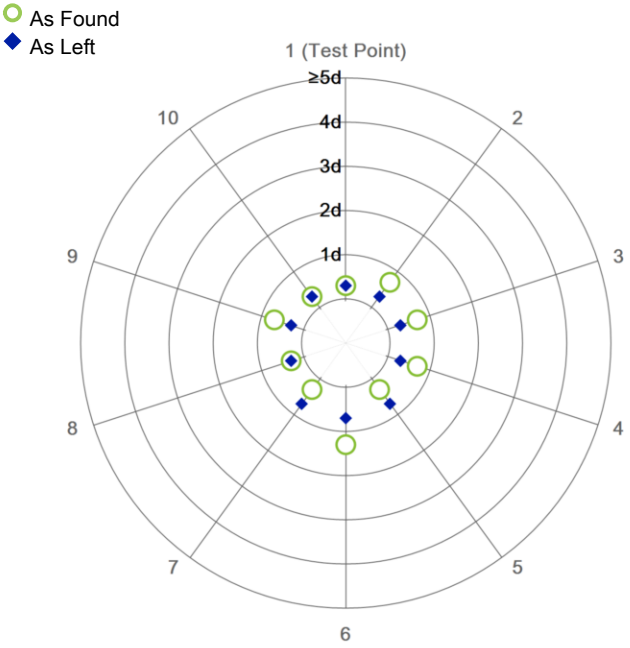
Measurement Results

Repeatability

Test Load: 100 g

	As Found	As Left
1	99.9992 g	100.0001 g
2	99.9991 g	100.0001 g
3	99.9991 g	100.0001 g
4	99.9991 g	100.0001 g
5	99.9992 g	100.0002 g
6	99.9993 g	100.0002 g
7	99.9992 g	100.0002 g
8	99.9992 g	100.0001 g
9	99.9991 g	100.0001 g
10	99.9992 g	100.0001 g

Standard Deviation	**0.00007 g**	**0.00005 g**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

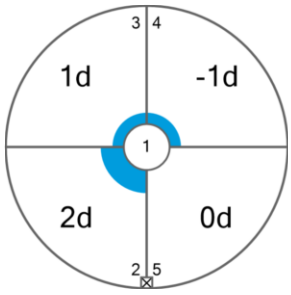
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

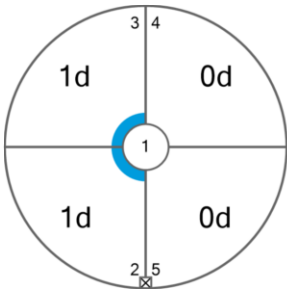
Test Load: 100 g

Position	As Found	As Left
1	99.9991 g	100.0001 g
2	99.9993 g	100.0002 g
3	99.9992 g	100.0002 g
4	99.9990 g	100.0001 g
5	99.9991 g	100.0001 g

Maximum Deviation	**0.0002 g**	**0.0001 g**



As Found



As Left

The "d" in the graph represents the readability of the range/interval in which the test was performed.

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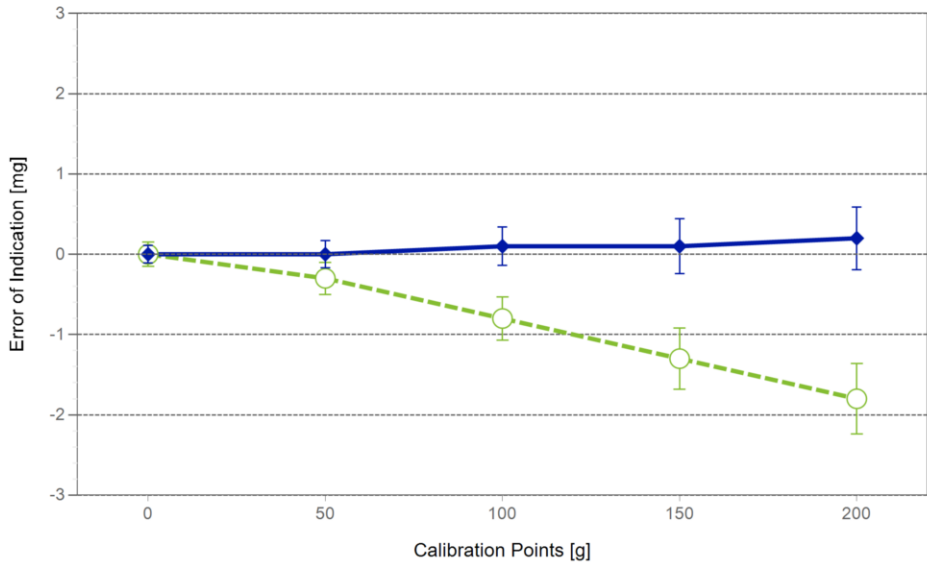
Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.15 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.16 mg	2
3	0.1000 g	0.0999 g	-0.0001 g	0.16 mg	2
4	0.5000 g	0.4999 g	-0.0001 g	0.16 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.16 mg	2
6	5.0000 g	5.0001 g	0.0001 g	0.16 mg	2
7	10.0000 g	10.0001 g	0.0001 g	0.17 mg	2
8	50.0000 g	49.9997 g	-0.0003 g	0.20 mg	2
9	100.0000 g	99.9992 g	-0.0008 g	0.27 mg	2
10	150.0000 g	149.9987 g	-0.0013 g	0.38 mg	2
11	200.0000 g	199.9982 g	-0.0018 g	0.44 mg	2

As Left

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.0000 g	0.0000 g	0.0000 g	0.11 mg	2
2	0.0500 g	0.0500 g	0.0000 g	0.13 mg	2
3	0.1000 g	0.1000 g	0.0000 g	0.13 mg	2
4	0.5000 g	0.5000 g	0.0000 g	0.13 mg	2
5	1.0000 g	1.0000 g	0.0000 g	0.13 mg	2
6	5.0000 g	5.0001 g	0.0001 g	0.13 mg	2
7	10.0000 g	10.0000 g	0.0000 g	0.14 mg	2
8	50.0000 g	50.0000 g	0.0000 g	0.17 mg	2
9	100.0000 g	100.0001 g	0.0001 g	0.24 mg	2
10	150.0000 g	150.0001 g	0.0001 g	0.34 mg	2
11	200.0000 g	200.0002 g	0.0002 g	0.39 mg	2



As Found

As Left

For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-18. The value of the measurand lies within the assigned range of values with a probability of approximately 95%.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

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Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	WS57	Date of Issue:	06-Jan-2022
Certificate Number:	177037	Calibration Due Date:	03-Jul-2023

Thermo Hygrometer

Equipment No.:	IN255	Date of Issue:	20-Jul-2022
Certificate Number:	22H1503	Calibration Due Date:	04-Jul-2023

Remarks

Equipment condition: Good

Next calibration according to customer's procedure

Calibration data not decide by calibration laboratory

End of Accredited Section

The information below and any attachments to this calibration certificate are not part of the accredited calibration.

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Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $3.0 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 3 K

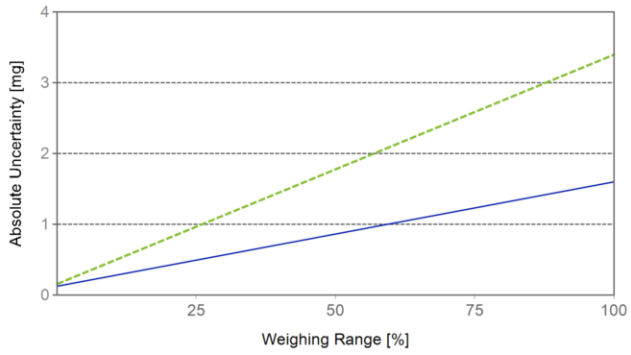
Linearization of Uncertainty Equation

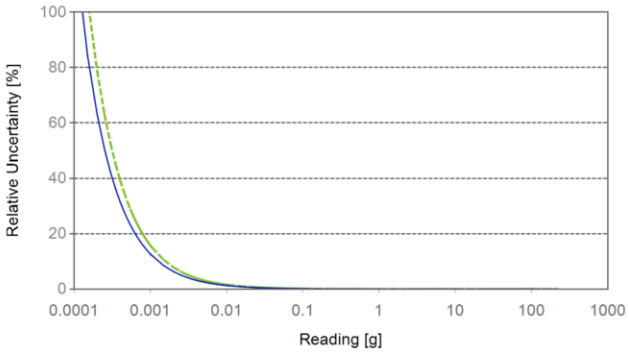
	Range		As Found	As Left
	d	Max		
1	0.0001 g	220 g	U_1 = 0.16 mg + 0.0147 mg/g · R	U_1 = 0.13 mg + 0.00671 mg/g · R

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.0220 g	0.16 mg	0.73%	0.13 mg	0.59%
0.2200 g	0.16 mg	0.074%	0.13 mg	0.060%
2.2000 g	0.19 mg	0.0087%	0.14 mg	0.0066%
22.0000 g	0.48 mg	0.0022%	0.28 mg	0.0013%
220.0000 g	3.4 mg	0.0015%	1.6 mg	0.00073%





As Found — As Left

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METTLER TOLEDO Service

GWP® Certificate

As Found

The weighing device meets the given process requirements.

As Left

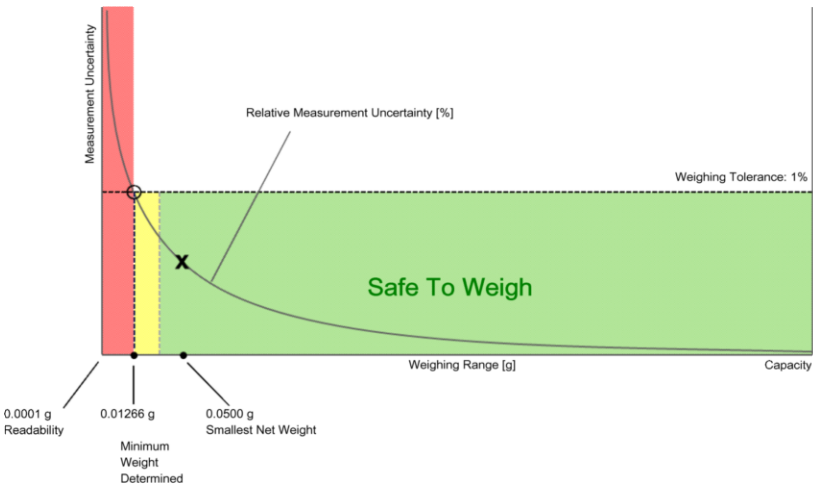
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☑ As Left

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.0500 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

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Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	**1**	**2**	**3**	**5**	**10**
0.1%	0.16012 g	0.32511 g	0.49518 g	0.85155 g	1.85026 g
0.2%	0.07947 g	0.16012 g	0.24199 g	0.40949 g	0.85155 g
0.5%	0.03165 g	0.06348 g	0.09550 g	0.16012 g	0.32511 g
1%	0.01580 g	0.03165 g	0.04754 g	0.07947 g	0.16012 g
2%	0.00789 g	0.01580 g	0.02372 g	0.03959 g	0.07947 g
5%	0.00316 g	0.00631 g	0.00947 g	0.01580 g	0.03165 g

Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	**1**	**2**	**3**	**5**	**10**
0.1%	0.12735 g	0.25642 g	0.38726 g	0.65440 g	1.35584 g
0.2%	0.06346 g	0.12735 g	0.19166 g	0.32162 g	0.65440 g
0.5%	0.02533 g	0.05073 g	0.07620 g	0.12735 g	0.25642 g
1%	0.01266 g	0.02533 g	0.03802 g	0.06346 g	0.12735 g
2%	0.00633 g	0.01266 g	0.01899 g	0.03168 g	0.06346 g
5%	0.00253 g	0.00506 g	0.00759 g	0.01266 g	0.02533 g

Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

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Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed

✗ = Failed

⚠ = Safety Factor not met

Repeatability

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	N/A	0.00007 g*	N/A	0.00005 g*	N/A
0.2%	0.00005 g		✗		⚠
0.5%	0.00013 g		✓		✓
1%	0.00025 g		✓		✓
2%	0.00050 g		✓		✓
5%	0.00125 g		✓		✓

*The calculated standard deviation value is below the rounding error of the balance. The 0.41*d rule is used for the assessment of this repeatability test and the calculation of the minimum weight.

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.0500 g	0.0002 g	✓	0.0001 g	✓
0.2%	0.1000 g		✓		✓
0.5%	0.2500 g		✓		✓
1%	0.5000 g		✓		✓
2%	1.0000 g		✓		✓
5%	2.5000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

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Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	-0.0003 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
100.0000 g	-0.0008 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	-0.0013 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	-0.0018 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.0000 g	0.0000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.0000 g	0.0000 g	0.0250 g	0.0500 g	0.1250 g	0.2500 g	0.5000 g	1.2500 g
100.0000 g	0.0001 g	0.0500 g	0.1000 g	0.2500 g	0.5000 g	1.0000 g	2.5000 g
150.0000 g	0.0001 g	0.0750 g	0.1500 g	0.3750 g	0.7500 g	1.5000 g	3.7500 g
200.0000 g	0.0002 g	0.1000 g	0.2000 g	0.5000 g	1.0000 g	2.0000 g	5.0000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.

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4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 20 August, 2022 Certification No. 342/22

Object : Weather Station

Manufacturer : Davis Instruments Inc.

Type : Vantage Pro2

Serial No. : AS160105025 ID No. : No.24

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1007.4 hPa

NATIONAL STANDARD WIND TUNNEL :

: Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.918802

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Mechanical Engineer

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 342/22

20 August, 2022

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.9	0.12
11.01	-	-	-	10.7	0.31
13.01	-	-	-	13.0	0.01
15.01	-	-	-	14.8	0.21
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.1	-0.08

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by

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Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

กรมอุตุนิยมวิทยา METEOROLOGICAL DEPARTMENT

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 342/22

20 August, 2022

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.1	45.1	0.0
30.2	30.2	0.0
15.4	15.5	-0.1

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Mechanical Engineer

Calibration & Test Section
Meteorological Instruments Bureau

THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 12 April, 2023 Certification No. 158/23

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : Davis Instruments

Type : Vantage Pro2 ID No. : No.30

Serial No. : Display BE181108006 Transmitter AS160105011

Customer : Environment Research & Technology Company Limited.
25/113-114 Moo 6 Soi Chinaket 1, Ngamwongwan Road,
Toongsonghong, Laksi, Bangkok 10210.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1008.5 hPa

NATIONAL STANDARD WIND TUNNEL :

: Thermal Anemometer 642 S/N 91563

: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)

Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 1 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: testo, testo 645 Serial No. 02848067 : Thermoschneider No.918802

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Mechanical Engineer

(Authorised Signatory)

for the Chief

Sub-Standard Instrument

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THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

The Result of Calibration

Certification No. 158/23

12 April, 2023

Standard	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
Ultrasonic Anemometer	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	2.7	0.32
5.00	-	-	-	4.9	0.10
7.00	-	-	-	6.7	0.30
9.02	-	-	-	8.5	0.52
11.01	-	-	-	10.7	0.31
13.01	-	-	-	12.5	0.51
15.01	-	-	-	14.7	0.31
17.02	-	-	-	16.5	0.52
20.02	-	-	-	19.7	0.32

Wind Aloft Plotting Board. US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	270

Calibrated by :

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Calibration & Test Section

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THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 0-2396-0156,0-2399-0469

The Result of Calibration

Certification No. 158/23

12 April, 2023

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
50.1	50.2	-0.1
30.2	30.2	0.0
15.8	16.0	-0.2

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Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

envi research
ENVIRONMENT RESEARCH & TECHNOLOGY CO., LTD.

Environment Research & Technology Company Limited
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Thung Song Hong, Lak Si, Bangkok 10210
Tel 0-2954-7745-6 Fax 0-2954-7747
E-mail : envi@enviresearch.co.th
www.enviresearch.co.th
Head Office/Tax ID 0105 542 064 981

Sound Level Meter Calibration Report

Support Equipment Type : Sound Level Calibrator
Manufacture : LARSON DAVIS
Model : CAL111
Serial No. : 590048
Range of Calibrator
- Sound Pressure Level : 93.9 dB.
- Frequency : 1,000 Hz.
Calibrated By : Mr.Nuttapon Juisup
Calibration Date : May 23, 2023
Customer Name : Consultants of Technology Co., Ltd. : โครงการโรงไฟฟ้าพลังงานแสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกักเก็บพลังงาน (จังหวัดสุพรรณบุรี) ของบริษัท กัลฟ์เอ็นเนอร์จีดีเวลลอปเมนท์ จำกัด (มหาชน)

Item	Equipment			Actual Reading (dB(A))		Status
	Brand	Model	Serial Number	Before Adjustment	After Adjustment	
1	Scarlet	ST-21D	820448	92.1	93.9	Pass
2	Scarlet	ST-21D	820459	94.4	93.9	Pass

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Checked By
Technician

Approved By
Environmental Scientist

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0768 **MTC No.** EEL. BP. 33/0965

CALIBRATION CERTIFICATE

Submitted by : Environment Research & Technology Co.,Ltd.

Address : 25/114 Moo 6, Soi Chinaket 1, Ngamwongwan Road, Toongsonghong, Laksi, Bangkok 10210.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
: Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Calibrator
Manufacturer : BSWA
Model : CA114
Serial No. : 590048

Ambient Environment

Temperature : (23 ± 3) °C
Relative Humidity : (50 ± 15) %
Ambient Pressure : (101.325 ± 1.500) kPa

Standards used :
1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.
3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.
4. Digital Multimeter Agilent 34401A S/N MY44005560.
5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.
6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.
7. Condenser Microphone Bruel&Kjaer 4180 S/N 2633526.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 16 Sep. 2022

Date of Calibration : 23 Sep. 2022

The results relate only to the items tested/calibrated or value assigned.
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Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
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E-mail : sumalee@tistr.or.th

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0768 **MTC No.** EEL. BP. 33/0965

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20μPa at 1000 Hz

Acoustic Output in dB re 20μPa , Corrected to Reference Conditions : 101.325 kPa , 23.0°C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Bruel&Kjaer 4180	93.91	-0.09	± 0.10	±0.75 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Bruel&Kjaer 4180	1000.5	0.5	± 1.5	±2.0%

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 2
1/2 inch Bruel&Kjaer 4180	1.40	± 0.50	±4.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by : **[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]**

Approved by :

...

(

Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 23 Sep. 2022

Date of Issue : 26 Sep. 2022

Ref : 20112650916040830O1

End of Certificate

The results relate only to the items tested/calibrated or value assigned.
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Appendix 4-1

Process of Human Rights Impact Assessment

HRIA Process

The process of HRIA includes scoping, baseline data collection and assessment as follows:

(1) Scoping of Impact and Risks

The first step of HRIA is to scope the potential impact and risk from following sources:

1) Human right issues and related data from Initial Environmental Examination Report (IEE).

2) Human rights risks reference from relevant organization such as Guidance Note on Implementation of Human Rights Assessments under the Equator Principles, Guide to Human Rights Impact Assessment and Management (HRIAM), Guiding Principles on Business and Human Right.

3) Human rights risks that have already occurred and those likely to occur throughout the entire value chain. This includes direct project activities by the project and indirect activities by suppliers or contractors; both of which may cause complicity in human rights violation.

These potential human rights issues are then grouped by topics with potential negative impact/risk and effectors as presented in **Table 1**.

(2) Baseline Data Collection

Baseline data collection is an important step to collect human right risks issues, from participants of human right risks assessment process, who have direct association with those risks issue as initially scoped in **Table 1**.

The Baseline data collection was collected through public consultation with project stakeholders. The result of the public consultation was analyzed and assessed as presented in **Table 2**.

Table 1

Scoping of Relevant Human Rights Issues from Project Implementation Activities

Relevant Human Rights Issues	Potential Negative Impact/Risk	Effectors
Labor rights		
Occupational health and safety	- Risk that workers will face occupational accident during the project construction and operation phase.	- Project Developer - Contractors
Discrimination	- Risk that workers may be treated unfairly (either though recruitment, hiring, management, compensation, career progression/ opportunities, or termination practices) due to certain attributes such as on the basis of their disability, religion, health, ethnicity, gender, sexual orientation, gender, age, indigenous origin, migrant worker status, etc. (as such, it intersects with other rights e.g. right to health).	- Project Developer - Contractors
Wages (pay equity, standard of life)	- Using staff that are paid extremely low wages with no or very limited entitlements to sick pay or leave.	- Project Developer - Contractors
Working Hours	- Mandating unreasonable working hours for employees that are inconsistent with ILO standards, which generally indicate that employees should not be required to work more than 48 hours per week, or ten hours a day, and should have one day off per week.	- Project Developer - Contractors
Community rights		
Community Safety & Standard of Living	- Impact of pollution that is affected by project construction, such as noise and vibration, and waste; - Impacts on public utility services which is affected by labour migration into the area; - Risk that project transportation incurs road accident.	- Project Developer

Table 2

Human Rights Risks in the Project Implementation Activities

Project activity	Respective rights	Description of human rights risks	Receptor	
			Employees	Local community
Labour rights				
Employment of staff and workers (full time and part time) for construction and operation phases	Occupational health and safety	- Risk that workers will face occupational accident during the project construction and operation period.	✓	
	Discrimination	- Risk that workers may be treated unfairly (either though recruitment, hiring, management, compensation, career progression/ opportunities, or termination practices) due to certain attributes such as on the basis of their disability, religion, health, ethnicity, gender, sexual orientation, gender, age, indigenous origin, migrant worker status, etc. (as such, it intersects with other rights e.g. right to health services).	✓	
	Working Hours	- Mandating unreasonable working hours for employees that are inconsistent with ILO standards, which generally indicate that employees should not be required to work more than 48 hours per week, or ten hours a day, and should have one day off per seven days.	✓	
Community Right				
Construction activities	Community Safety & Standard of Living	- Impact of pollution that is affected by the project construction, such as noise and vibration, and waste; - Risk that project transportation incurs road accident; - Conflict between migrant workers and the local people; - Utilization of public infrastructures affected by migrant workers are inadequate to the local people. - Infestation of disease carriers		✓
Operation activities	Community Safety & Standard of Living	- Contamination to the environment ; - Risk that project transportation incurs road accident; - Infestation of disease carriers		✓

(3) Assessment

1) Human Right Risks Assessment Criteria

According to the UN Guiding Principles, Human right assessment considers 2 key parameters i.e. severity of Risk and Likelihood of Occurrence. Consideration on Severity of the identified human rights risks consider the impacts through the 3 factors of which are most severe (based on scale, scope, and remediability). These two dimensions (severity and likelihood), human rights risk assessment criteria is developed to identify level of risks from 1-4 as presented in **Table 3.**

Table 3
Human Rights Risk Assessment Criteria

Criteria for Severity				
	Remediability	**Remediability**	**Remediability**	**Remediability**
Scale	Minor impact to health and safety: first aid case	Slight impact to health and safety: minor injury or illness (no loss time)	Moderate impact to health and safety: serious injury that needs rehabilitation (loss time injury)	Significant impact to health and safety: physical disability or fatality
Scope	No negative impact to stakeholder	Impact to some stakeholders in particular stakeholder group	Impact to most stakeholders in particular stakeholder group	Impact to all stakeholders' group (such as local communities, affected community members, and vulnerable)
Remediability	Take less than a year (<1 year) to restore the impact	Take 1-3 years to restore the impact	Take 3-5 years to restore the impact	Impossible to restore or will take longer than 5 years (>5 years) to restore the impact
Criteria for Likelihood				
	Rare (1)	**Unlikely (2)**	**Possible (3)**	**Likely (4)**
Score	Incident has occurred within the industry, but it is very improbable that the incident will occur in the company's area of operations (<1%)	Incident rarely occurs within the area of operations, but it is possible (1-10%)	Incident occasionally occurs within the area of operations occasionally (10-25%)	Incident occurs within the area of operations several times per year (>25%)

2) Assessment of Level of Human Right Risk

Considering the severity and likelihood of occurrence of each implement activity and plot in the Human Right risk assessment matrix as show in **Figure 1** the level of Human Rights Risk can be obtained in the level of low, medium high or critical with definition of Impact/Risk describe in **Table 4**.

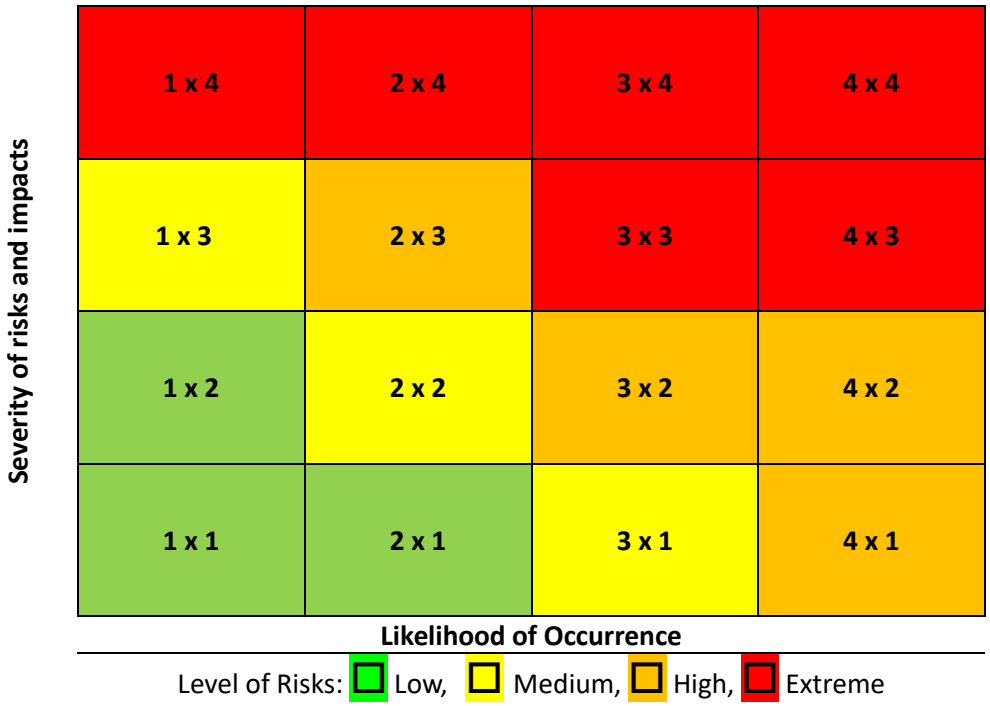


Figure 1 The Human Rights Risk Impact Assessment Matrix

Table 4

Description of the Level of Human Rights Risk/Impact

Level of Risk Impact	Type of Impact
Extreme	- Human rights impact covers a wide scope of area or population, extending beyond the area of operations. - The project cannot control or mitigate human rights impacts to remediate the affected victims and restore them to their original condition. - The impact /incident related to human rights requires the support of an independent, trusted third party to mediate the issue.
High	- The project is complicit in assisting or supporting an activity that resulted in human rights violation (legal complicity). - The human rights impact was caused by the activities of the project or the activities in the project's supply chain, and created impacts on stakeholders in the area of operations. - The project has a human rights conflict with a vulnerable group.
Medium	- The project benefited from activities conducted by external parties that resulted in human rights violation (non-legal complicity). - The project cannot respond to the human rights concerns of internal or external stakeholders.
Low	- Potential human rights impacts and concerns raised by internal or external stakeholders are resolved, with prevention measures put in place. The project's grievance mechanisms are effective.

Appendix 6-1

Invitation letter for pre-engagement meeting

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Appendix 6-2

Letter to disseminating documents for pre-engagement meeting

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Appendix 6-3

Brochure for pre-engagement meeting

SOLAR Farm

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power



โครงการ โรงไฟฟ้า บรีซแอนด์ไชน์ เพาเวอร์

SOLAR Farm

ของ บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด

ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

11 ระยะเวลาในการพัฒนาโครงการ

โครงการใช้ระยะเวลาในการออกแบบ ก่อสร้าง และติดตั้งอุปกรณ์ผลิตไฟฟ้าจนถึงช่วงทดสอบระบบ ประมาณ 21 เดือน

12 วิธีการดำเนินงานของโครงการ

คัดเลือกพื้นที่โครงการและเทคโนโลยีเบื้องต้น → ศึกษาและออกแบบรายละเอียดโครงการ → ศึกษาและจัดทำรายงาน → แจ้งหน่วยงานที่เกี่ยวข้องเพื่อดำเนินการก่อสร้าง → การก่อสร้างและทดสอบระบบ → ดำเนินการผลิตไฟฟ้าและส่งพลังไฟฟ้าเข้าระบบ

13 ขอบเขตการศึกษาและจัดทำรายงาน

ศึกษาและออกแบบรายละเอียดโครงการ → ศึกษาสภาพแวดล้อมปัจจุบัน ขอบเขตการโดยมีพื้นที่ศึกษา 3 กิโลเมตร → ศึกษาและจัดทำรายงาน → การประเมินผลกระทบสิ่งแวดล้อม → กิจกรรมด้านการประชาสัมพันธ์เริ่มแต่การมีส่วนร่วมของประชาชน → การจัดทำรายงาน

14 การดำเนินกิจกรรมด้านการประชาสัมพันธ์และการมีส่วนร่วมของประชาชน

กลุ่มผู้มีส่วนได้เสียของโครงการ

1. กลุ่มผู้ได้รับผลกระทบหรือผู้มีส่วนได้เสีย ประกอบด้วย
   - ประชาชนในพื้นที่ศึกษา
   - ผู้นำชุมชนในพื้นที่ศึกษา
   - กลุ่มเปราะบาง เช่น กลุ่มสตรี เด็ก คนพิการ แรงงานข้ามชาติ เป็นต้น
   - กลุ่มชาติพันธุ์
2. กลุ่มหน่วยงานราชการในระดับต่างๆ ที่เกี่ยวข้อง
3. ประชาชน/ผู้สนใจทั่วไป

การเผยแพร่และประชาสัมพันธ์ของโครงการ

โครงการดำเนินการนำเอกสารเผยแพร่ข้อมูลของโครงการไปประชาสัมพันธ์ ณ บอร์ดประชาสัมพันธ์ของสถานที่ต่างๆ ในพื้นที่ศึกษา ประกอบด้วย

- พื้นที่ตั้งโครงการ
- สำนักงานคณะกรรมการกำกับกิจการพลังงาน ประจำเขต 9 (กาญจนบุรี)
- สำนักงานอุตสาหกรรมจังหวัดสุพรรณบุรี
- ที่ว่าการอำเภอในพื้นที่ศึกษา
- องค์กรปกครองส่วนท้องถิ่นในพื้นที่ศึกษา
- ที่ทำการผู้นำชุมชนในพื้นที่ศึกษา หรือศาลาประชาคมหมู่บ้านในพื้นที่ศึกษา
- โรงเรียน ศาสนสถาน สวนสาธารณะของชุมชน และตลาดในพื้นที่ศึกษา

ช่องทางการติดต่อสอบถามข้อมูลและรับฟังความคิดเห็น

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด
(เจ้าของโครงการ)
87 อาคารเอ็มไทย ทาวเวอร์ ออลซีซั่น เพลส ชั้น 26 ถนนวิทยุ แขวงลุมพินี เขตปทุมวัน กรุงเทพมหานคร 10330

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

บริษัท คอนซัลแทนท์ ออฟ เทคโนโลยี จำกัด
(บริษัทที่ปรึกษาด้านสิ่งแวดล้อม)
39 ออลาดพร้าว 124 ถนนลาดพร้าว แขวงพลับพลา เขตวังทองหลาง กรุงเทพมหานคร 10310

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

บรีซแอนด์ไชน์ เพาเวอร์ Breeze and Shine Power

Consultants of Technology

01 เหตุผลความจำเป็นของโครงการ

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด มีแผนที่จะพัฒนาโครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์ ซึ่งเป็นโครงการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ด้วยเทคโนโลยีแผงโฟโตโวลเทอิก หรือเซลล์แสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกับระบบกักเก็บพลังงานเพื่อจำหน่ายไฟฟ้าให้แก่ภาครัฐ ตามนโยบายให้การสนับสนุนการผลิตไฟฟ้าจากพลังงานทดแทนหรือพลังงานทางเลือก โดยพลังงานแสงอาทิตย์เป็นหนึ่งในพลังงานทดแทนหรือพลังงานทางเลือกที่สะอาด สามารถนำมาใช้งานได้อย่างไม่จำกัด ไม่ก่อให้เกิดมลภาวะทางสิ่งแวดล้อม และเป็นการส่งเสริมความมั่นคงด้านพลังงานในระยะยาว ทั้งนี้ การพัฒนาดังกล่าวเข้าข่ายต้องจัดทำรายงานประมวลหลักการปฏิบัติ (CoP) และรายงานการศึกษามาตรการป้องกันและแก้ไขผลกระทบต่อคุณภาพสิ่งแวดล้อมและความปลอดภัย (ESA) เพื่อประกอบการขออนุญาตดำเนินโครงการ

02 วัตถุประสงค์ของโครงการ

- เพื่อส่งเสริมการผลิตไฟฟ้าจากพลังงานหมุนเวียน ตามแผนการเพิ่มการผลิตไฟฟ้าจากพลังงานสะอาด ภายใต้แผน PDP2018 Revision 1 และแผนพัฒนาพลังงานทดแทนและพลังงานทางเลือก พ.ศ. 2561-2580 โดยการเพิ่มสัดส่วนกำลังการผลิตไฟฟ้าจากพลังงานสะอาดในรูปแบบต่างๆ
- เพื่อสนับสนุนให้ประเทศไทยสามารถมุ่งสู่พลังงานสะอาดและลดการปล่อยก๊าซคาร์บอนไดออกไซด์สุทธิเป็นศูนย์ ภายในปี พ.ศ. 2608-2609 โดยการเพิ่มสัดส่วนการผลิตไฟฟ้าจากพลังงานทดแทน

03 ประโยชน์ของโครงการ

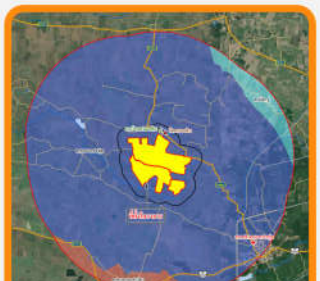
- การพัฒนาโครงการโรงไฟฟ้าพลังงานแสงอาทิตย์เป็นการใช้ทรัพยากรธรรมชาติที่มีอยู่เป็นวัตถุดิบในการผลิตพลังงาน จึงส่งผลกระทบต่อชุมชนโดยรอบพื้นที่โครงการค่อนข้างต่ำ
- เพิ่มสัดส่วนกำลังการผลิตไฟฟ้าจากพลังงานหมุนเวียนภายในประเทศ และช่วยลดการผลิตไฟฟ้าจากเชื้อเพลิงฟอสซิลที่เป็นต้นเหตุของการปล่อยก๊าซเรือนกระจกตามนโยบายภาครัฐ
- เงินกองทุนพัฒนาไฟฟ้า ตามระเบียบสำนักงานคณะกรรมการกำกับกิจการพลังงาน
- การจ้างแรงงานในท้องถิ่น
- การสนับสนุนงบประมาณในการพัฒนาชุมชน
- ภาษีโรงเรือนและที่ดิน และภาษีป้าย

04 ข้อมูลโครงการเบื้องต้น

เจ้าของโครงการ : บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด
ที่ตั้งโครงการ : ต.หนองกระทุ่ม อ.เดิมบางนางบวช จ.สุพรรณบุรี
ขนาดพื้นที่โครงการ : 1,051.96 ไร่
ประเภทโครงการ : ผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ แบบติดตั้งบนพื้นดินร่วมกับระบบกักเก็บพลังงาน
กำลังการผลิตไฟฟ้าติดตั้ง : 144.000 MW_{AC} (199.456 MW_p)
พลังงานไฟฟ้าที่ผลิตได้ต่อปี : 334.904 จิกะวัตต์ชั่วโมงต่อปี (GWh/year)

เครื่องจักรหลัก :

- **แผงเซลล์แสงอาทิตย์ (Solar Panel)**
  ขนาด 605 วัตต์ต่อแผง หรือเทียบเท่าประมาณ 329,680 แผง
- **เครื่องแปลงกระแสไฟฟ้า (Inverter)**
  ขนาดกำลังการผลิต 300 กิโลวัตต์ จำนวน 480 ชุด หรือเทียบเท่า
- **หม้อแปลงไฟฟ้า (Transformer)**
  ขนาด 90 เมกะโวลต์แอมแปร์ จำนวน 1 ชุด
- **ระบบกักเก็บพลังงาน (Battery Energy Storage System; BESS)**
  ขนาด 2.752 MWh จำนวน 42 ชุด

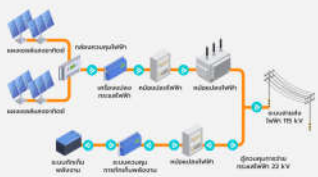


05 พื้นที่ศึกษาโครงการ

โครงการกำหนดพื้นที่ศึกษารัศมี 3 กิโลเมตร จากขอบเขตพื้นที่ตั้งโครงการ ตามระเบียบคณะกรรมการกำกับกิจการพลังงาน ว่าด้วยการรับฟังความคิดเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสีย ในการพิจารณาออกใบอนุญาตประกอบกิจการผลิตไฟฟ้า พ.ศ. 2565 ซึ่งครอบคลุมพื้นที่บางส่วนของตำบลหนองกระทุ่ม ตำบลบ่อกรุ อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี และตำบลหนองมะค่าโมง อำเภอด่านช้าง จังหวัดสุพรรณบุรี

จังหวัด	อำเภอ	ตำบล	หมู่ที่
สุพรรณบุรี	เดิมบางนางบวช	หนองกระทุ่ม	1,2,3,5,6,7,8
		บ่อกรุ	3,4
	ด่านช้าง	หนองมะค่าโมง	1,7

06 กระบวนการผลิตไฟฟ้า



กระบวนการผลิตกระแสไฟฟ้า จะเริ่มจากแสงอาทิตย์ซึ่งเป็นคลื่นแม่เหล็กไฟฟ้ามากระทบกับแผงเซลล์แสงอาทิตย์ที่มีสารกึ่งตัวนำจนเกิดอนุภาคที่มีประจุไฟฟ้าบวกและลบเคลื่อนที่ไปในทิศทางตรงกันข้าม ซึ่งการเคลื่อนที่ของอนุภาคประจุบวกและลบดังกล่าวจะทำให้เกิดไฟฟ้ากระแสตรงขึ้น โดยไฟฟ้ากระแสตรงดังกล่าวจะถูกส่งไปยังอุปกรณ์ที่เรียกว่า "เครื่องแปลงกระแสไฟฟ้า (Inverter)" เพื่อแปลงกระแสไฟฟ้ากระแสตรงให้เป็นไฟฟ้ากระแสสลับ แล้วส่งเข้าสู่หม้อแปลงไฟฟ้าเพื่อแปลงให้เป็นไฟฟ้าแรงดันสูงและจ่ายไฟฟ้าเข้าสู่ระบบสายส่ง เพื่อจำหน่ายให้แก่การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) ต่อไป

นอกจากนี้ โครงการยังมีระบบกักเก็บพลังงาน (Battery Energy Storage System; BESS) หรือแบตเตอรี่ ซึ่งระบบกักเก็บพลังงานจะทำหน้าที่ในการกักเก็บไฟฟ้าส่วนเกินที่ผลิตได้ไว้ภายในแบตเตอรี่ และในช่วงที่ผลิตไฟฟ้าได้น้อย พลังงานไฟฟ้าที่กักเก็บไว้ภายในแบตเตอรี่จะถูกส่งเข้าสู่ระบบสายส่ง เพื่อจำหน่ายให้แก่การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) ต่อไป

07 การคัดเลือกพื้นที่โครงการและเทคโนโลยี

การคัดเลือกพื้นที่โครงการ : โครงการกำหนดให้พื้นที่โครงการต้องสามารถใช้ประโยชน์ในการประกอบกิจการผลิตไฟฟ้าได้ โดยไม่ขัดต่อกฎหมายหรือระเบียบที่มีการบังคับใช้

- ต้องไม่ขัดต่อกฎหมายว่าด้วยผังเมือง
- ต้องไม่ขัดต่อกฎหมายว่าด้วยการส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติ
- ต้องไม่ขัดต่อกฎหมายว่าด้วยโบราณสถานและโบราณวัตถุ
- ต้องไม่ขัดต่อมติคณะรัฐมนตรี

ทั้งนี้ พื้นที่โครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์ ตั้งอยู่ที่ ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี ซึ่งจากการตรวจสอบพบว่าพื้นที่ดังกล่าวสามารถดำเนินการได้โดยไม่ขัดต่อกฎหมายที่มีผลบังคับใช้ในปัจจุบัน

การคัดเลือกเทคโนโลยี : โครงการเลือกใช้แผงซิลิคอน *ชนิดโมโนคริสตัลไลน์ (Monocrystalline)* เนื่องจากเป็นเทคโนโลยีที่มีประสิทธิภาพการผลิตไฟฟ้าดีที่สุด

แผงซิลิคอนชนิดโมโนคริสตัลไลน์	แผงซิลิคอนชนิดโพลีคริสตัลไลน์	แผงชนิดอะมอร์ฟัส
- ผลิตไฟฟ้าได้ดีที่สุด - ใช้พื้นที่น้อย - อายุงาน > 25 ปี - เงาบังผลกระทบต่อการผลิตไฟฟ้า	- ผลิตไฟฟ้าน้อยกว่าโมโนคริสตัลไลน์ - ใช้พื้นที่มาก - อายุงาน > 25 ปี - เงาบังผลกระทบต่อการผลิตไฟฟ้า	- ผลิตไฟฟ้าได้น้อยที่สุด - ใช้พื้นที่มากที่สุด - เสื่อมสภาพเร็ว - เงาบังผลกระทบต่อการผลิตไฟฟ้าน้อย

08 ระบบสาธารณูปโภค

น้ำใช้ :
ระยะก่อสร้างและดำเนินการ
โครงการจะรับน้ำประปาจากการประปาส่วนภูมิภาค สาขาด่านช้าง เพื่อนำมาใช้ภายในโครงการ

ไฟฟ้า :
ระยะก่อสร้าง
โครงการจะใช้ไฟฟ้าจากการไฟฟ้าส่วนภูมิภาค
ระยะดำเนินการ
จะนำไฟฟ้าที่ผลิตได้มาใช้ภายในโครงการ

09 ผลกระทบสิ่งแวดล้อมและการจัดการ

ผลกระทบด้านสิ่งแวดล้อมจากการดำเนินโครงการโรงไฟฟ้าจากพลังงานแสงอาทิตย์*ก่อนข้างต่ำ โดยผลกระทบหลักอยู่ในระยะก่อสร้าง* ซึ่งสามารถจำแนกผลกระทบได้ดังนี้

	ปัจจัย	กิจกรรมที่ก่อให้เกิดผลกระทบ	มาตรการเบื้องต้น
ระยะก่อสร้าง	คุณภาพอากาศ	• การปรับสภาพพื้นที่/ขุดเจาะดิน • การขนส่งอุปกรณ์และคนงานก่อสร้าง	• ฉีดพรมน้ำบริเวณพื้นที่ก่อสร้างโครงการและถนนของโครงการ • ล้างล้อรถบรรทุกก่อนออกจากพื้นที่โครงการ • ดูแลอุปกรณ์ให้งานในการก่อสร้างให้มีสภาพดีเสมอ
	ระดับเสียง	• การเดินเครื่องยนต์เครื่องจักร • การปรับสภาพพื้นที่/ขุดเจาะดิน	• เลือกใช้เครื่องจักรที่มีเสียงเบา • กำหนดช่วงเวลาดำเนินงานที่ก่อให้เกิดเสียงเฉพาะในช่วงเวลากลางวันเท่านั้น
	คมนาคม	• การขนส่งอุปกรณ์และคนงานก่อสร้าง	• จัดให้มีป้ายหรือสัญญาณเตือนที่เห็นได้ชัด • อบรมและควบคุมพนักงานขับรถให้ปฏิบัติตามกฎจราจรอย่างเคร่งครัด
	การใช้น้ำ/น้ำทิ้ง	• จากกิจกรรมการก่อสร้างและคนงานก่อสร้าง	• เลือกใช้น้ำจากแหล่งน้ำที่เหมาะสม • หลีกเลี่ยงการใช้น้ำร่วมกับชุมชน • พิจารณาเลือกวิธีการจัดการน้ำทิ้งอย่างเหมาะสม

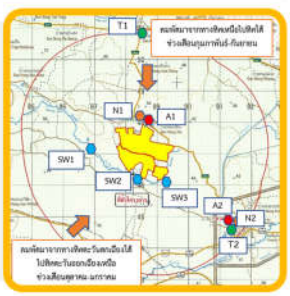
	ปัจจัย	กิจกรรมที่ก่อให้เกิดผลกระทบ	มาตรการเบื้องต้น
ระยะดำเนินการ	การใช้น้ำ/น้ำทิ้ง	• จากการล้างแผงเซลล์แสงอาทิตย์ • จากพนักงานของโครงการ	• เลือกใช้น้ำจากแหล่งน้ำที่เหมาะสม • หลีกเลี่ยงการใช้น้ำร่วมกับชุมชน • พิจารณาเลือกวิธีการจัดการน้ำทิ้งอย่างเหมาะสม

10 การศึกษาสภาพแวดล้อมปัจจุบัน

การศึกษาสภาพแวดล้อมปัจจุบันของโครงการจะดำเนินการในรัศมี*พื้นที่ศึกษา 3 กิโลเมตร* จากขอบเขตพื้นที่ตั้งโครงการ โดยกำหนดการสำรวจสิ่งแวดล้อมภาคสนามตามปัจจัยสิ่งแวดล้อมที่เกี่ยวข้อง ประกอบด้วย คุณภาพอากาศ บรรยากาศ ระดับเสียง คุณภาพน้ำผิวดิน นิเวศวิทยาทางน้ำ และคมนาคมขนส่ง

จุดตรวจวัดคุณภาพสิ่งแวดล้อม ดังนี้

- **คุณภาพอากาศ**
  2 สถานี 5 วันต่อเนื่อง
  จำนวน 2 ครั้ง
  A1: โรงเรียนบ้านหนองคีม
  A2: รพ.สต. หนองกระทุ่ม
- **คุณภาพน้ำผิวดินและนิเวศวิทยาทางน้ำ**
  3 สถานี จำนวน 1 ครั้ง
  SW1: ห้วยคีม (ด้านทิศตะวันตกโครงการ)
  SW2: ห้วยคีม (ด้านทิศใต้โครงการ)
  SW3: ห้วยคีม (ด้านทิศตะวันออกโครงการ)
- **ระดับเสียง**
  2 สถานี 5 วันต่อเนื่อง
  จำนวน 1 ครั้ง
  N1: โรงเรียนบ้านหนองคีม
  N2: รพ.สต. หนองกระทุ่ม
- **จุดตรวจนับปริมาณจราจร**
  T1: ทางหลวงชนบทหมายเลข 4086 (ก่อนถึงจุดตัด ทล.4027)
  T2: ทางหลวงชนบทหมายเลข 4086 (รพ.สต. หนองกระทุ่ม)



Appendix 6-4

Presentation for pre-engagement meeting

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

การรับฟังความเห็นของประชาชนและผู้มีส่วนได้เสีย ต่อการจัดทำรายงานสิ่งแวดล้อม

โครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์

ของ บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด

ตั้งอยู่ที่ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

วันอังคารที่ 23 พฤษภาคม พ.ศ. 2566 เวลา 09.00-12.00 น.

ห้องประชุมเทศบาลตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

เหตุผลและความจำเป็นของโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด มีแผนที่จะพัฒนาโครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์ ซึ่งเป็นโครงการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ด้วยเทคโนโลยีแผงโฟโตโวลเทอิกหรือ**เซลล์แสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกับระบบกักเก็บพลังงาน** เพื่อจำหน่ายไฟฟ้าให้แก่ภาครัฐตามนโยบายให้การสนับสนุนการผลิตไฟฟ้าจากพลังงานทดแทนหรือพลังงานทางเลือก โดยพลังงานแสงอาทิตย์เป็นหนึ่งในพลังงานทดแทนหรือพลังงานทางเลือกที่สะอาด สามารถนำมาใช้งานได้อย่างไม่จำกัด ไม่ก่อให้เกิดมลภาวะทางสิ่งแวดล้อม และช่วยส่งเสริมความมั่นคงด้านพลังงานในระยะยาว

ทั้งนี้ การพัฒนาโครงการดังกล่าวเข้าข่ายต้องจัดทำรายงานประมวลหลักการปฏิบัติ (CoP) และรายงานการศึกษามาตรการป้องกันและแก้ไขผลกระทบต่อคุณภาพสิ่งแวดล้อมและความปลอดภัย (ESA) เพื่อประกอบการขออนุญาตดำเนินโครงการต่อหน่วยงานที่เกี่ยวข้อง

วัตถุประสงค์ของการประชาสัมพันธ์โครงการ

- เพื่อ**ให้ข้อมูลเบื้องต้น**ของโครงการกับชุมชนได้รับทราบ
- เพื่อเปิดโอกาสให้ประชาชนและ**ผู้มีส่วนได้เสียได้มีส่วนร่วม**กับการพัฒนาโครงการตั้งแต่เริ่มต้น
- เพื่อนำข้อมูลที่ได้จากการประชุมมา**กำหนดแนวทางศึกษา/มาตรการลดผลกระทบด้านสิ่งแวดล้อม** และข้อห่วงกังวลที่อาจเกิดขึ้นจากการพัฒนาโครงการ

การจัดทำรายงาน CoP

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

สำนักงานคณะกรรมการกำกับกิจการพลังงาน

ระเบียบคณะกรรมการกำกับกิจการพลังงานว่าด้วย หลักเกณฑ์การจัดทำรายงานประมวลหลักภารปฏิบัติและรายงานผลการปฏิบัติตามประมวลหลักการปฏิบัติ สำหรับการประกอบกิจการผลิตไฟฟ้า พ.ศ. 2565



ระเบียบคณะกรรมการกำกับกิจการพลังงานว่าด้วย การรับฟังความเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสียในการพิจารณาออกใบอนุญาตประกอบกิจการผลิตไฟฟ้า พ.ศ. 2565

การจัดทำรายงาน ESA

กรมโรงงานอุตสาหกรรม
DEPARTMENT OF INDUSTRIAL WORKS



ประกาศกระทรวงอุตสาหกรรม เรื่อง การทำรายงานเกี่ยวกับการศึกษามาตรการป้องกันและแก้ไขผลกระทบต่อคุณภาพสิ่งแวดล้อมและความปลอดภัย (ฉบับที่ 3) พ.ศ. 2559

ประโยชน์ของโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

ภาพรวม:

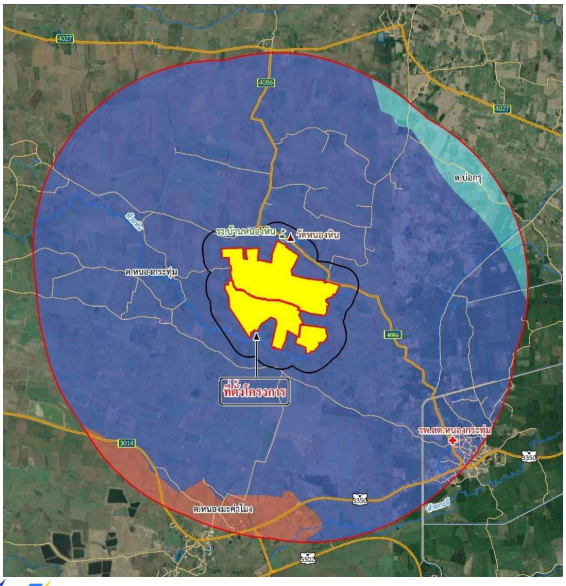
- การพัฒนาโครงการโรงไฟฟ้าพลังงานแสงอาทิตย์เป็นการใช้ทรัพยากรธรรมชาติที่มีอยู่เป็นวัตถุดิบในการผลิตพลังงาน จึงส่งผลกระทบต่อชุมชนโดยรอบพื้นที่โครงการค่อนข้างต่ำ
- เพิ่มสัดส่วนกำลังการผลิตไฟฟ้าจากพลังงานหมุนเวียนภายในประเทศ และช่วยลดการผลิตไฟฟ้าจากเชื้อเพลิงฟอสซิลที่เป็นต้นเหตุของการปล่อยก๊าซเรือนกระจกตามนโยบายภาครัฐ

ระดับพื้นที่:

- เงินกองทุนพัฒนาไฟฟ้า ตามระเบียบสำนักงานคณะกรรมการกำกับกิจการพลังงาน
- การจ้างแรงงานในท้องถิ่น
- การสนับสนุนงบประมาณในการพัฒนาชุมชน
- ภาษีโรงเรือนและที่ดิน และภาษีป้าย

รายละเอียดโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power



เจ้าของโครงการ : บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด

ประเภทโครงการ : โรงไฟฟ้าพลังงานแสงอาทิตย์ด้วยเทคโนโลยีแผงโฟโตโวลเทอิก หรือเซลล์แสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกับระบบกักเก็บพลังงาน

ที่ตั้งโครงการ : ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

ขนาดพื้นที่โครงการ : ประมาณ 1,052 ไร่

กำลังการผลิตไฟฟ้าติดตั้ง : 144.000 MW_{AC} (199.456 MW_P)

ระยะเวลาในการก่อสร้าง : โครงการใช้ระยะเวลาในการออกแบบ ก่อสร้าง ติดตั้งอุปกรณ์ผลิตไฟฟ้า จนถึงช่วงทดสอบระบบ ประมาณ 21 เดือน

กำลังการผลิตและเครื่องจักรหลักที่ติดตั้ง

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

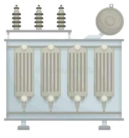
กำลังการผลิตไฟฟ้าติดตั้ง : 144.000 MW_{AC} (199.456 MW_P)



แผงเซลล์แสงอาทิตย์ชนิดซิลิกอน : ขนาด 605 วัตต์ต่อแผง หรือเทียบเท่า จำนวน 329,680 แผง



เครื่องแปลงกระแสไฟฟ้า (Inverter) : ขนาดกำลังการผลิต 300 กิโลวัตต์ จำนวน 480 ชุด หรือเทียบเท่า



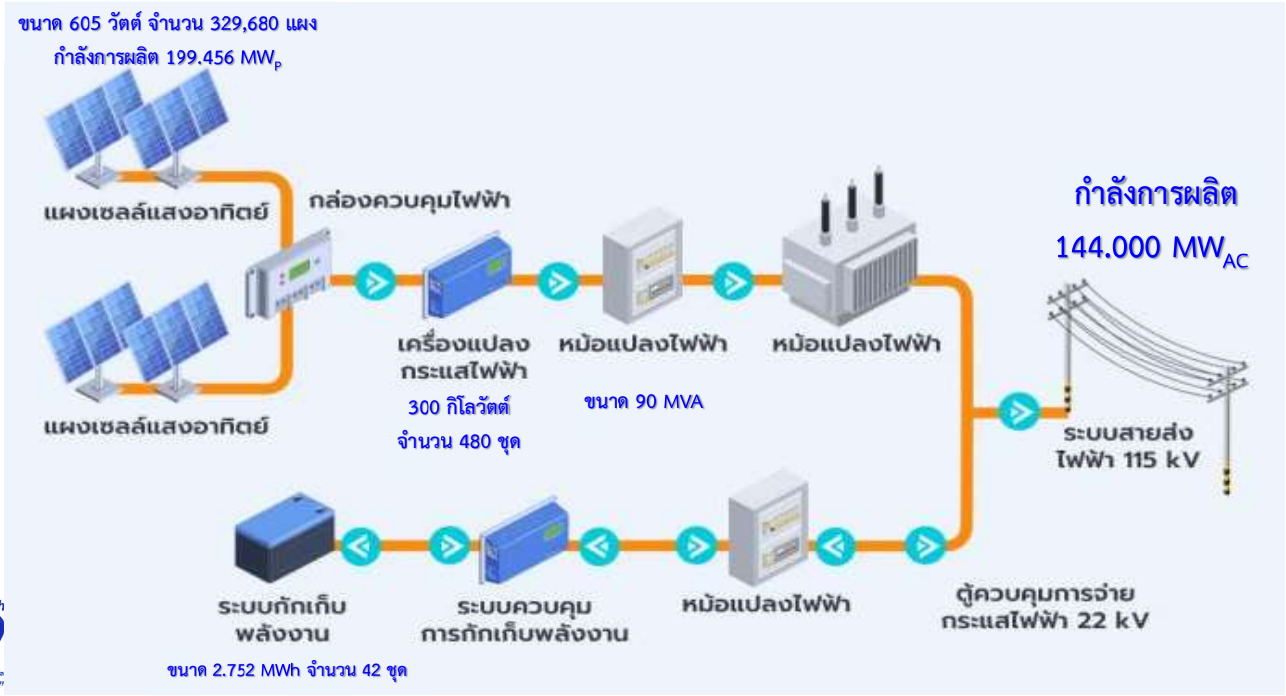
หม้อแปลงไฟฟ้า : ขนาด 90 เมกะโวลต์แอมแปร์ จำนวน 1 ชุด



ระบบกักเก็บพลังงาน (BESS) : ขนาด 2.752 MWh จำนวน 42 ชุด

กระบวนการผลิตไฟฟ้า

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power



ประโยชน์ที่ชุมชนจะได้รับ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

● กองทุนพัฒนาไฟฟ้า

ประกาศคณะกรรมการกำกับกิจการพลังงาน

เรื่อง การนำส่งเงินเข้ากองทุนพัฒนาไฟฟ้าสำหรับผู้รับใบอนุญาตประกอบกิจการไฟฟ้า ประเภทใบอนุญาตผลิตไฟฟ้า (ฉบับที่ 2) พ.ศ. 2559 มีวัตถุประสงค์เพื่อเป็นทุนสนับสนุนให้มีการให้บริการไฟฟ้าไปยังท้องที่ต่างๆ อย่างทั่วถึง และกระจายความเจริญไปสู่ท้องถิ่น อีกทั้ง**พัฒนาชุมชนในท้องถิ่นที่ได้รับผลกระทบจากการดำเนินงานของโรงไฟฟ้า**

อัตราการจ่ายเงินเข้าสู่กองทุนฯ

ระยะก่อสร้าง : 50,000 บาท/เมกะวัตต์/ปี

ระยะดำเนินการ : 1.0 สตางค์/หน่วย/เดือน

การใช้ประโยชน์จากกองทุนฯ

- การพัฒนาอาชีพ
- การสนับสนุนการศึกษา ศาสนา วัฒนธรรมประเพณี กีฬา และดนตรี
- การสนับสนุนการสาธารณสุขและสิ่งแวดล้อม
- การพัฒนาคุณภาพชีวิต
- การพัฒนาพลังงานหมุนเวียน
- อื่นๆ ตามที่คณะกรรมการบริหารกองทุนเห็นสมควร

● การจ้างงาน ภาษีท้องถิ่น กิจกรรมชุมชนสัมพันธ์ของโครงการ

ผลกระทบที่อาจเกิดขึ้น และการจัดการเบื้องต้นของโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

ระยะก่อสร้าง

กิจกรรมที่จะเกิดขึ้น

- การปรับสภาพพื้นที่
- การขนส่งอุปกรณ์ก่อสร้าง
- การติดตั้งแผงเซลล์แสงอาทิตย์

การคัดกรองผลกระทบเบื้องต้น

- ด้านคุณภาพอากาศ
- ด้านระดับเสียง
- ด้านการใช้น้ำและน้ำทิ้ง

ระยะดำเนินการ

กิจกรรมที่เกิดขึ้น

- การใช้น้ำของพนักงาน
- การล้างแผงเซลล์แสงอาทิตย์

การคัดกรองผลกระทบเบื้องต้น

- ด้านการใช้น้ำและน้ำทิ้ง (ระดับต่ำ)







วิธีการดำเนินงานของโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

① ขั้นเตรียมการ

- คัดเลือกพื้นที่โครงการและเทคโนโลยี
- ศึกษาและออกแบบรายละเอียดโครงการ
- ศึกษาและจัดทำรายงาน
- ขออนุญาตหน่วยงานที่เกี่ยวข้องเพื่อดำเนินการก่อสร้าง

② การก่อสร้างและทดสอบระบบ

③ ดำเนินการผลิตไฟฟ้าและจำหน่ายให้กับภาครัฐ

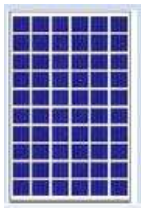
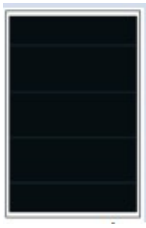
การคัดเลือกที่ตั้ง และการคัดเลือกเทคโนโลยี

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

พื้นที่ตั้งโครงการต้องขัดต่อกฎหมายหรือระเบียบที่มีการบังคับใช้ อาทิ

- ต้องไม่ขัดต่อกฎหมายว่าด้วยผังเมือง
- ต้องไม่ขัดต่อกฎหมายว่าด้วยการส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติ
- ต้องไม่ขัดต่อกฎหมายว่าด้วยโบราณสถานและโบราณวัตถุ
- ต้องไม่ขัดต่อมติคณะรัฐมนตรี

ที่ตั้งโครงการ
ไม่ขัดต่อกฎหมาย ✓
ที่มีผลบังคับใช้ในปัจจุบัน

ปัจจัย	แผงซิลิคอน ชนิดโมโนคริสตัลไลน์	แผงซิลิคอน ชนิดโพลีคริสตัลไลน์	แผงชนิดอะมอฟัส
	 ✓		
การผลิตไฟฟ้า	ผลิตได้ดีที่สุด	ผลิตได้น้อยว่าโมโนคริสตัลไลน์	ผลิตได้น้อยสุด
การใช้พื้นที่	ใช้น้อย	ใช้มาก	ใช้มากที่สุด
อายุการใช้งาน	≥ 25 ปี	≥ 25 ปี	เสื่อมสภาพเร็ว/ประกันสินค้าสั้น
ผลกระทบของเงาต่อการผลิตไฟฟ้า	เงามีผลกระทบต่อการผลิต	เงามีผลกระทบต่อการผลิต	เงามีผลกระทบต่อการผลิตน้อย

ขอบเขตการศึกษารายงานสิ่งแวดล้อมของโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

① ศึกษาและออกแบบรายละเอียดโครงการศึกษาสภาพแวดล้อมปัจจุบันของ

② โครงการโดยมีรัศมีพื้นที่ศึกษา 3 กิโลเมตร

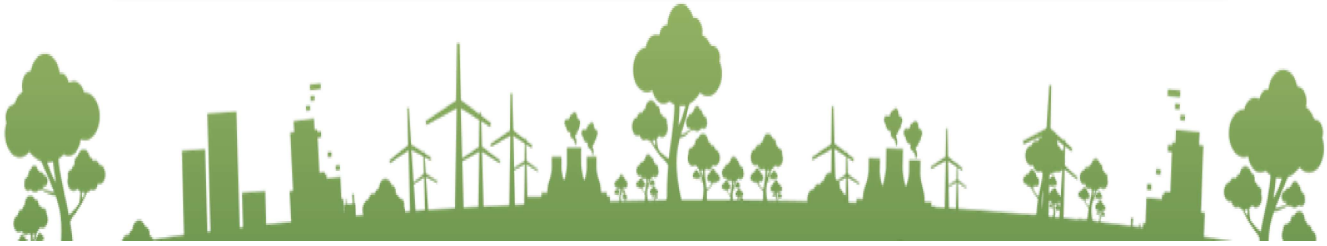
③ การประเมินผลกระทบสิ่งแวดล้อม

④ การกำหนดมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม

ประชาสัมพันธ์และการมีส่วนร่วมของประชาชน

การจัดทำรายงาน

การศึกษาประมวลหลักการปฏิบัติการ (CoP) ผลกระทบสิ่งแวดล้อม และมาตรการป้องกัน แก้ไข และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม



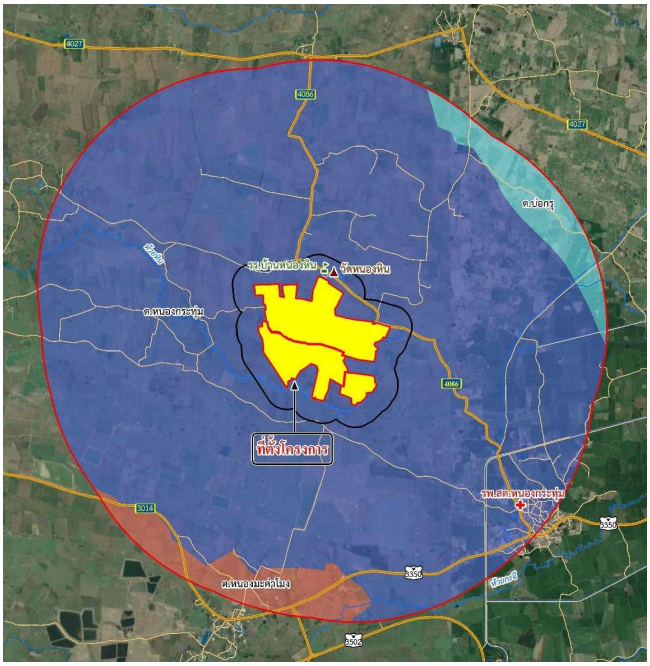
วิธีการศึกษา

การรวบรวมข้อมูลทุติยภูมิ	การตรวจสอบภาคสนาม	การเก็บตัวอย่างคุณภาพสิ่งแวดล้อม	การจัดประชุมรับฟังความคิดเห็นฯ
		- คุณภาพอากาศ - เสียง - คุณภาพน้ำ - นิเวศวิทยาบนบก/ในน้ำ 	

การวิเคราะห์ข้อมูล

พื้นที่ศึกษาของโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

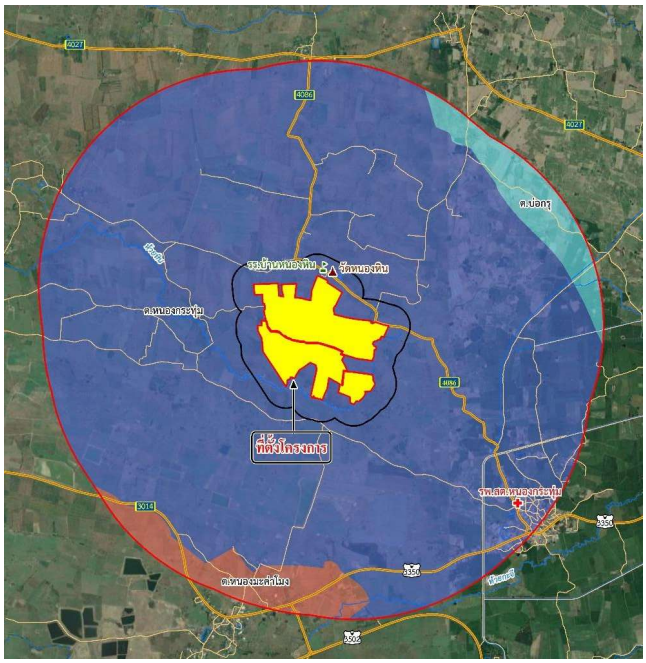


กำลังการผลิตไฟฟ้ามากกว่า 10 เมกะวัตต์
ไม่มีการเผาไหม้

- กำหนดพื้นที่ศึกษารัศมี 3 กิโลเมตร จากขอบเขตพื้นที่ตั้งโครงการ ตามระเบียบคณะกรรมการกำกับกิจการพลังงาน ว่าด้วยการรับฟังความคิดเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสียในการพิจารณาออกใบอนุญาตประกอบกิจการผลิตไฟฟ้า พ.ศ. 2565
- ครอบคลุมพื้นที่บางส่วนของ**ตำบลหนองกระทุ่ม ตำบลบ่อกรุ อำเภอเดิมบางนางบวช และตำบลหนองมะค่าโมง อำเภอด่านช้าง จังหวัดสุพรรณบุรี**

กลุ่มผู้มีส่วนได้เสียของโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power



จังหวัด	อำเภอ	องค์กรปกครองส่วนท้องถิ่น	หมู่บ้าน
สุพรรณบุรี	เดิมบางนางบวช	เทศบาลตำบลหนองกระทุ่ม	- หมู่ที่ 1 บ้านหนองกระทุ่ม - หมู่ที่ 2 บ้านหนองกระทุ่ม - หมู่ที่ 3 บ้านหนองปอ - หมู่ที่ 5 บ้านหนองกอก - หมู่ที่ 6 บ้านหนองนา - หมู่ที่ 7 บ้านหนองอิงพิง - หมู่ที่ 8 บ้านหนองหิน
		องค์การบริหารส่วนตำบลบ่อกรุ	- หมู่ที่ 3 บ้านหนองฉนวน - หมู่ที่ 4 บ้านลาด
	ด่านช้าง	องค์การบริหารส่วนตำบลหนองมะค่าโมง	- หมู่ที่ 1 บ้านหนองมะค่าโมง - หมู่ที่ 7 บ้านสระบัวกำ
1 จังหวัด	2 อำเภอ	3 หน่วยงาน	11 หมู่บ้าน

1. กลุ่มผู้ได้รับผลกระทบหรือผู้มีส่วนได้เสีย ประกอบด้วย
   - ประชาชนในพื้นที่ศึกษา - ผู้นำชุมชนในพื้นที่ศึกษา - กลุ่มชาติพันธุ์
   - กลุ่มเปราะบาง เช่น กลุ่มสตรี เด็ก คนพิการ แรงงานข้ามชาติ เป็นต้น
2. กลุ่มหน่วยงานราชการในระดับต่าง ๆ ที่เกี่ยวข้อง
3. ประชาชน/ผู้สนใจทั่วไป

ผลกระทบสิ่งแวดล้อม
ช่วงก่อสร้าง



กิจกรรมช่วงก่อสร้าง

- **ฝุ่นละออง** จากการปรับพื้นที่
- **มลภาวะทางเสียง** จากงานติดตั้งโครงสร้างแผง
- **การคมนาคม** จากการขนส่งอุปกรณ์และคนงาน
- **กากของเสีย** จากบรรจุภัณฑ์และคนงาน
- **น้ำเสีย** จากคนงานก่อสร้าง

ระยะเวลาก่อสร้าง ประมาณ 12 เดือน
คนงานก่อสร้างสูงสุดประมาณ 1,596 คน



การปรับพื้นที่



การขนส่งอุปกรณ์





การติดตั้งแผงเซลล์แสงอาทิตย์

การประเมินผลกระทบด้านคุณภาพอากาศ

ฝุ่นละออง (ช่วงก่อสร้าง)

ระยะเวลาก่อสร้าง
12 เดือน

แหล่งกำเนิดมลพิษทางอากาศของโครงการ

คำนวณด้วย Air model

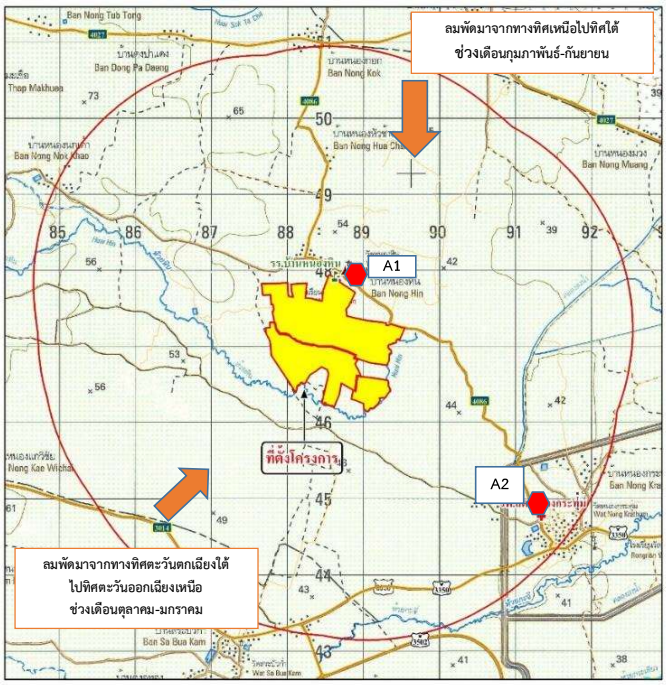


+ คุณภาพอากาศในบรรยากาศปัจจุบัน = ผลกระทบ

ค่ามาตรฐานฝุ่นละออง
ไม่เกิน 330 ไมโครกรัมต่อลูกบาศก์เมตร

การตรวจวัดคุณภาพอากาศในบรรยากาศปัจจุบัน

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power



- **คุณภาพอากาศ** 2 สถานี 5 วันต่อเนื่อง จำนวน 2 ครั้ง

A1 : โรงเรียนบ้านหนองหิน

A2 : รพ.สต. หนองกระทุ่ม

พารามิเตอร์ที่ตรวจวัด ได้แก่

- ฝุ่นละอองรวม (TSP) เฉลี่ย 24 ชั่วโมง
- ฝุ่นละอองขนาดไม่เกิน 10 ไมครอน (PM-10) เฉลี่ย 24 ชั่วโมง
- ฝุ่นละอองขนาดไม่เกิน 2.5 ไมครอน (PM-2.5) เฉลี่ย 24 ชั่วโมง
- ทิศทางและความเร็วลม

มาตรการฯ ที่สำคัญ (ด้านคุณภาพอากาศ)

แหล่งกำเนิด	มาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม
กิจกรรมการปรับพื้นที่ 	✓ **ฉีดพรมน้ำ**ในบริเวณพื้นที่ที่มีการเปิดหน้าดิน กองวัสดุ และบริเวณถนนทางเข้าพื้นที่ก่อสร้าง**อย่างน้อยวันละ 2 ครั้ง (เช้า-บ่าย)** หรือพิจารณาตามความเหมาะสมกับสภาพภูมิอากาศ โดยควบคุมให้ผิวดินมีความเปียกชื้น เพื่อป้องกันฝุ่นละอองฟุ้งกระจายและลดผลกระทบต่อชุมชนที่อยู่ใกล้เคียง
การใช้ยานพาหนะและการขนส่งอุปกรณ์ 	✓ ก่อนนำรถออกจากพื้นที่ก่อสร้างให้**ล้างทำความสะอาดตัวรถและล้อรถ**ที่มีเศษหินดินโคลน หรือทรายที่อาจจะก่อให้เกิดสภาพที่เป็นอันตรายและความสกปรกบนถนน ✓ **จัดเก็บวัสดุอุปกรณ์ก่อสร้างให้เป็นระเบียบ**ส่วนใดที่ก่อให้เกิดฝุ่นฟุ้งกระจายต้องมีวัสดุคลุมปิดทับ

การประเมินผลกระทบด้านเสียง

แหล่งกำเนิดเสียง



ค่าระดับเสียงลดลงตามระยะทาง

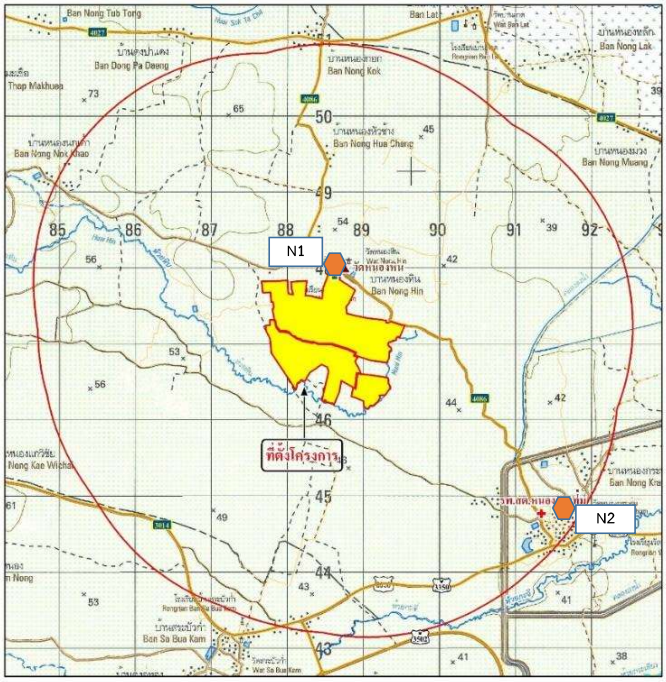
ผลตรวจวัดระดับเสียงปัจจุบัน



เสียงที่ชุมชนได้รับ

การตรวจวัดค่าระดับเสียงในปัจจุบัน

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power



ระดับเสียง 2 สถานี 5 วันต่อเนื่อง จำนวน 2 ครั้ง

N1 : โรงเรียนบ้านหนองหิน

N2 : รพ.สต. หนองกระทุ่ม

พารามิเตอร์ ได้แก่

- ระดับเสียงเฉลี่ย 24 ชั่วโมง (Leq 24 hr)
- ระดับเสียงสูงสุด (Lmax)
- ระดับเสียงเฉลี่ย 1 ชั่วโมง (Leq 1 hr)
- ระดับเสียงเฉลี่ย 5 นาที (Leq 5 min)
- ระดับเสียงกลางวัน-กลางคืน (Ldn)
- ระดับเสียงพื้นฐาน (L90)

มาตรการฯ ที่สำคัญ (ด้านเสียง)

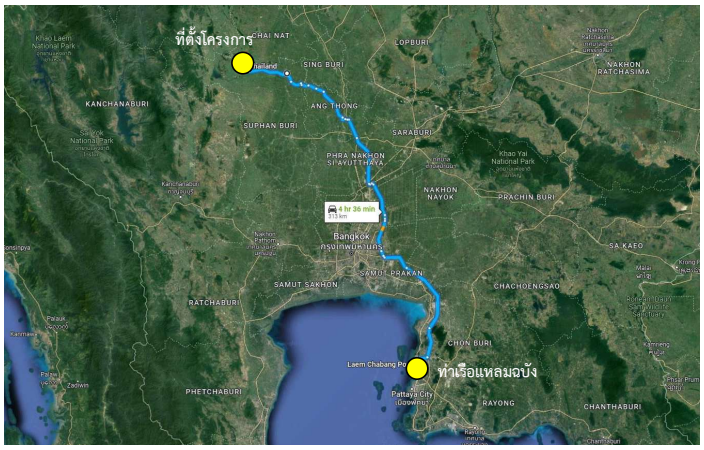
แหล่งกำเนิด	มาตรการป้องกันและแก้ไขผลกระทบ
กิจกรรมการปรับพื้นที่ 	✓ กิจกรรมการก่อสร้างที่อาจก่อให้เกิดผลกระทบด้านเสียงต่อชุมชนหรือสิ่งมีชีวิตที่อยู่บริเวณโดยรอบ **ให้มีการดำเนินการเฉพาะในช่วงเวลากลางวัน** ยกเว้นกิจกรรมที่จำเป็นต้องดำเนินการต่อเนื่องให้แล้วเสร็จจะต้องแจ้งให้ผู้นำชุมชนในพื้นที่ทราบก่อนดำเนินการในกิจกรรมนั้น ๆ อย่างน้อย 7 วัน ✓ **ให้ติดตั้งกำแพงหรือรั้ว**ที่มีลักษณะเป็นแผ่นหนา ทึบ หรือวัสดุอื่นที่ให้ผลเทียบเท่าและให้มีความสูงกว่าระดับสายตา บริเวณริมรั้วพื้นที่ก่อสร้างด้านที่อยู่ติดหรือใกล้เคียงกับชุมชนหรือพื้นที่อ่อนไหว ทั้งนี้ กำแพงกั้นเสียงควรติดตั้งในบริเวณที่ใกล้ที่สุดกับแหล่งกำเนิดเสียงเท่าที่จะทำได้
การติดตั้งอุปกรณ์ 	✓ **เลือกใช้อุปกรณ์**และเครื่องจักรในการก่อสร้างที่มีระดับเสียงต่ำและตรวจ**ซ่อมบำรุงรักษาอุปกรณ์**และเครื่องจักรให้มีประสิทธิภาพในการใช้งานให้ดีอยู่เสมอ ✓ จัดให้มี**อุปกรณ์ป้องกันเสียง**ให้แก่คนงานที่ทำงานบริเวณที่มีเสียงดัง และควบคุมระดับเสียงทั่วไปให้อยู่ในเกณฑ์มาตรฐาน

การคมนาคมขนส่ง

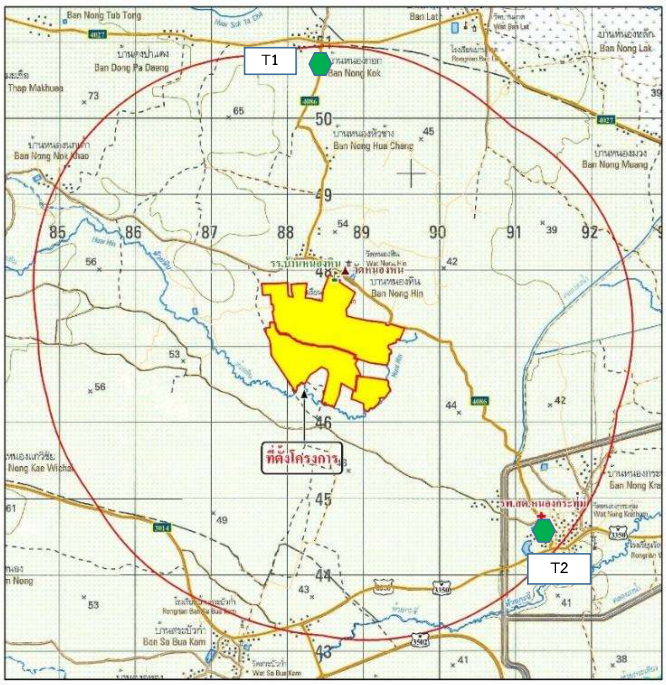
ประเภทของการขนส่ง	ความถี่ (เที่ยว/วัน)
รถขนส่งอุปกรณ์ก่อสร้าง	
- รถบรรทุกแผงเซลล์แสงอาทิตย์ (18 ล้อ)	10
- รถบรรทุกขนาดใหญ่ (6 ล้อ)	8
- รถบรรทุกขนาดเล็ก (4 ล้อ)	4
รถขนส่งคนงานก่อสร้าง	
- รถบรรทุกขนาดกลาง (6 ล้อ)	108
- รถปิคอัพ (4 ล้อ)	2

เส้นทางขนส่งแผงเซลล์แสงอาทิตย์ :

ท่าเรือแหลมฉบัง → ทางหลวงพิเศษหมายเลข 7 (กรุงเทพฯ-ชลบุรี) → ทางหลวงพิเศษหมายเลข 9 (ถนนกาญจนาภิเษก) → ทางหลวงแผ่นดินหมายเลข 32 → ทางหลวงแผ่นดินหมายเลข 3064 → ทางหลวงแผ่นดินหมายเลข 3350 → ทางหลวงชนบทหมายเลข 4086 → พื้นที่โครงการ



การตรวจวัดปริมาณการจราจรในปัจจุบัน



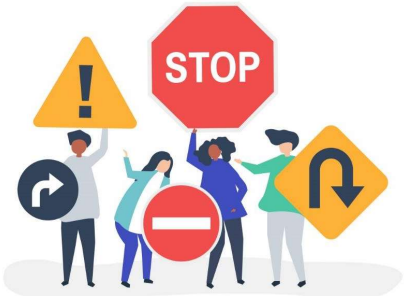
จุดตรวจนับปริมาณจราจร ตรวจวัด 2 วัน (ครอบคลุมวันทำการและวันหยุด)

T1 : ทางหลวงชนบทหมายเลข 4086 (ก่อนถึงจุดตัด ทล.4027)

T2 : ทางหลวงชนบทหมายเลข 4086 (รพ.สต.หนองกระทุ่ม)

มาตรการฯ ที่สำคัญ (ด้านคมนาคมขนส่ง)

- กำหนดให้มี**เจ้าหน้าที่อำนวยความสะดวกและดูแลการเข้า-ออก** ของรถทุกประเภท ที่เข้าสู่พื้นที่โครงการ
- จัดให้มี**ป้ายหรือสัญญาณเตือนที่เห็นได้ชัดเจน** ทั้งเวลากลางวันและกลางคืนก่อนถึงพื้นที่ก่อสร้างอย่างน้อย 100 เมตร
- **หลีกเลี่ยงการขนส่งวัสดุอุปกรณ์ก่อสร้างในช่วงชั่วโมงเร่งด่วน** เช่น เวลา 07.00-08.00 น. และเวลา 16.00-17.00 น. เป็นต้น
- **จำกัดความเร็วรถให้เป็นไปตามที่กฎหมายกำหนด** และกำหนดให้มีการควบคุมความเร็วของพาหนะในบริเวณพื้นที่ก่อสร้างให้ใช้ความเร็วไม่เกิน 40 กม./ชม.



กากของเสียและขยะมูลฝอย

แหล่งกำเนิด	มาตรการป้องกันและแก้ไขผลกระทบ
เศษเหล็ก / เศษวัสดุบรรจุภัณฑ์จากการก่อสร้าง (ปริมาณ 10 ตันต่อเดือน)	นโยบายนำกลับมาใช้ประโยชน์ให้มากที่สุด นอกจากนี้ ในส่วนที่ไม่สามารถนำกลับมาใช้โครงการได้กำหนดให้บริษัทรับเหมารับผิดชอบในการเก็บขนออกนอกพื้นที่ก่อสร้างเพื่อนำไปกำจัดให้ถูกต้องตามหลักวิชาการ
คนงานก่อสร้าง (ปริมาณ 1,276.80 กิโลกรัมต่อวัน) (คำนวณอัตราการเกิดขยะ 0.8 kg/คน/วัน x 1,596 คน)	จัดให้มีถังรองรับมูลฝอยขนาด 200 ลิตร มีฝาปิดมิดชิด ติดตั้งตามจุดต่างๆ อย่างเพียงพอเพื่อรองรับมูลฝอยที่เกิดขึ้นก่อนติดต่อให้หน่วยงานที่ได้รับอนุญาตไปกำจัดอย่างถูกหลักวิชาการ





มาตรการฯ ที่สำคัญ (ด้านกากของเสียและขยะมูลฝอย)

- **จัดเตรียมวัสดุอุปกรณ์รองรับขยะ**ที่เกิดขึ้นจากคนงานไว้ตามบริเวณพื้นที่ปฏิบัติงานและบริเวณที่พักคนงานให้พอเพียงและประสานกับหน่วยงานท้องถิ่นเพื่อดำเนินการกำจัดขยะ
- กรณีกิจกรรมการก่อสร้างมีของเสียอันตรายที่มีลักษณะและคุณสมบัติตามที่กำหนดในประกาศกระทรวงอุตสาหกรรม เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว พ.ศ. 2548 ให้หน่วยงานที่ได้รับอนุญาตจากกรมโรงงานอุตสาหกรรมมารับไปกำจัดอย่างถูกต้อง และ**กำหนดวิธีปฏิบัติงานเรื่องการแยกทิ้งขยะหรือของเสียอันตราย**
- อบรมให้คนงานที่เกี่ยวข้องทราบ**ห้ามทิ้งมูลฝอยลงในทางระบายน้ำ ท่อน้ำทิ้งและแหล่งน้ำ**ในบริเวณใกล้เคียงพื้นที่ก่อสร้าง



น้ำเสียและการระบายน้ำ

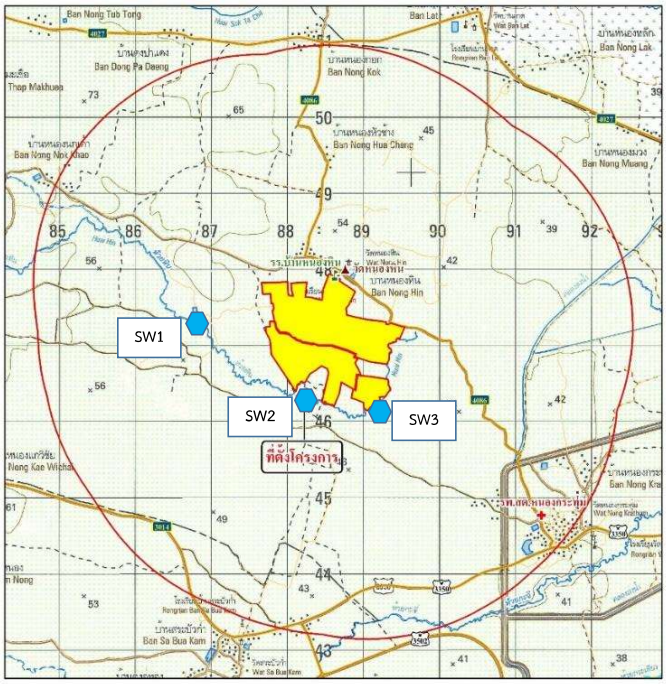
แหล่งกำเนิด	มาตรการป้องกันและแก้ไขผลกระทบ
การอุปโภคบริโภคคนงานก่อสร้าง (ปริมาณ 89.36 ลูกบาศก์เมตรต่อวัน)	กำหนดให้บริษัทผู้รับเหมาจัดให้มีห้องน้ำ-ห้องส้วมที่ถูกหลักสุขาภิบาลเพียงพอกับคนงานก่อสร้างในช่วงเวลาที่มีจำนวนคนงานสูงสุด (Peak) พร้อมระบบบำบัดน้ำเสียสำเร็จรูป ก่อนนำไปกำจัดตามหลักสุขาภิบาลต่อไป
กิจกรรมการก่อสร้าง (สำหรับการล้างอุปกรณ์ ปริมาณ 50 ลูกบาศก์เมตรต่อวัน)	รวบรวมสู่รางระบายน้ำชั่วคราวของโครงการ ก่อนจะระบายลงบ่อพักน้ำของโครงการทั้งหมด ก่อนนำมาหมุนเวียนกลับไปใช้ประโยชน์อื่นๆ เช่น รดน้ำต้นไม้ หรือฉีดพรมน้ำบริเวณพื้นที่ก่อสร้าง เป็นต้น



ตัวอย่าง ห้องน้ำ-ห้องส้วม พร้อมระบบบำบัดน้ำเสียสำเร็จรูป

การตรวจวัดคุณภาพน้ำและนิเวศวิทยาในน้ำ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power



คุณภาพน้ำผิวดินและนิเวศวิทยาทางน้ำ
3 สถานี จำนวน 1 ครั้ง
SW1: ห้วยหิน (ด้านทิศตะวันตกของโครงการ)
SW2: ห้วยหิน (ด้านทิศใต้ของโครงการ)
SW3: ห้วยหิน (ด้านทิศตะวันออกของโครงการ)

คุณภาพน้ำผิวดิน พารามิเตอร์ ดังนี้

- อัตราการไหล
- ค่าความเป็นกรดด่าง
- ของแข็งแขวนลอย
- บีโอดี
- โคลิฟอร์มทั้งหมดและฟีคัลโคลิฟอร์ม
- อุณหภูมิ
- ออกซิเจนละลายน้ำ
- ของแข็งละลายน้ำทั้งหมด
- ซีโอดี

นิเวศวิทยาทางน้ำ พารามิเตอร์ ดังนี้

- แพลงก์ตอนพืช
- แพลงตอนสัตว์
- สัตว์หน้าดิน
- สัตว์น้ำ
- พืชน้ำ

มาตรการฯ ที่สำคัญ (ด้านคุณภาพน้ำและระบายน้ำ)

- **ติดตั้งระบบบำบัดน้ำเสียสำเร็จรูปจากห้องน้ำห้องส้วม** เพื่อบำบัดน้ำเสียให้ได้ตามมาตรฐานน้ำทิ้งที่ราชการกำหนดก่อนระบายออกสู่ภายนอก โดยห้ามระบายของเสียใดๆ ที่ยังมิได้มีการบำบัดลงสู่แหล่งน้ำ และจะต้องมีการสูบน้ำเสียหรือของเสียดังกล่าวไปทิ้งหรือบำบัดให้ถูกต้องตามกฎหมายว่าด้วยโรงงาน
- **ห้ามทิ้งขยะหรือเศษวัสดุจากการก่อสร้าง**ลงในท่อระบายน้ำ หรือแหล่งน้ำสาธารณะโดยเด็ดขาด
- **จัดทำรางระบายน้ำชั่วคราวและบ่อดักตะกอนให้แล้วเสร็จในช่วง 1 เดือนแรกของการก่อสร้าง** เพื่อควบคุมการระบายน้ำจากการก่อสร้างไม่ให้เกิดผลกระทบต่อพื้นที่โดยรอบ ทั้งนี้ ให้มีการตรวจสอบประสิทธิภาพรางระบายน้ำชั่วคราวเป็นประจำ หากพบว่าชำรุดเสียหายให้ซ่อมแซมให้อยู่ในสภาพใช้งานโดยเร็ว

ผลกระทบสิ่งแวดล้อม
ช่วงดำเนินการ



กิจกรรมช่วงดำเนินการ

เป็นพลังงานสะอาดและบริสุทธิ์



ไม่ปลดปล่อยมลพิษขณะผลิต

ไม่มีมลพิษทางอากาศจากการเผาไหม้



ไม่มีมลภาวะทางเสียง

(ไม่มีเครื่องจักรและอุปกรณ์เคลื่อนไหว)



ไม่มีน้ำเสีย มีเพียงน้ำล้างทำความสะอาดแผงเซลล์แสงอาทิตย์



ไม่มีกากของเสียอุตสาหกรรม

เมื่อหมดอายุแผงเซลล์แสงอาทิตย์สามารถรีไซเคิลได้ 95%

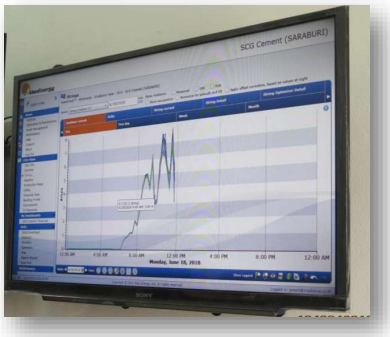


การดูแล ตรวจสอบ และบำรุงรักษา

- **ทำความสะอาดเช็ดถู/ล้างแผง 2 ครั้งต่อปี หรือตามสภาพอากาศ**
- การสังเกตการณ์ประสิทธิภาพของระบบและแผงเซลล์แสงอาทิตย์ผ่านระบบออนไลน์
- ตรวจสอบทางกายภาพอย่างสม่ำเสมอ







ทำความสะอาดเช็ดถู/ล้างแผง 2 ครั้งต่อปี หรือตามสภาวะแวดล้อม
โดยใช้น้ำสะอาดทำความสะอาดเท่านั้น (ไม่เติมสารเคมีหรือสารทำความสะอาด)

ด้านทัศนียภาพและแสงสะท้อน

การวาง
แผงเซลล์แสงอาทิตย์

การผลิตไฟฟ้าของเซลล์แสงอาทิตย์**ไม่ได้อาศัยอุณหภูมิหรือความร้อนในบรรยากาศในการทำงาน แต่ขึ้นอยู่กับความเข้มแสงจากดวงอาทิตย์** ดังนั้น การติดตั้งแผงเซลล์แสงอาทิตย์จึงไม่เป็นการเพิ่มอุณหภูมิ หรือสภาพอากาศโดยรอบแต่อย่างใด

- **ติดตั้งแผงเซลล์โดยทำมุมจากพื้นดินประมาณ 10 องศา ในแนวเหนือ-ใต้ และวางแผงให้รับแสงทางทิศใต้**
- **ติดตั้งแผงเซลล์สูงจากพื้นดินอย่างน้อย 1 เมตร**
- **จัดให้มีต้นไม้โดยรอบ**



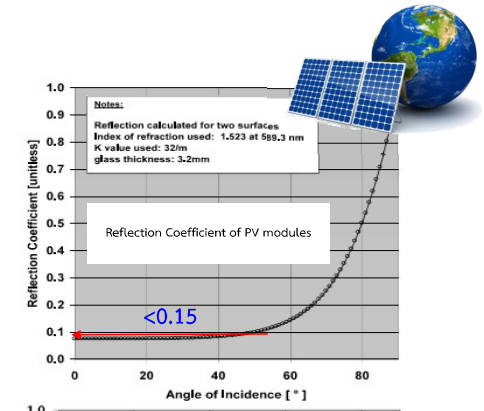


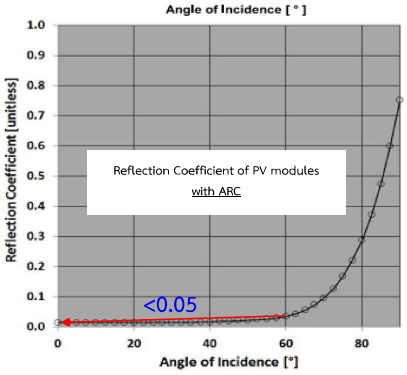
จากเทคโนโลยีที่พัฒนาขึ้น (การติดตั้งชั้นป้องกันการสะท้อนแสงกลับ (Anti-Reflection Coating, ARC)) ทำให้ค่าการสะท้อนแสงของเซลล์แสงอาทิตย์มีค่าเพียง 0.05 ซึ่งน้อยกว่าค่าการสะท้อนของถนนคอนกรีต



สัมประสิทธิ์การสะท้อน
(Reflection Coefficients of Various Surfaces)

เงินขัดเงา (Highly polished silver)	0.9
กระจกเงา (Glass lined mirrors)	0.85
กระดาษขาว (White paper)	0.7
กระดาษสีดำ (Black paper)	0.05
ผ้าสีอ่อน (Light gray suit)	0.1
ผิวหนัง (Caucasian)	0.3
ถนนคอนกรีต (Concrete roadway)	0.15
แผงเซลล์แสงอาทิตย์ (Solar cell)	<0.05





แผนการศึกษาและดำเนินงาน

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

กิจกรรม	ปี 2566					
	เม.ย.	พ.ค.	มิ.ย.	ก.ค.	ส.ค.	ก.ย.
1. จัดทำรายละเอียดโครงการ	←	- - -	- - -	- - -	- - -	- - - →
2. ทบทวนข้อมูลทุติยภูมิ/การใช้ประโยชน์ที่ดิน	←	→				
3. จัดประชุมเพื่อประชาสัมพันธ์โครงการ		▲ 23 พ.ค. 66				
4. การเก็บตัวอย่างด้านสิ่งแวดล้อม - คุณภาพอากาศ เสียง คุณภาพน้ำผิวดิน นิเวศวิทยาทางน้ำ - การตรวจนับปริมาณจราจร		▲ ฤดูแล้ง 24-29 พ.ค. 66 ▲ 26-27 พ.ค. 66		▲ ฤดูฝน ช่วงเดือน ก.ค. 66		
5. การเข้าพบหน่วยงานราชการ/จัดประชุมรับฟังความเห็นของประชาชน			▲ ช่วงเดือน มิ.ย. 66			
6. การจัดทำรายงานที่เกี่ยวข้อง		←	- - -	- - -	- - - →	
7. นำเสนอรายงานให้หน่วยงานผู้อนุญาต/หน่วยงานที่เกี่ยวข้องพิจารณา					★ ช่วงเดือน ส.ค. 66	

รับฟังความคิดเห็นและข้อเสนอแนะ

- ข้อห่วงใย/ข้อห่วงกังวล ประเด็นผลกระทบที่ต้องการให้ศึกษา
- นำไปศึกษาผลกระทบและกำหนดมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อมต่อไป



ช่องทางการติดต่อสอบถามข้อมูลเพิ่มเติม

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด (เจ้าของโครงการ)

87 อาคารเอ็มไทย ทาวเวอร์ ออลซีซั่น เพลส ชั้น 26 ถนนวิทยุ แขวงลุมพินี เขตปทุมวัน กรุงเทพมหานคร 10330

ติดต่อ

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

บริษัท คอนซัลแทนท์ ออฟ เทคโนโลยี จำกัด (บริษัทที่ปรึกษาด้านสิ่งแวดล้อม)

39 ซอยลาดพร้าว 124 ถนนลาดพร้าว แขวงพลับพลา เขตวังทองหลาง กรุงเทพมหานคร 10310

ติดต่อ

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

Appendix 6-5

Letter to disseminating meeting summary report (pre-engagement meeting)

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Appendix 6-6

Invitation letter for public meeting

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Appendix 6-7

Letter to disseminating documents for public meeting

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Appendix 6-8

Brochure for public meeting



11 ระยะเวลาและงบประมาณก่อสร้าง

ระยะเวลาในการพัฒนาโครงการ :
โครงการใช้ระยะเวลาในการออกแบบ ก่อสร้างและติดตั้งอุปกรณ์ผลิตไฟฟ้าจนถึงช่วงทดสอบระบบ **ประมาณ 21 เดือน**
งบประมาณในการดำเนินโครงการ : ประมาณ 6,500 ล้านบาท

12 วิธีการดำเนินงานของโครงการ

คัดเลือกพื้นที่โครงการและเทคโนโลยีเบื้องต้น → ศึกษาและออกแบบรายละเอียดโครงการ → ศึกษาและจัดทำรายงาน → แสดงตนหน่วยงานที่เกี่ยวข้องเพื่อดำเนินการก่อสร้าง → การก่อสร้างและทดสอบระบบ → ดำเนินการผลิตไฟฟ้าและส่งหน่วยให้กับการไฟฟ้า

13 ขอบเขตการศึกษาและจัดทำรายงาน

ศึกษาและออกแบบรายละเอียดโครงการ → ศึกษาทางกายภาพและสิ่งแวดล้อม ขอบเขตการศึกษาครอบคลุมพื้นที่ประมาณ 3 กิโลเมตร → ศึกษาและจัดทำรายงาน → การประเมินผลกระทบสิ่งแวดล้อม → กิจกรรมด้านการประชาสัมพันธ์และการมีส่วนร่วมของประชาชน → การจัดทำรายงาน

14 การดำเนินกิจกรรมด้านการประชาสัมพันธ์และการมีส่วนร่วมของประชาชน

กลุ่มผู้มีส่วนได้เสียของโครงการ

1. กลุ่มผู้ได้รับผลกระทบหรือผู้มีส่วนได้เสีย ประกอบด้วย
   - ประชาชนในพื้นที่ศึกษา
   - ผู้นำชุมชนในพื้นที่ศึกษา
   - กลุ่มเปราะบาง เช่น กลุ่มสตรี เด็ก คนพิการ แรงงานข้ามชาติ เป็นต้น
   - กลุ่มชาติพันธุ์
2. กลุ่มหน่วยงานราชการในระดับต่างๆ ที่เกี่ยวข้อง
3. ประชาชน/ผู้สนใจทั่วไป

การเผยแพร่และประชาสัมพันธ์ของโครงการ

โครงการดำเนินการนำเอกสารเผยแพร่ข้อมูลของโครงการไปประชาสัมพันธ์ ณ บอร์ดประชาสัมพันธ์ของสถานที่ต่างๆ ในพื้นที่ศึกษา ประกอบด้วย

- พื้นที่ตั้งโครงการ
- สำนักงานคณะกรรมการกำกับกิจการพลังงาน ประจำเขต 9 (กาญจนบุรี)
- สำนักงานสุดสาครกรมจังหวัดสุพรรณบุรี
- ที่ว่าการอำเภอในพื้นที่ศึกษา
- องค์กรปกครองส่วนท้องถิ่นในพื้นที่ศึกษา
- ที่ทำการผู้นำชุมชนในพื้นที่ศึกษา หรือศาลาประชาคมหมู่บ้านในพื้นที่ศึกษา
- โรงเรียน ศาสนสถาน สวนสาธารณะของชุมชน และตลาดในพื้นที่ศึกษา

ช่องทางการติดต่อสอบถามข้อมูลและรับฟังความคิดเห็น

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด
(เจ้าของโครงการ)
87 อาคารเอ็มไทย ทาวเวอร์ ออลซีซั่น เพลส ชั้น 26 ถนนวิทยุ แขวงลุมพินี เขตปทุมวัน กรุงเทพมหานคร 10330

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บริษัท คอนซัลแทนท์ ออฟ เทคโนโลยี จำกัด
(บริษัทที่ปรึกษาด้านสิ่งแวดล้อม)
39 ออลาดพร้าว 124 ถนนลาดพร้าว แขวงพลับพลา เขตวังทองหลาง กรุงเทพมหานคร 10310

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บรีซแอนด์ไชน์ เพาเวอร์ Breeze and Shine Power

Consultants of Technology

01 เหตุผลความจำเป็นของโครงการ

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด มีแผนที่จะพัฒนาโครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์ ซึ่งเป็นโครงการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ด้วยเทคโนโลยีแผงโฟโตโวลเทอิก หรือเซลล์แสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกับระบบกักเก็บพลังงานเพื่อจำหน่ายไฟฟ้าให้แก่ภาครัฐ ตามนโยบายให้การสนับสนุนการผลิตไฟฟ้าจากพลังงานทดแทนหรือพลังงานทางเลือก โดยพลังงานแสงอาทิตย์เป็นหนึ่งในพลังงานทดแทนหรือพลังงานทางเลือกที่สะอาด สามารถนำมาใช้งานได้อย่างไม่จำกัด ไม่ก่อให้เกิดมลภาวะทางสิ่งแวดล้อม และเป็นการส่งเสริมความมั่นคงด้านพลังงานในระยะยาว ทั้งนี้ การพัฒนาดังกล่าวเข้าข่ายต้องจัดทำรายงานประมวลหลักการปฏิบัติ (CoP) และรายงานการศึกษามาตรการป้องกันและแก้ไขผลกระทบต่อคุณภาพสิ่งแวดล้อมและความปลอดภัย (ESA) เพื่อประกอบการขออนุญาตดำเนินโครงการ

02 วัตถุประสงค์ของโครงการ

- เพื่อส่งเสริมการผลิตไฟฟ้าจากพลังงานหมุนเวียน ตามแผนการเพิ่มการผลิตไฟฟ้าจากพลังงานสะอาด ภายใต้แผน PDP2018 Revision 1 และแผนพัฒนาพลังงานทดแทนและพลังงานทางเลือก พ.ศ. 2561-2580 โดยการเพิ่มสัดส่วนกำลังการผลิตไฟฟ้าจากพลังงานสะอาดในรูปแบบต่างๆ
- เพื่อสนับสนุนให้ประเทศไทยสามารถมุ่งสู่พลังงานสะอาดและลดการปล่อยก๊าซคาร์บอนไดออกไซด์สุทธิเป็นศูนย์ ภายในปี พ.ศ. 2608-2609 โดยการเพิ่มสัดส่วนการผลิตไฟฟ้าจากพลังงานทดแทน

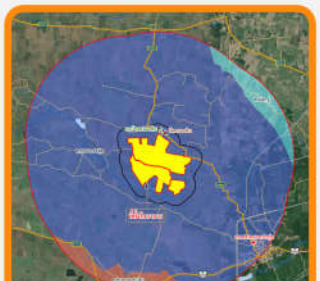
03 ประโยชน์ของโครงการ

- การพัฒนาโครงการโรงไฟฟ้าพลังงานแสงอาทิตย์เป็นการใช้ทรัพยากรธรรมชาติที่มีอยู่เป็นวัตถุดิบในการผลิตพลังงาน จึงส่งผลกระทบต่อชุมชนโดยรอบพื้นที่โครงการค่อนข้างต่ำ
- เพิ่มสัดส่วนกำลังการผลิตไฟฟ้าจากพลังงานหมุนเวียนภายในประเทศ และช่วยลดการผลิตไฟฟ้าจากเชื้อเพลิงฟอสซิลที่เป็นต้นเหตุของการปล่อยก๊าซเรือนกระจกตามนโยบายภาครัฐ
- เงินกองทุนพัฒนาไฟฟ้า ตามระเบียบสำนักงานคณะกรรมการกำกับกิจการพลังงาน
- การจ้างแรงงานในท้องถิ่น
- การสนับสนุนงบประมาณในการพัฒนาชุมชน
- ภาษีโรงเรือนและที่ดิน และภาษีป้าย

04 ข้อมูลโครงการเบื้องต้น

เจ้าของโครงการ : บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด
ที่ตั้งโครงการ : ต.หนองกระทุ่ม อ.เดิมบางนางบวช จ.สุพรรณบุรี
ขนาดพื้นที่โครงการ : **1,051.96** ไร่
ประเภทโครงการ : ผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ แบบติดตั้งบนพื้นดินร่วมกับระบบกักเก็บพลังงาน
กำลังการผลิตไฟฟ้าติดตั้ง : **144.000** MW_{AC} (**199.456** MW_p)
พลังงานไฟฟ้าที่ผลิตได้ต่อปี : **334.904** จิกะวัตต์ชั่วโมงต่อปี (GWh/year)

เครื่องจักรหลัก :
- **แผงเซลล์แสงอาทิตย์ (Solar Panel)**
  ขนาด **605** วัตต์ต่อแผง หรือเทียบเท่าประมาณ **329,680** แผง
- **เครื่องแปลงกระแสไฟฟ้า (Inverter)**
  ขนาดกำลังการผลิต **300** กิโลวัตต์ จำนวน **480** ชุด หรือเทียบเท่า
- **หม้อแปลงไฟฟ้า (Transformer)**
  ขนาด **90** เมกะโวลต์แอมแปร์ จำนวน **1** ชุด
- **ระบบกักเก็บพลังงาน (Battery Energy Storage System; BESS)**
  ขนาด **2.752** MWh จำนวน **42** ชุด

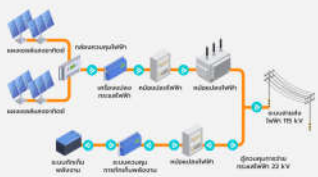


05 พื้นที่ศึกษาโครงการ

โครงการกำหนดพื้นที่ศึกษารัศมี 3 กิโลเมตร จากขอบเขตพื้นที่ตั้งโครงการ ตามระเบียบคณะกรรมการกำกับกิจการพลังงาน ว่าด้วยการรับฟังความคิดเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสีย ในการพิจารณาออกใบอนุญาตประกอบกิจการผลิตไฟฟ้า พ.ศ. 2565 ซึ่งครอบคลุมพื้นที่บางส่วนของตำบลหนองกระทุ่ม ตำบลบ่อกรุ อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี และตำบลหนองมะค่าโมง อำเภอด่านช้าง จังหวัดสุพรรณบุรี

จังหวัด	อำเภอ	ตำบล	หมู่ที่
สุพรรณบุรี	เดิมบางนางบวช	หนองกระทุ่ม	1,2,3,5,6,7,8
		บ่อกรุ	3,4
	ด่านช้าง	หนองมะค่าโมง	1,7

06 กระบวนการผลิตไฟฟ้า



กระบวนการผลิตกระแสไฟฟ้า จะเริ่มจากแสงอาทิตย์ซึ่งเป็นคลื่นแม่เหล็กไฟฟ้ามากระทบกับแผงเซลล์แสงอาทิตย์ที่มีสารกึ่งตัวนำจนเกิดอนุภาคที่มีประจุไฟฟ้าบวกและลบเคลื่อนที่ไปในทิศทางตรงกันข้าม ซึ่งการเคลื่อนที่ของอนุภาคประจุบวกและลบดังกล่าวจะทำให้เกิดไฟฟ้ากระแสตรงขึ้น โดยไฟฟ้ากระแสตรงดังกล่าวจะถูกส่งไปยังอุปกรณ์ที่เรียกว่า "เครื่องแปลงกระแสไฟฟ้า (Inverter)" เพื่อแปลงกระแสไฟฟ้ากระแสตรงให้เป็นไฟฟ้ากระแสสลับ แล้วส่งเข้าสู่หม้อแปลงไฟฟ้าเพื่อแปลงให้เป็นไฟฟ้าแรงดันสูงและจ่ายไฟฟ้าเข้าสู่ระบบสายส่ง เพื่อจำหน่ายให้แก่การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) ต่อไป

นอกจากนี้ โครงการยังมีระบบกักเก็บพลังงาน (Battery Energy Storage System; BESS) หรือแบตเตอรี่ ซึ่งระบบกักเก็บพลังงานจะทำหน้าที่ในการกักเก็บไฟฟ้าส่วนเกินที่ผลิตได้ไว้ภายในแบตเตอรี่ และในช่วงที่ผลิตไฟฟ้าได้น้อย พลังงานไฟฟ้าที่กักเก็บไว้ภายในแบตเตอรี่จะถูกส่งเข้าสู่ระบบสายส่ง เพื่อจำหน่ายให้แก่การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) ต่อไป

07 การคัดเลือกพื้นที่โครงการและเทคโนโลยี

การคัดเลือกพื้นที่โครงการ : โครงการกำหนดให้พื้นที่โครงการต้องสามารถใช้ประโยชน์ในการประกอบกิจการผลิตไฟฟ้าได้ โดยไม่ขัดต่อกฎหมายหรือระเบียบที่มีการบังคับใช้

- ต้องไม่ขัดต่อกฎหมายว่าด้วยผังเมือง
- ต้องไม่ขัดต่อกฎหมายว่าด้วยการส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติ
- ต้องไม่ขัดต่อกฎหมายว่าด้วยโบราณสถานและโบราณวัตถุ
- ต้องไม่ขัดต่อมติคณะรัฐมนตรี

ทั้งนี้ พื้นที่โครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์ ตั้งอยู่ที่ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี ซึ่งจากการตรวจสอบพบว่าพื้นที่ดังกล่าวสามารถดำเนินการได้โดยไม่ขัดต่อกฎหมายที่มีผลบังคับใช้ในปัจจุบัน

การคัดเลือกเทคโนโลยี : โครงการเลือกใช้แผงซิลิคอน *ชนิดโมโนคริสตัลไลน์ (Monocrystalline)* เนื่องจากเป็นเทคโนโลยีที่มีประสิทธิภาพการผลิตไฟฟ้าดีที่สุด

แผงซิลิคอนชนิดโมโนคริสตัลไลน์	แผงซิลิคอนชนิดโพลีคริสตัลไลน์	แผงชนิดอะมอร์ฟัส
- ผลิตไฟฟ้าได้ดีที่สุด - ใช้พื้นที่น้อย - อายุงาน > 25 ปี - เอาน์พุตกระทบต่อการผลิตไฟฟ้า	- ผลิตไฟฟ้าน้อยกว่าโมโนคริสตัลไลน์ - ใช้พื้นที่มาก - อายุงาน > 25 ปี - เอาน์พุตกระทบต่อการผลิตไฟฟ้า	- ผลิตไฟฟ้าได้น้อยที่สุด - ใช้พื้นที่มากที่สุด - เสื่อมสภาพเร็ว - เอาน์พุตกระทบต่อการผลิตไฟฟ้าน้อย

08 ระบบสาธารณูปโภค

น้ำใช้ :
ระยะก่อสร้างและดำเนินการ
โครงการจะรับน้ำประปาจากการประปาส่วนภูมิภาค สาขาด่านช้าง เพื่อนำมาใช้ภายในโครงการ

ไฟฟ้า :
ระยะก่อสร้าง
โครงการจะใช้ไฟฟ้าจากการไฟฟ้าส่วนภูมิภาค
ระยะดำเนินการ
จะนำไฟฟ้าที่ผลิตได้มาใช้ภายในโครงการ

09 ผลกระทบสิ่งแวดล้อมและการจัดการ

ผลกระทบด้านสิ่งแวดล้อมจากการดำเนินโครงการโรงไฟฟ้าจากพลังงานแสงอาทิตย์*ก่อนข้างต่ำ โดยผลกระทบหลักอยู่ในระยะก่อสร้าง* ซึ่งสามารถจำแนกผลกระทบได้ดังนี้

ระยะก่อสร้าง

ปัจจัย	กิจกรรมที่ก่อให้เกิดผลกระทบ	มาตรการเบื้องต้น
คุณภาพอากาศ	• การปรับสภาพพื้นที่/ขุดเจาะดิน • การขนส่งอุปกรณ์และคนงานก่อสร้าง	• ฉีดพรมน้ำบริเวณพื้นที่ก่อสร้างโครงการและถนนของโครงการ • ล้างล้อรถบรรทุกก่อนออกจากพื้นที่โครงการ • ดูแลอุปกรณ์ใช้งานในการก่อสร้างให้มีสภาพดีเสมอ
ระดับเสียง	• การเดินเครื่องยนต์เครื่องจักร • การปรับสภาพพื้นที่/ขุดเจาะดิน	• เลือกใช้เครื่องจักรที่มีเสียงเบา • กำหนดช่วงเวลาดำเนินงานที่ก่อให้เกิดเสียงเฉพาะในช่วงเวลากลางวันเท่านั้น
คมนาคม	• การขนส่งอุปกรณ์และคนงานก่อสร้าง	• จัดให้มีป้ายหรือสัญญาณเตือนที่เห็นได้ชัด • อบรมและควบคุมพนักงานขับรถให้ปฏิบัติตามกฎจราจรอย่างเคร่งครัด
การใช้น้ำ/น้ำทิ้ง	• จากกิจกรรมการก่อสร้างและคนงานก่อสร้าง	• เลือกใช้น้ำจากแหล่งน้ำที่เหมาะสม • หลีกเลี่ยงการใช้น้ำร่วมกับชุมชน • พิจารณาเลือกวิธีการจัดการน้ำทิ้งอย่างเหมาะสม

ระยะดำเนินการ

ปัจจัย	กิจกรรมที่ก่อให้เกิดผลกระทบ	มาตรการเบื้องต้น
การใช้น้ำ/น้ำทิ้ง	• จากการล้างแผงเซลล์แสงอาทิตย์ • จากพนักงานของโครงการ	• เลือกใช้น้ำจากแหล่งน้ำที่เหมาะสม • หลีกเลี่ยงการใช้น้ำร่วมกับชุมชน • พิจารณาเลือกวิธีการจัดการน้ำทิ้งอย่างเหมาะสม

10 การศึกษาสภาพแวดล้อมปัจจุบัน

การศึกษาสภาพแวดล้อมปัจจุบันของโครงการจะดำเนินการในรัศมี*พื้นที่ศึกษา 3 กิโลเมตร* จากขอบเขตพื้นที่ตั้งโครงการ โดยกำหนดการสำรวจสิ่งแวดล้อมภาคสนามตามปัจจัยสิ่งแวดล้อมที่เกี่ยวข้อง ประกอบด้วย คุณภาพอากาศ บรรยากาศ ระดับเสียง คุณภาพน้ำผิวดิน นิเวศวิทยาทางน้ำ และคมนาคมขนส่ง

จุดตรวจวัดคุณภาพสิ่งแวดล้อม ดังนี้

- **คุณภาพอากาศ**
  2 สถานี 5 วันต่อเนื่อง
  จำนวน 2 ครั้ง
  A1: โรงเรียนบ้านหนองคีม
  A2: รพ.สต. หนองกระทุ่ม
- **คุณภาพน้ำผิวดินและนิเวศวิทยาทางน้ำ**
  3 สถานี จำนวน 1 ครั้ง
  SW1: ห้วยคีม (ต้นเกิดละวันตกโครงการ)
  SW2: ห้วยคีม (ต้นเกิดใต้โครงการ)
  SW3: ห้วยคีม (ต้นเกิดละวันออกโครงการ)
- **ระดับเสียง**
  2 สถานี 5 วันต่อเนื่อง
  จำนวน 1 ครั้ง
  N1: โรงเรียนบ้านหนองคีม
  N2: รพ.สต. หนองกระทุ่ม
- **จุดตรวจนับปริมาณจราจร**
  T1: ทางหลวงชนบทหมายเลข 4086 (ก่อนถึงจุดตัด ทล.4027)
  T2: ทางหลวงชนบทหมายเลข 4086 (รพ.สต. หนองกระทุ่ม)



Appendix 6-9

Presentation for public meeting

การประชุมรับฟังความเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสีย ต่อการศึกษาและจัดทำรายงานประมวลหลักการปฏิบัติ (CoP)

โครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์

ของ บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด

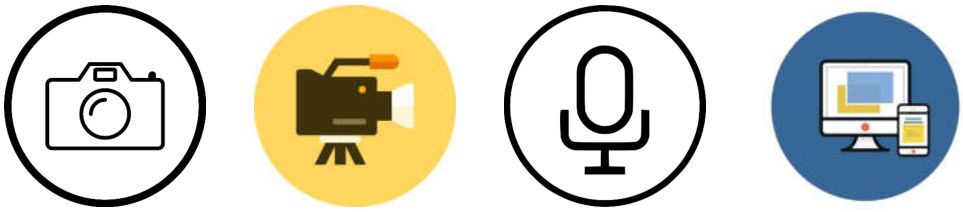
ตั้งอยู่ที่ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

วันพุธที่ 21 มิถุนายน พ.ศ. 2566 เวลา 08.30-12.00 น.

อาคารอเนกประสงค์เทศบาลตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

1



การประชุมรับฟังความเห็นครั้งนี้

มีการบันทึกภาพนิ่ง ภาพเคลื่อนไหว และเสียงตลอดการประชุม

ทางผู้จัดงานขออนุญาตผู้เข้าร่วมประชุมทุกท่าน

นำภาพถ่ายภายในงานไปใช้ประกอบรายงานการศึกษา

และเผยแพร่ประชาสัมพันธ์การจัดกิจกรรมของโครงการ

(อ้างอิงตามพระราชบัญญัติคุ้มครองข้อมูลส่วนบุคคล พ.ศ. 2562)

2



กำหนดการประชุม

08.30 - 09.30 น.	ลงทะเบียน และรับเอกสาร
09.30 - 09.40 น.	เปิดการประชุม
09.40 - 11.00 น.	นำเสนอความเป็นมาโครงการ รายละเอียดโครงการ กิจกรรมที่ผ่านมา สรุปผลการศึกษา และมาตรการด้านสิ่งแวดล้อม
11.00 - 12.00 น.	รับฟังข้อคิดเห็น/ ข้อเสนอแนะ/ ข้อห่วงกังวล และตอบข้อซักถาม
12.00 น.	ปิดการประชุม

เอกสารที่ได้รับจากการลงทะเบียน

เอกสารที่ไม่ต้องส่งคืน

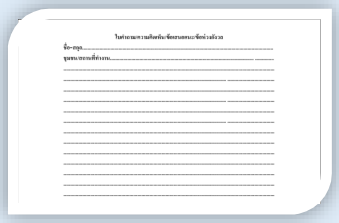
1. ปากกา สำหรับบันทึกข้อความ
2. กำหนดการประชุม
3. เอกสารประกอบการประชุม



เอกสารที่ต้องส่งคืน (หลังการประชุม)

4. ใบคำถาม/ความคิดเห็น ฯ

สำหรับสอบถามวิทยากร



5. แบบประเมินความคิดเห็นต่อโครงการฯ

(ขอความอนุเคราะห์ตอบแบบประเมินภายหลังการประชุม)



เอกสารประกอบการประชุม

- รายงาน CoP ขั้นต้น
- เอกสารสรุปรายละเอียดข้อมูล
- สื่ออินโฟกราฟิก

  (แผ่นพับประชาสัมพันธ์)







ดาวน์โหลด
เอกสารประกอบการประชุม

5



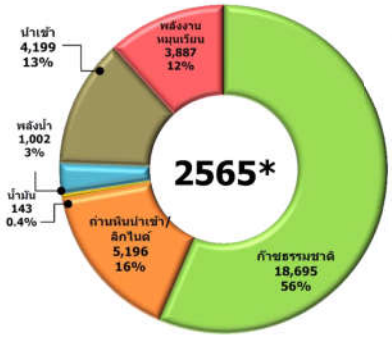
วัตถุประสงค์ของการประชุม

1. นำเสนอรายละเอียดโครงการ
2. นำเสนอรายงานประมวลหลักการปฏิบัติ (Code of Practice: CoP)
3. นำเสนอมาตรการป้องกันแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
4. รับฟังความเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสีย

6

เหตุผลและความจำเป็นของโครงการ

การผลิตไฟฟ้าของประเทศไทยในปัจจุบัน



รวมทั้งสิ้น 33,123 GWh

พึ่งพาเชื้อเพลิงจากฟอสซิลเป็นหลัก

- ก๊าซธรรมชาติ
- ถ่านหิน

ต้องนำเข้าจากต่างประเทศ ก่อให้เกิดมลพิษสูง

โรงไฟฟ้าพลังงานแสงอาทิตย์ สอดคล้องนโยบายของรัฐ
ซึ่งมีเป้าหมาย เพิ่มสัดส่วนการผลิตไฟฟ้าจากพลังงานทดแทน

สร้างความมั่นคงด้านพลังงานให้กับระบบไฟฟ้าของประเทศ



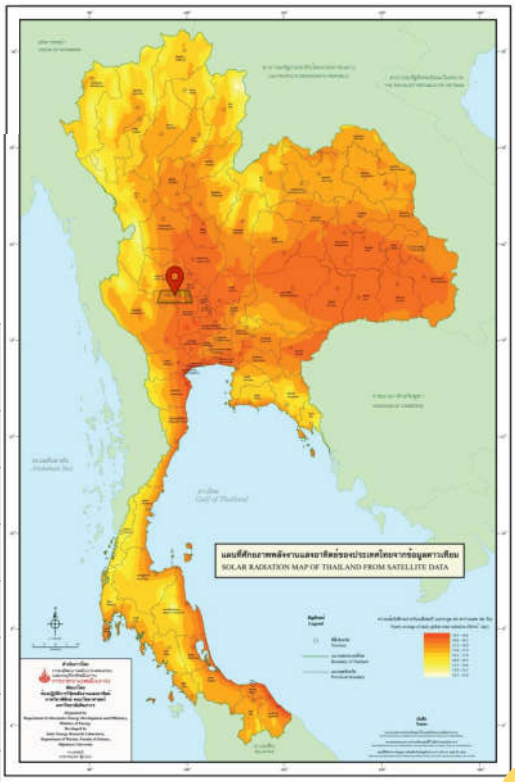
7

เหตุผลและความจำเป็นของโครงการ

ศักยภาพพลังงานแสงอาทิตย์ในประเทศไทย

ประเทศไทยมีศักยภาพพลังงานแสงอาทิตย์ค่อนข้างสูง
มีความเข้มแสงเฉลี่ยต่อปีมากกว่า 17 เมกะจูล/ตารางเมตร-วัน

พื้นที่	ความเข้มแสงเฉลี่ยรายปี (เมกะจูล/ตารางเมตร-วัน)
ทั้งประเทศ	17.8
ภาคเหนือ	17.5
ภาคตะวันออกเฉียงเหนือ	17.9
ภาคกลาง	18.2
ภาคใต้	17.6
จังหวัดสุพรรณบุรี	18.6
ตำบลหนองกระทุ่ม	18.3



8

เหตุผลและความจำเป็นของโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด ได้เล็งเห็นความสำคัญด้านพลังงานและสิ่งแวดล้อม รวมทั้งการใช้พลังงานทดแทนที่เป็นพลังงานสะอาด ซึ่งเป็นโอกาสในการพัฒนาธุรกิจ จึงมีแผนที่จะพัฒนา**โครงการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ด้วยเทคโนโลยีแผงโฟโตโวลเทอิก**หรือ**เซลล์แสงอาทิตย์แบบติดตั้งบนพื้นดิน**ร่วมกับ**ระบบกักเก็บพลังงาน** เพื่อจำหน่ายไฟฟ้าให้แก่ภาครัฐตามนโยบายให้การสนับสนุนการผลิตไฟฟ้าจากพลังงานทดแทนหรือพลังงานทางเลือก



กำลังการผลิตไฟฟ้าติดตั้ง : 144.000 MW_{AC} (199.456 MW_P)

แผนการพัฒนาโครงการ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

ระยะเวลาตั้งแต่ออกแบบ ก่อสร้าง ติดตั้งอุปกรณ์ผลิตไฟฟ้า จนถึงช่วงทดสอบระบบ รวมระยะเวลาทั้งสิ้นประมาณ **21 เดือน**



ระยะเตรียมการ

①
- คัดเลือกพื้นที่โครงการและเทคโนโลยี
- ศึกษาและออกแบบรายละเอียดโครงการ
- ศึกษาและจัดทำรายงาน
- ขออนุญาตหน่วยงานที่เกี่ยวข้องเพื่อดำเนินการก่อสร้าง

9 เดือน

② การก่อสร้างและทดสอบระบบ

③ เริ่มดำเนินการผลิตไฟฟ้าและจำหน่ายให้กับภาครัฐ

12 เดือน

การจัดทำรายงานประกอบการขออนุมัติอนุญาต

❶ ขอรับ **ใบอนุญาตผลิตไฟฟ้า** ต่อสำนักงานคณะกรรมการกำกับกิจการพลังงาน

รายงานประมวลหลักการปฏิบัติ (Code of Practice: CoP)
ตามระเบียบคณะกรรมการกำกับกิจการพลังงานว่าด้วยหลักเกณฑ์การจัดทำรายงานประมวลหลักการปฏิบัติ และรายงานผลการปฏิบัติตามประมวลหลักการปฏิบัติ สำหรับการประกอบกิจการไฟฟ้า พ.ศ. 2565

การรับฟังความเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสีย
ตามระเบียบคณะกรรมการกำกับกิจการพลังงานว่าด้วยการรับฟังความเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสียในการพิจารณาออกใบอนุญาตประกอบกิจการผลิตไฟฟ้า พ.ศ. 2565



❷ ขอรับ **ใบอนุญาตประกอบกิจการโรงงาน** ต่อกรมโรงงานอุตสาหกรรม

รายงานเกี่ยวกับการศึกษามาตรการป้องกันและแก้ไขผลกระทบต่อคุณภาพสิ่งแวดล้อมและความปลอดภัย (Environmental Safety Assessment, ESA)

การศึกษาและจัดทำรายงาน

ขั้นตอนการศึกษา

การศึกษาโครงการและข้อมูลพื้นที่เบื้องต้น
ขอบเขตการศึกษา

↓

การศึกษารายละเอียดโครงการ
สภาพแวดล้อมปัจจุบันของพื้นที่ศึกษา

↓

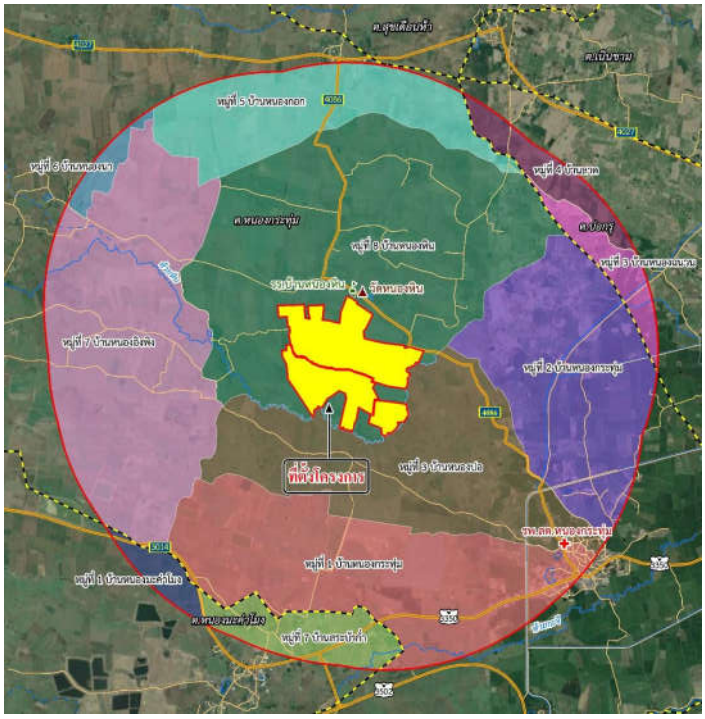
การประเมินผลกระทบสิ่งแวดล้อม
มาตรการป้องกันและแก้ไข → ผลกระทบสิ่งแวดล้อม

ขั้นตอนการมีส่วนร่วม



การจัดประชุมรับฟังความคิดเห็นฯ
การนำเสนอและรับฟังความคิดเห็นต่อผลการศึกษาและมาตรการฯ

การรับฟังความคิดเห็นของประชาชน



กรณีโรงไฟฟ้าที่ไม่มีการเผาไหม้เชื้อเพลิงที่มีกำลังการผลิตติดตั้งตั้งแต่ 10 เมกะวัตต์ขึ้นไป ให้ดำเนินการครอบคลุมกลุ่มเป้าหมายในพื้นที่รัศมีอย่างน้อย 3 กิโลเมตร จากขอบเขตพื้นที่โครงการ

กลุ่มผู้มีส่วนได้ส่วนเสียของโครงการ

เทศบาลตำบลหนองกระทุ่ม
- หมู่ที่ 1 บ้านหนองกระทุ่ม
- หมู่ที่ 2 บ้านหนองกระทุ่ม
- หมู่ที่ 3 บ้านหนองปอ
- หมู่ที่ 5 บ้านหนองกอก
- หมู่ที่ 6 บ้านหนองนา
- หมู่ที่ 7 บ้านหนองอิงพิง
- หมู่ที่ 8 บ้านหนองหิน

องค์การบริหารส่วนตำบลบ่อกรุ
- หมู่ที่ 3 บ้านหนองฉนวน
- หมู่ที่ 4 บ้านลาด

องค์การบริหารส่วนตำบลหนองมะค่าโมง
- หมู่ที่ 1 บ้านหนองมะค่าโมง
- หมู่ที่ 7 บ้านสระบัวกำ่า

การดำเนินงานด้านการมีส่วนร่วมของประชาชน

ตามระเบียบคณะกรรมการกำกับกิจการพลังงาน พ.ศ. 2565

สำนักงานคณะกรรมการกำกับกิจการพลังงาน

แจ้งกำหนดการ สถานที่จัดประชุม และเผยแพร่ข้อมูล ล่วงหน้า ≥ 15 วัน
ณ บอร์ดของหน่วยงานราชการและชุมชน
2-3 มิถุนายน 2566





❶ ❷ ❸



WE ARE HERE

จัดเวทีรับฟังความคิดเห็น
21 มิถุนายน 2566

15 วัน → 15 วัน → 15 วัน → 30 วัน

ปิดประกาศเผยแพร่ข้อมูลต่อเนื่อง
≥ 15 วัน
4-18 มิถุนายน 2566

รับฟังความเห็นเพิ่มเติมต่อเนื่อง ≥ 15 วัน
22 มิถุนายน - 6 กรกฎาคม 2566
- สื่อสังคม
- สื่ออิเล็กทรอนิกส์
- ไปรษณีย์
- โทรศัพท์

ส่งสรุปผลการรับฟังความคิดเห็นหลังรับฟังความคิดเห็นเพิ่มเติมฯ ภายใน 15 วัน
ภายใน 21 กรกฎาคม 2566

เผยแพร่รายงานสรุปผลและเปิดโอกาสให้ท้วงติงต่อรายงานสรุปผลฯ ภายใน 30 วัน
21 กรกฎาคม - 19 สิงหาคม 2566



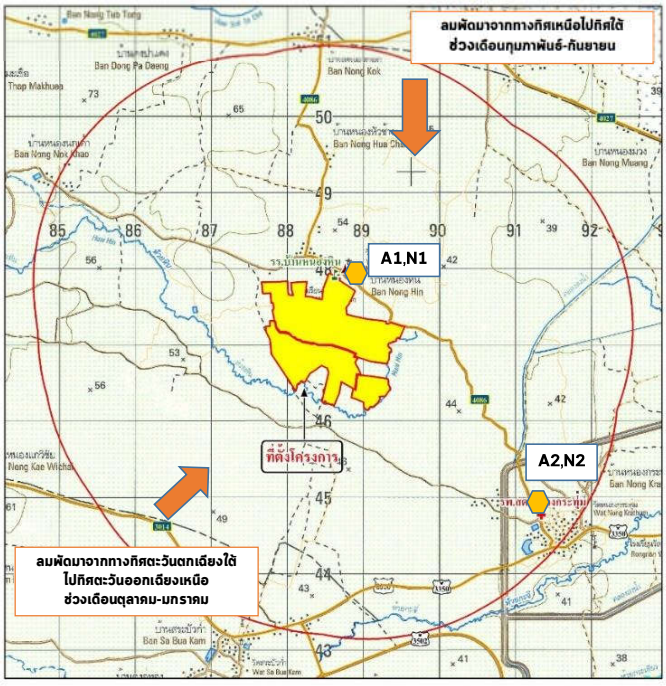
การศึกษาสภาพแวดล้อมปัจจุบัน

การรวบรวมข้อมูลทุติยภูมิ	การตรวจสอบภาคสนาม	การเก็บตัวอย่างคุณภาพสิ่งแวดล้อม - คุณภาพอากาศ - เสียง	การจัดประชุมรับฟังความคิดเห็นฯ
			

การวิเคราะห์ข้อมูล

การศึกษาสภาพแวดล้อมปัจจุบัน

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power



จุดตรวจวัดคุณภาพอากาศและเสียง
ตรวจวัดระหว่างวันที่ 24-29 พฤษภาคม 2566
A1,N1 : โรงเรียนบ้านหนองหิน
A2,N2 : รพ.สต. หนองกระทุ่ม





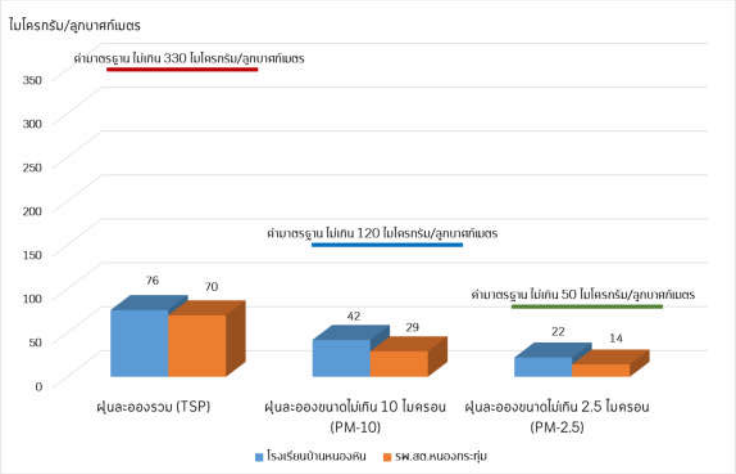

โรงเรียนบ้านหนองหิน

รพ.สต.หนองกระทุ่ม

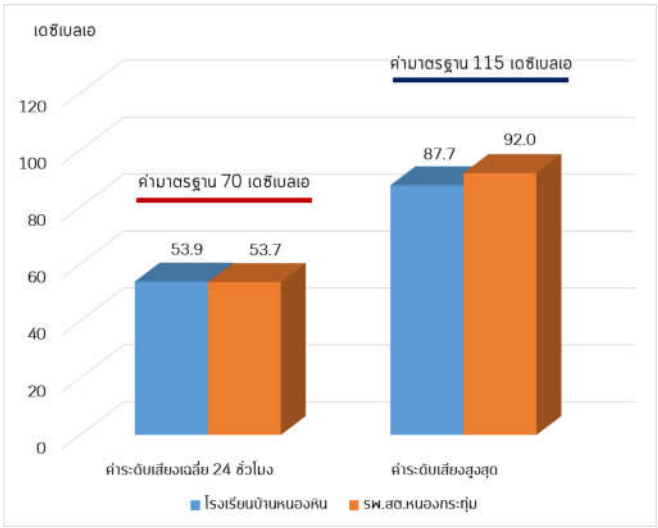
การเก็บตัวอย่างคุณภาพสิ่งแวดล้อมปัจจุบัน

ดำเนินการตรวจวัดในวันที่ 24-29 พ.ค. 66 จำนวน 2 สถานี (รร.บ้านหนองหิน และ รพ.สต.หนองกระทุ่ม)

คุณภาพอากาศ ผ่านเกณฑ์



ระดับเสียง ผ่านเกณฑ์



การศึกษาและจัดทำรายงานประมวลหลักการปฏิบัติ

ศึกษาผลกระทบและกำหนดมาตรการด้านสิ่งแวดล้อม ครอบคลุมรายละเอียดโครงการ 4 ระยะ



ระยะเตรียมการก่อสร้าง



ระยะก่อสร้าง
12 เดือน



ระยะดำเนินการ
อายุโครงการ 25 ปี



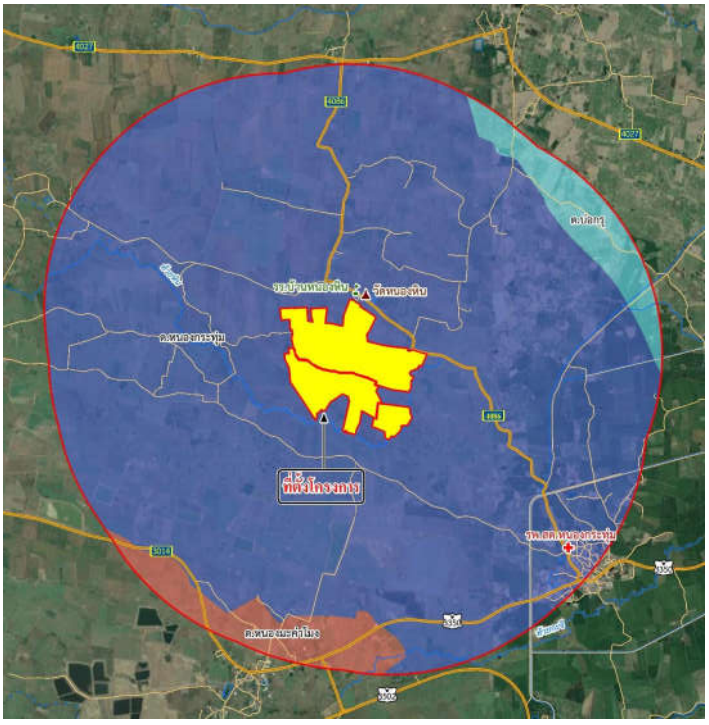
ระยะรื้อถอน
บางส่วน หรือทั้งหมด

1 2 3 4

รายละเอียดโครงการ



ที่ตั้งโครงการ



บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

ที่ตั้งโครงการ : ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

ขนาดพื้นที่โครงการ : 1,051.96 ไร่

สภาพพื้นที่โครงการปัจจุบัน

จากการสำรวจพื้นที่โครงการเมื่อวันที่ 8 มิถุนายน พ.ศ. 2566 พบว่า ปัจจุบันบริเวณพื้นที่ที่จะทำการก่อสร้างโครงการมีสภาพเป็นพื้นที่ว่างรอการใช้ประโยชน์ทั้งหมด





การใช้ประโยชน์พื้นที่โครงการ

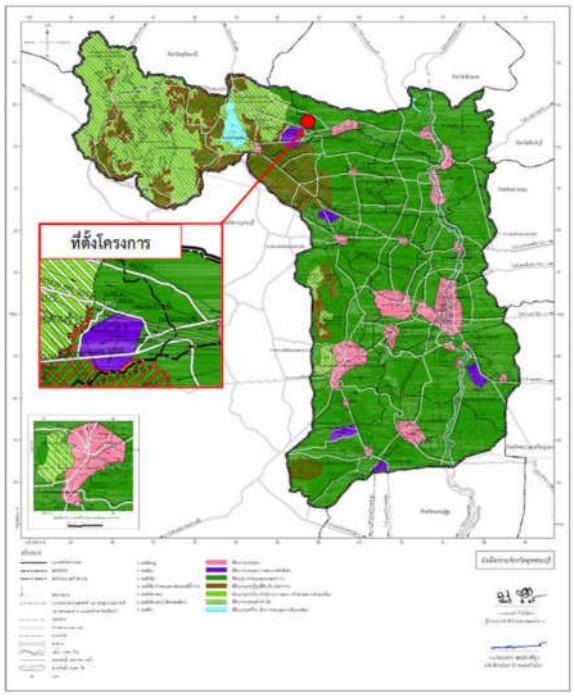
ที่ตั้งโครงการ
ไม่ขัดต่อกฎหมาย ✓
ที่มีผลบังคับใช้ในปัจจุบัน

ตามประกาศกฎกระทรวงให้ใช้บังคับผังเมืองรวมจังหวัดสุพรรณบุรี พ.ศ. 2560 พบว่า ที่ดินบริเวณโครงการตั้งอยู่ใน

บริเวณหมายเลข 3.1
กำหนดเป็นที่ดินประเภทชนบทและเกษตรกรรม (สีเขียว)

และไม่เข้าข่ายตามบัญชีกำหนดประเภท ชนิด และจำพวกของโรงงานที่ห้ามประกอบกิจการในท้ายกฎกระทรวงฯ

ดังนั้น โครงการสามารถดำเนินการได้ตามกฎกระทรวงฯดังกล่าว



ผังพื้นที่โครงการ



พื้นที่โครงการทั้งหมด 1,051.96 ไร่

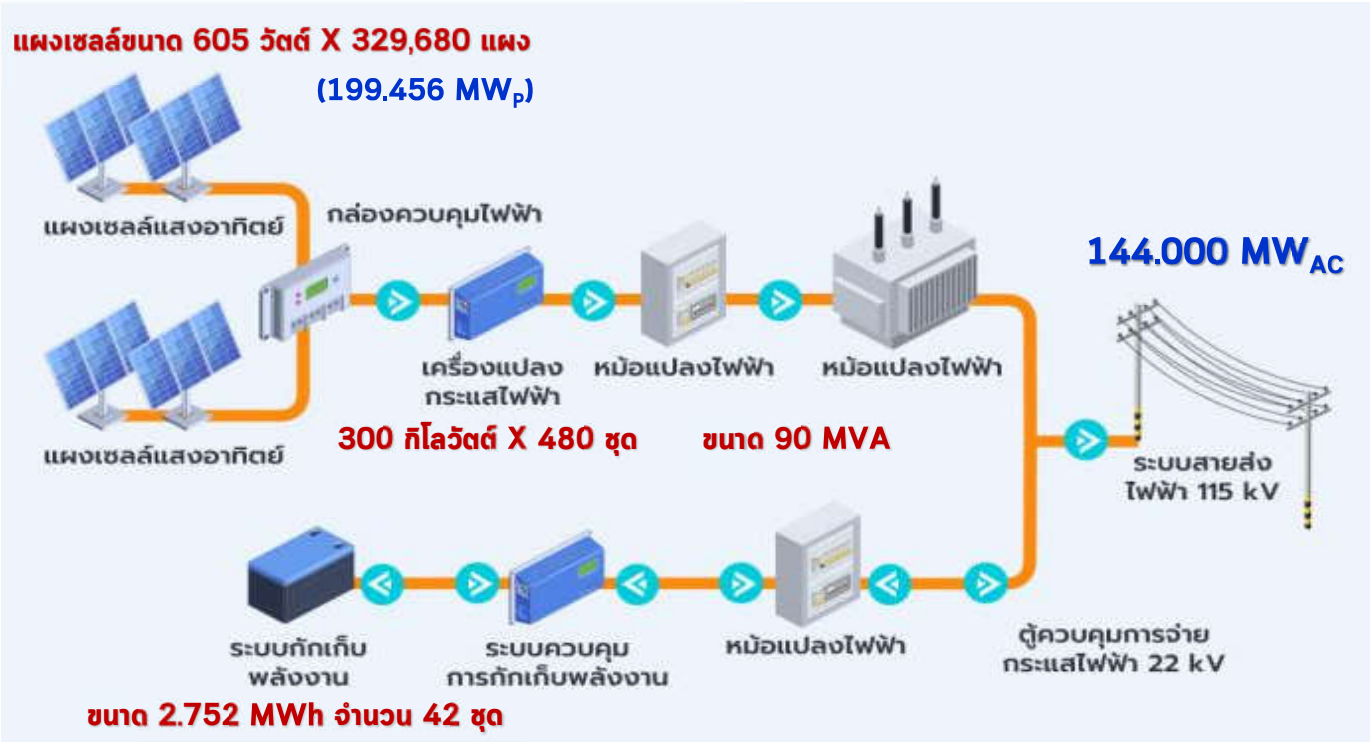
พื้นที่ติดตั้งแผงเซลล์แสงอาทิตย์ 696 ไร่
(ประมาณร้อยละ 66)

ทั้งนี้ โครงการได้พิจารณาจัดให้มี**พื้นที่สีเขียวในบริเวณที่ไม่ส่งผลกระทบต่อการทำงานของแผงเซลล์แสงอาทิตย์** เช่น การจัดให้มีสวนหย่อมหรือไม้พุ่มเตี้ยบริเวณสำนักงานโครงการที่ชุมชนสามารถมองเห็นได้ชัดเจน

การใช้ประโยชน์พื้นที่โครงการ

พื้นที่	ตารางเมตร	ไร่	ร้อยละ
1. พื้นที่ส่วนผลิตไฟฟ้า (พื้นที่ติดตั้งแผงเซลล์แสงอาทิตย์และอินเวอร์เตอร์)	1,113,605.6	696.0	66.16
2. พื้นที่ส่วนสนับสนุนและเกี่ยวข้องกับการผลิตไฟฟ้า	4,800.0	3.0	0.29
3. พื้นที่ลานไกไฟฟ้า หรือสถานีไฟฟ้า	1,815.0	1.13	0.11
4. พื้นที่อาคารที่ทำการเพื่อควบคุมระบบผลิตไฟฟ้า	288.0	0.18	0.02
5. พื้นที่จัดเก็บอะไหล่ วัสดุอุปกรณ์ ทากของเสีย และซ่อมบำรุง	120.0	0.08	0.01
6. พื้นที่ว่าง หรือถนน ทางเดินและลานจอดรถ	496,989.2	310.62	29.53
7. พื้นที่สีเขียวและแนวกันชน	63,505.0	39.69	3.77
8. พื้นที่อื่นๆ	2,010.8	1.26	0.12
รวม	1,683,133.6	1,051.96	100.00

องค์ประกอบของโครงการ



กำลังการผลิตและเครื่องจักรหลักที่ติดตั้ง

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

กำลังการผลิตไฟฟ้าติดตั้ง : 144.000 MW_{AC} (199.456 MW_P)

แผงเซลล์แสงอาทิตย์ชนิดซิลิกอน : ขนาด 605 วัตต์ต่อแผง หรือเทียบเท่า จำนวน 329,680 แผง

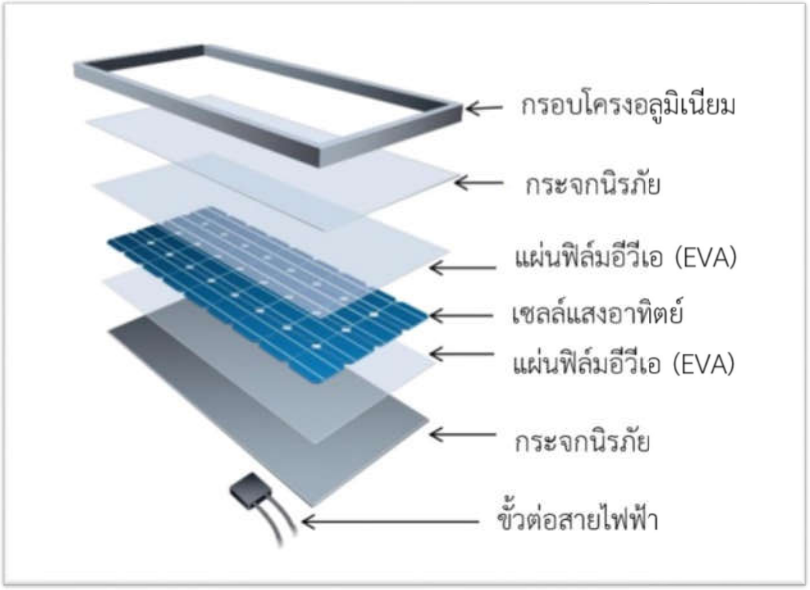
เครื่องแปลงกระแสไฟฟ้า (Inverter) : ขนาดกำลังการผลิต 300 กิโลวัตต์ จำนวน 480 ชุด หรือเทียบเท่า

หม้อแปลงไฟฟ้า : ขนาด 90 เมกะโวลต์แอมแปร์ จำนวน 1 ชุด

ระบบกักเก็บพลังงาน (BESS) : ขนาด 2.752 MWh จำนวน 42 ชุด

เซลล์แสงอาทิตย์ (SOLAR CELL) ที่โครงการเลือกใช้งาน

ชนิดแผงเซลล์ : แผงซิลิคอนชนิดผลึกเดี่ยว (Mono Crystalline)



กำลังการผลิต : 605 วัตต์ต่อแผง
จำนวนแผงเซลล์ : 329,680 แผง



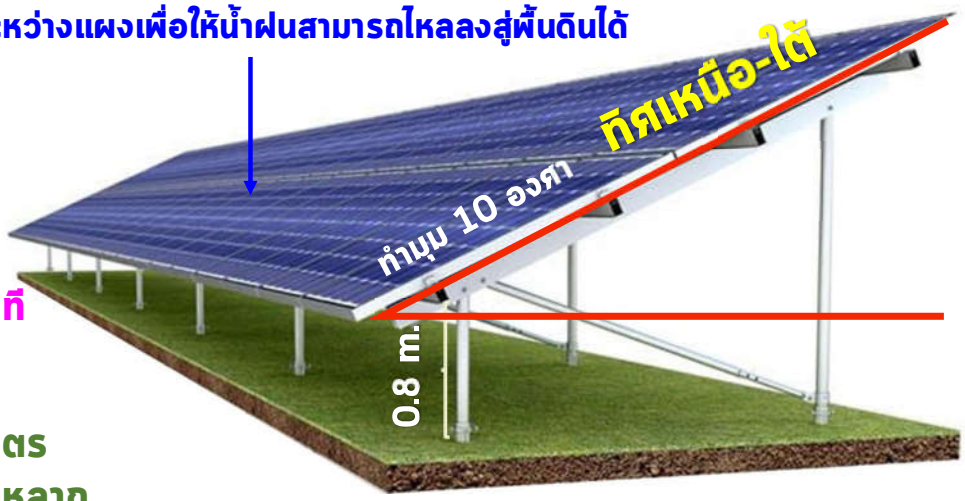
ตัวอย่างการวางแผงเซลล์แสงอาทิตย์ภายในโครงการ

จัดวางแผงเซลล์ในแนวทิศเหนือ-ใต้
โดยหันแผงไปทางทิศใต้เพื่อให้สามารถรับแสงอาทิตย์ได้มากที่สุด

มีช่องว่างระหว่างแผงเพื่อให้น้ำฝนสามารถไหลลงสู่พื้นดินได้

การออกแบบชุดโครงสร้าง
มีความแข็งแรง และ
สามารถรองรับแรงลม
ไม่น้อยกว่า 30 เมตร/วินาที
โดยไม่เกิดการชำรุด

ความสูงจากพื้นดิน 0.8 เมตร
ปลอดภัยจากน้ำท่วมและน้ำหลาก



ไม่มีการเปลี่ยนแปลงสภาพพื้นที่

การออกแบบระบบไฟฟ้าและความปลอดภัย

- มาตรฐานอุปกรณ์ การติดตั้ง การเชื่อมต่อกับระบบโครงข่ายไฟฟ้า และความปลอดภัยให้เป็นไปตามมาตรฐานผลิตภัณฑ์อุตสาหกรรม (มอก.) หรือเทียบเท่ามาตรฐานสากล และระเบียบข้อกำหนดของการไฟฟ้า โดยต้องมีวิศวกรที่ได้รับใบอนุญาตประกอบวิชาชีพวิศวกรรมควบคุมตามกฎหมายว่าด้วยวิศวกรลงนามรับรองการออกแบบ
- ออกแบบชุดโครงสร้างรองรับชุดแผงเซลล์แสงอาทิตย์ที่มีความแข็งแรง ให้แผงเซลล์แสงอาทิตย์ที่ติดตั้งบนโครงสร้างดังกล่าวสามารถทนทานต่อแรงกระทำจากความเร็วลมโดยไม่เกิดการชำรุดเสียหาย





ระบบป้องกันอันตรายและความปลอดภัย



การเข้าเขตพื้นที่โครงการ

- ติดตั้งรั้วและป้ายโครงการเพื่อแสดงขอบเขตที่ชัดเจน
- สงวนสิทธิ์การเข้าพื้นที่เฉพาะบุคคลที่ได้รับอนุญาต



ระบบป้องกันไฟรั่ว

- ระบบสายไฟฟ้าแบบแยกประจุบวก-ลบ
- ติดตั้งระบบกราวน์ และระบบตัดวงจร อัตโนมัติเมื่อเกิดการ Short Circuit

ระบบป้องกันอัคคีภัย

- จัดให้มี รปภ. ตรวจสอบและเฝ้าระวังเป็นระยะ
- มีระบบกล้องวงจรปิด
- ติดตั้งอุปกรณ์ดับเพลิงอย่างเพียงพอ





ผลกระทบสิ่งแวดล้อมที่สำคัญ มาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม



ระยะก่อสร้าง

- **คุณภาพอากาศ**
  การปรับพื้นที่ การขนส่งคนงานและอุปกรณ์ก่อสร้าง
- **เสียง**
  จากการติดตั้งโครงสร้างแผงเซลล์แสงอาทิตย์
- **น้ำเสียและการระบายน้ำ**
  จากคนงานก่อสร้างและกิจกรรมการก่อสร้าง
- **การคมนาคม**
  จากการขนส่งคนงานและอุปกรณ์ก่อสร้าง
- **มูลฝอยและกากของเสีย**
  จากคนงานและเศษวัสดุก่อสร้าง
- **เศรษฐกิจ สังคม และการมีส่วนร่วมของประชาชน**

ระยะดำเนินการ

- **น้ำเสียและการระบายน้ำ**
  จากการทำความสะอาดแผงเซลล์แสงอาทิตย์
- **มูลฝอยและกากของเสีย**
  แผงเซลล์แสงอาทิตย์ที่ชำรุด
- **แสงสะท้อนและความร้อน**
- **เศรษฐกิจ สังคม และการมีส่วนร่วมของประชาชน**

คุณภาพอากาศ

ข้อห่วงกังวลจากการประชาสัมพันธ์โครงการเบื้องต้น

- กังวลผลกระทบจากฝุ่นละออง โดยเฉพาะ PM-2.5

แหล่งกำเนิด ระยะก่อสร้าง
กิจกรรมการปรับพื้นที่ 
การใช้ยานพาหนะและการขนส่งอุปกรณ์ 

แหล่งกำเนิด ระยะดำเนินการ
ไม่มีแหล่งกำเนิดมลพิษอากาศ

การจัดการด้านคุณภาพอากาศ




แหล่งกำเนิดมลสารทางอากาศ : **กิจกรรมการปรับพื้นที่โครงการ**

ฝุ่นละอองที่เกิดขึ้นจากกิจกรรมก่อสร้างส่วนใหญ่เป็นฝุ่นขนาดใหญ่ สามารถตกลงในพื้นที่ได้โดยง่าย

PM-2.5 — สาเหตุหลัก เกิดจาก



การเผาไหม้ของเครื่องยนต์



การเผาไหม้ของโรงงานอุตสาหกรรม

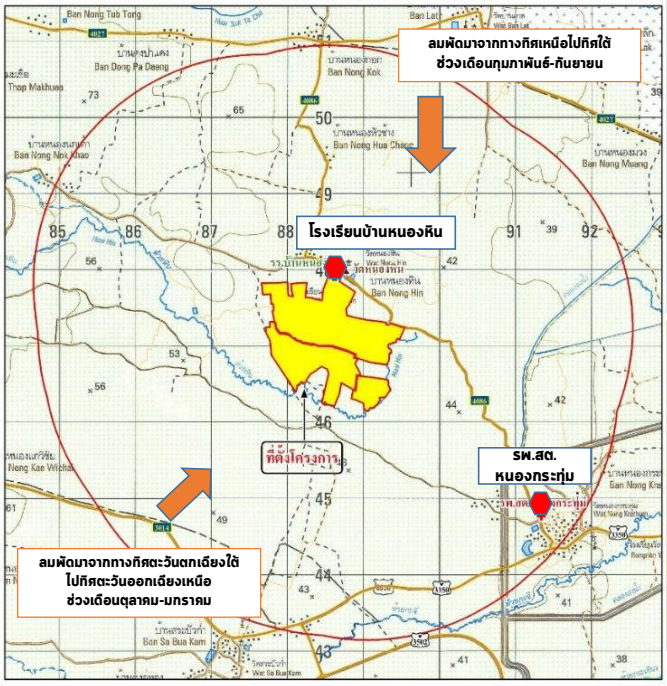


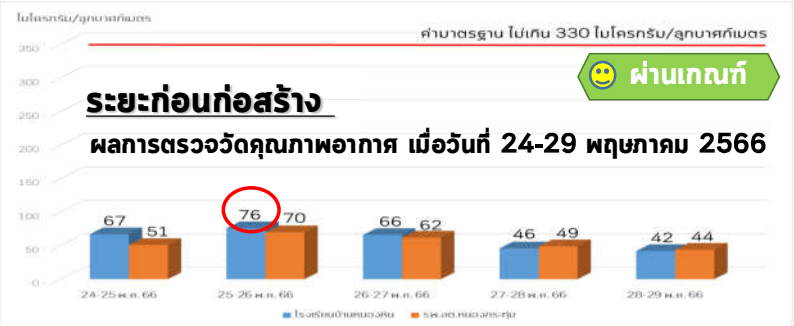
การเผาป่า

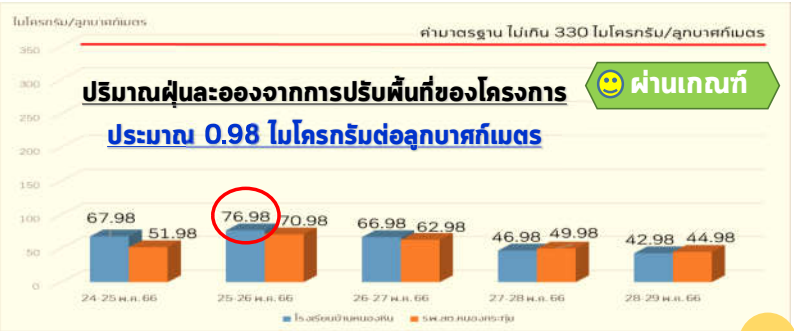
การตรวจวัดคุณภาพอากาศในบรรยากาศปัจจุบัน

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

จุดสังเกต/ประเมินผลกระทบ







มาตรการฯ ที่สำคัญ (ด้านคุณภาพอากาศ)

แหล่งกำเนิด	มาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม
กิจกรรมการปรับพื้นที่ 	✓ ฉีดพรมน้ำในบริเวณพื้นที่ที่มีการเปิดหน้าดิน กองวัสดุ และบริเวณถนนทางเข้าพื้นที่ก่อสร้างอย่างน้อยวันละ 2 ครั้ง (เช้า-บ่าย) หรือพิจารณาตามความเหมาะสมกับสภาพภูมิอากาศ โดยควบคุมให้ผิวดินมีความเปียกชื้น เพื่อป้องกันฝุ่นละอองฟุ้งกระจายและลดผลกระทบต่อชุมชนที่อยู่ใกล้เคียง
การใช้ยานพาหนะและการขนส่งอุปกรณ์ 	✓ ก่อนนำรถออกจากพื้นที่ก่อสร้างให้ล้างทำความสะอาดตัวรถและล้อรถที่มีเศษหินดินโคลน หรือทรายที่อาจจะก่อให้เกิดสภาพที่เป็นอันตรายและความสกปรกบนถนน ✓ จัดเก็บวัสดุอุปกรณ์ก่อสร้างให้เป็นระเบียบส่วนใดที่ก่อให้เกิดฝุ่นฟุ้งกระจายต้องมีวัสดุคลุมปิดทับ





ข้อห่วงกังวลจากการประชาสัมพันธ์โครงการเบื้องต้น

- กังวลผลกระทบเรื่องเสียงจากกิจกรรมการก่อสร้าง ขอให้มีการชี้แจงชุมชนเกี่ยวกับผลกระทบที่อาจเกิดขึ้นในช่วงดังกล่าว

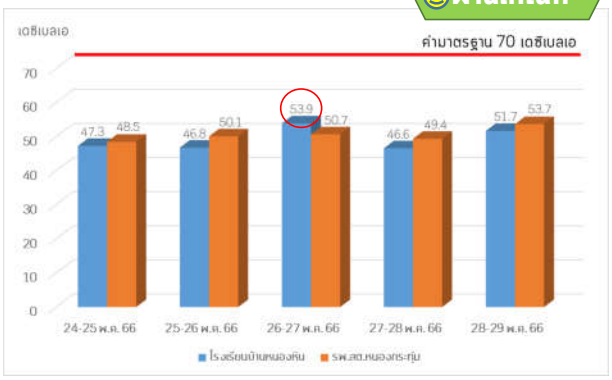
แหล่งกำเนิด ระยะก่อสร้าง
กิจกรรมการปรับพื้นที่ 
การติดตั้งอุปกรณ์ 

แหล่งกำเนิด ระยะดำเนินการ
ไม่มีแหล่งกำเนิดเสียง

ผลการประเมินค่าระดับเสียง

ผลการตรวจวัดระดับเสียง **ระยะก่อนก่อสร้าง**
เมื่อวันที่ 24-29 พฤษภาคม 2566

ผ่านเกณฑ์

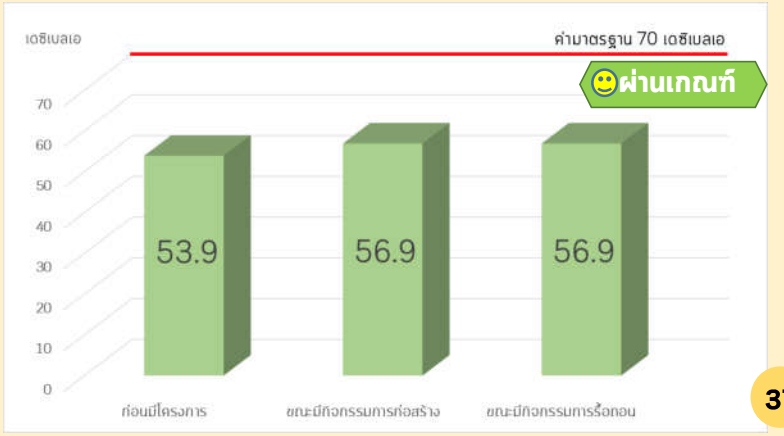


ค่าระดับเสียงสุงสุดจากการตรวจวัด
53.9 เดซิเบลเอ

ผลประเมินระดับเสียงรวมที่จุดสังเกต **ช่วงก่อสร้างและรื้อถอน**
บริเวณ **โรงเรียนบ้านหนองหิน** (ห่างจากโครงการประมาณ 120 เมตร)

- ระดับเสียงที่ได้รับจากโครงการ เท่ากับ 53.9 เดซิเบลเอ
- ระดับเสียงสูงสุดที่ได้จากการตรวจวัด เท่ากับ 53.9 เดซิเบลเอ

ระดับเสียงรวมบริเวณโรงเรียนบ้านหนองหิน เท่ากับ 56.9 เดซิเบลเอ



มาตรการฯ ที่สำคัญ (ด้านเสียง)

แหล่งกำเนิด	มาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม
กิจกรรมการปรับพื้นที่ 	✓ กิจกรรมการก่อสร้างที่อาจก่อให้เกิดผลกระทบด้านเสียงต่อชุมชนหรือสิ่งมีชีวิตที่อยู่บริเวณโดยรอบ ให้มีการดำเนินการเฉพาะในช่วงเวลากลางวัน ยกเว้นกิจกรรมที่จำเป็นต้องดำเนินการต่อเนื่องให้แล้วเสร็จ ✓ ในกรณีที่เสียงดังเกินกำหนด ให้ติดตั้งกำแพงหรือรั้วที่มีลักษณะเป็นแผ่นหนา ทึบ หรือวัสดุอื่นที่ให้ผลเทียบเท่าและให้มีความสูงกว่าระดับสายตา บริเวณริมรั้วพื้นที่ก่อสร้างด้านที่อยู่ติดหรือใกล้เคียงกับชุมชนหรือพื้นที่อ่อนไหว ทั้งนี้ กำแพงกั้นเสียงควรติดตั้งในบริเวณที่ใกล้ที่สุดกับแหล่งกำเนิดเสียงเท่าที่จะทำได้
การติดตั้งอุปกรณ์ 	✓ เลือกใช้อุปกรณ์และเครื่องจักรในการก่อสร้างที่มีระดับเสียงต่ำและตรวจซ่อมบำรุงรักษาอุปกรณ์และเครื่องจักรให้มีประสิทธิภาพในการใช้งานให้ดีอยู่เสมอ ✓ จัดให้มีอุปกรณ์ป้องกันเสียงให้แก่คนงานที่ทำงานบริเวณที่มีเสียงดัง และควบคุมระดับเสียงทั่วไปให้อยู่ในเกณฑ์มาตรฐาน
ตลอดระยะเวลาก่อสร้าง	✓ กิจกรรมการก่อสร้างที่อาจก่อให้เกิดผลกระทบด้านเสียงต่อชุมชน**จะต้องแจ้งให้ผู้นำชุมชนในพื้นที่ทราบก่อนดำเนินการในกิจกรรมนั้น ๆ อย่างน้อย 7 วัน**

น้ำเสียและการระบายน้ำ

แหล่งกำเนิด ช่วงก่อสร้าง

กิจวัตรประจำวันของคนงานก่อสร้าง



กิจกรรมการก่อสร้าง
และการล้างทำความสะอาดอุปกรณ์



แหล่งกำเนิด ช่วงดำเนินการ

การทำความสะอาด
แผงเซลล์แสงอาทิตย์



ข้อห่วงกังวลจากการประชาสัมพันธ์โครงการเบื้องต้น

- ในขั้นตอนการล้างทำความสะอาดแผงเซลล์แสงอาทิตย์ ชุมชนจะมั่นใจได้อย่างไรว่าจะไม่มีการใช้สารเคมีหรือสารทำความสะอาด และหากเกิดผลกระทบต่อสิ่งแวดล้อม ทางโครงการมีมาตรการอย่างไร
- แม้โครงการไม่มีการปรับพื้นดินด้านล่างบริเวณที่ติดตั้งแผงเซลล์แสงอาทิตย์ แต่เมื่อน้ำฝนตกกระทบแผงเซลล์แสงอาทิตย์ อาจทำให้เกิดการไหลบ่าของน้ำไปยังพื้นที่ข้างเคียงได้หรือไม่

ระยะก่อสร้าง

แหล่งกำเนิด	การอุปโภคบริโภคคนงานก่อสร้าง ปริมาณ 89.38 ลูกบาศก์เมตรต่อวัน	กิจกรรมการก่อสร้าง สำหรับการล้างอุปกรณ์ ปริมาณ 50 ลูกบาศก์เมตรต่อวัน
การจัดการ	กำหนดให้บริษัทผู้รับเหมาจัดให้มีห้องน้ำ-ห้องส้วม ที่ถูกหลักสุขาภิบาล เพียงพอกับคนงานก่อสร้าง ในช่วงเวลาที่มีจำนวนคนงานสูงสุด	• รวบรวมสู่รางระบายน้ำชั่วคราวของโครงการ • ระบายลงบ่อพักน้ำของโครงการทั้งหมด • หมุนเวียนน้ำกลับไปใช้ประโยชน์อื่นๆ เช่น รดน้ำต้นไม้ หรือฉีดพรมน้ำบริเวณพื้นที่ก่อสร้าง เป็นต้น

มาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม

- **ติดตั้งระบบบำบัดน้ำเสียสำเร็จรูปจากห้องน้ำห้องส้วม** เพื่อบำบัดน้ำเสียให้ได้ตามมาตรฐานน้ำทิ้งที่ราชการกำหนดก่อนระบายออกสู่ภายนอก โดยห้ามระบายของเสียใดๆ ที่ยังมิได้มีการบำบัดลงสู่แหล่งน้ำ และจะต้องมีการสูบน้ำเสียหรือของเสียดังกล่าวไปทิ้งหรือบำบัดให้ถูกต้องตามกฎหมายว่าด้วยโรงงาน
- **ห้ามทิ้งขยะหรือเศษวัสดุจากการก่อสร้าง**ลงในท่อระบายน้ำ หรือแหล่งน้ำสาธารณะโดยเด็ดขาด

ระยะดำเนินการ

น้ำเสียจากการทำความสะอาดแผงเซลล์แสงอาทิตย์

โครงการกำหนดให้มีการล้างแผงเซลล์ปีละ 2 ครั้ง หรือตามสภาพอากาศ

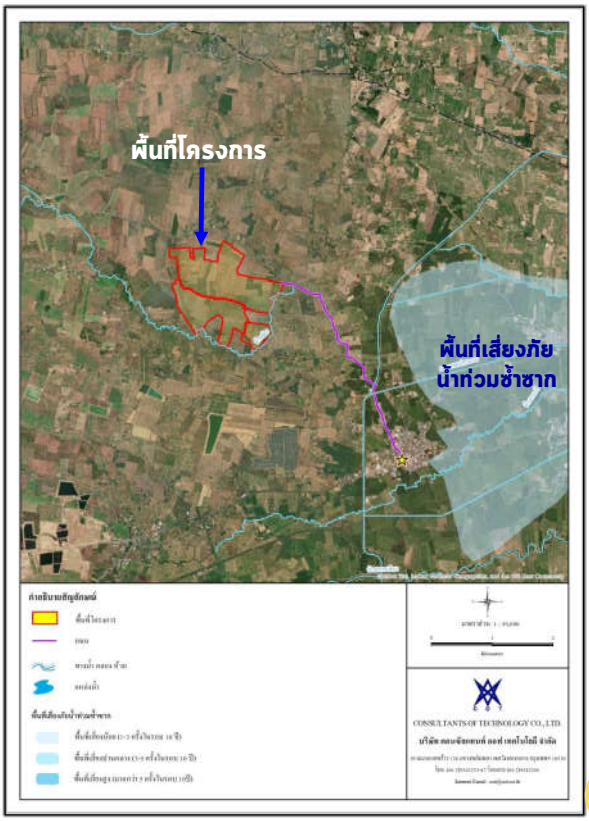




- **อัตราการใช้น้ำ** ประมาณ 8.24 ลูกบาศก์เมตร/วัน หรือ 494.52 ลูกบาศก์เมตร/ครั้ง (แต่ละครั้งปฏิบัติงานประมาณ 2 เดือน)
- **คุณสมบัติ** น้ำที่ใช้ในการล้างแผงเซลล์แสงอาทิตย์ **เป็นน้ำประปา ไม่ได้มีการเติมสารเคมีหรือสารทำความสะอาดแต่อย่างใด** ดังนั้น **น้ำจากการล้างแผงจึงเป็นน้ำที่ชะล้างฝุ่นละอองที่ติดอยู่บนแผงเท่านั้น**
- **การจัดการ** น้ำจากการล้างแผงจะปล่อยไหลซึมลงสู่พื้นดินและระเหยตามธรรมชาติต่อไป

พื้นที่น้ำท่วมซ้ำซาก

จากการพิจารณาแผนที่น้ำท่วมซ้ำซาก พบว่า บริเวณพื้นที่โครงการไม่จัดอยู่ในพื้นที่เสี่ยงภัยต่อน้ำท่วมซ้ำซากแต่อย่างใด



การระบายน้ำฝน



ปริมาณน้ำฝนที่ทางโครงการ
ต้องทำการหน่วงไว้
ในระยะเวลา 3 ชั่วโมง
= 123.12 ลูกบาศก์เมตร

มีรางระบายน้ำฝน
บริเวณอาคาร

บ่อหน่วงน้ำของโครงการ
ขนาด 600 ลูกบาศก์เมตร

รองรับได้เพียงพอ ✓

การระบายน้ำฝน ตัวอย่างพื้นที่ติดตั้งแผงเซลล์แสงอาทิตย์

อัตราการซึมลงดินและทิศทางการไหลของน้ำฝน ไม่เปลี่ยนแปลงจากสภาพก่อนพัฒนาโครงการ

การติดตั้งแผงเซลล์แสงอาทิตย์ มีช่องว่างระหว่างแผง ให้น้ำฝนไหลลงสู่พื้นดินด้านล่างได้



โครงสร้างที่ติดตั้งมีลักษณะโปร่ง
ไม่กีดขวางการไหลของน้ำ

พื้นที่ด้านล่าง คงสภาพดินเดิม มิได้ลาดคอนกรีต

ทิศทางการระบายน้ำในพื้นที่โครงการ



โครงการมีเพียงการปรับระดับพื้นดินเดิมให้เหมาะสมกับการติดตั้งแผงเซลล์แสงอาทิตย์เท่านั้น โดย**ไม่มีการเปลี่ยนแปลงสภาพการระบายน้ำในพื้นที่**ให้เปลี่ยนแปลงไปจากเดิมแต่อย่างใด

เมื่อพิจารณาทิศทางการระบายน้ำโดยใช้แผนที่เส้นชั้นความสูงในพื้นที่โครงการ จะเห็นได้ว่าทิศทางการระบายน้ำจะ**ออกจากกึ่งกลางพื้นที่โครงการทั้งหมด ก่อนระบายไปตามเส้นทางธรรมชาติที่มีอยู่เดิมในปัจจุบัน** โดยไม่มีการเปลี่ยนแปลงอย่างมีนัยสำคัญแต่อย่างใด

การคมนาคมขนส่ง

แหล่งกำเนิด ช่วงก่อสร้าง

รถขนส่งแผงเซลล์แสงอาทิตย์



รถขนส่งวัสดุอุปกรณ์ก่อสร้าง
รถขนส่งพนักงาน



แหล่งกำเนิด ช่วงดำเนินการ

ไม่มีกิจกรรมการขนส่ง
มีเพียงการเดินทางของพนักงานประจำโครงการประมาณ 5 คนเท่านั้น

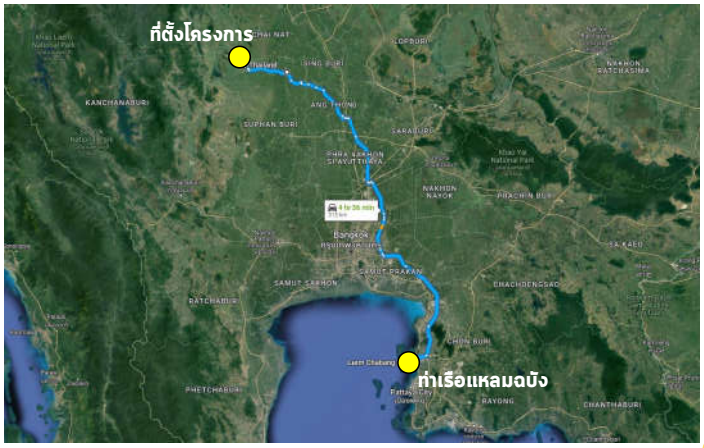
ข้อห่วงกังวลจากการประชาสัมพันธ์โครงการเบื้องต้น

- กังวลผลกระทบด้านการคมนาคมในช่วงก่อสร้าง ขอให้มีการชี้แจงชุมชนเกี่ยวกับผลกระทบที่อาจเกิดขึ้นในช่วงดังกล่าว
- การขนส่งวัสดุก่อสร้างของโครงการ อาจส่งผลกระทบต่อแนวท่อบริเวณถนนของชุมชน

การคมนาคมขนส่ง

ประเภทของการขนส่ง	ความถี่ (เที่ยว/วัน)
รถขนส่งอุปกรณ์ก่อสร้าง	
- รถบรรทุกแผงเซลล์แสงอาทิตย์ (18 ล้อ)	10
- รถบรรทุกขนาดใหญ่ (6 ล้อ)	8
- รถบรรทุกขนาดเล็ก (4 ล้อ)	4
รถขนส่งคนงานก่อสร้าง	
- รถบรรทุกขนาดกลาง (6 ล้อ)	108
- รถปิคอัพ (4 ล้อ)	2

เส้นทางขนส่งแผงเซลล์แสงอาทิตย์ :
ท่าเรือแหลมฉบัง → ทางหลวงพิเศษหมายเลข 7 (กรุงเทพฯ-ชลบุรี) → ทางหลวงพิเศษหมายเลข 9 (ถนนกาญจนาภิเษก) → ทางหลวงแผ่นดินหมายเลข 32 → ทางหลวงแผ่นดินหมายเลข 3064 → ทางหลวงแผ่นดินหมายเลข 3350 → ทางหลวงชนบทหมายเลข 4086 → พื้นที่โครงการ



เส้นทางขนส่งหลักของโครงการ

เส้นทางขนส่งหลักของโครงการ ได้แก่ ทางหลวงชนบทหมายเลข 4086 โดยปัจจุบันมีสภาพเป็นถนนแอสฟัลต์คอนกรีต จำนวน 2 ช่องจราจร (ไป-กลับ) ทั้งนี้ จากการสำรวจพบว่าตลอดเส้นทางขนส่งหลักเพื่อเข้าสู่พื้นที่โครงการ**ไม่พบแนวท่อซึ่งเป็นระบบสาธารณูปโภคพื้นฐานของชุมชนแต่อย่างใด**

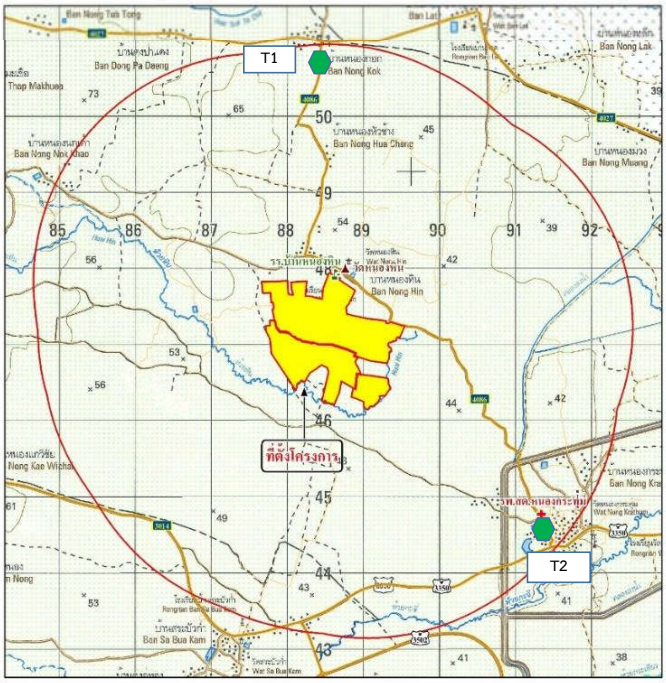








การตรวจสอบปริมาณจราจรในปัจจุบัน



- จุดตรวจนับปริมาณจราจร ตรวจวัด 2 วัน (ครอบคลุมวันทำการและวันหยุด) ดำเนินการในวันที่ 9-10 มิถุนายน 2566

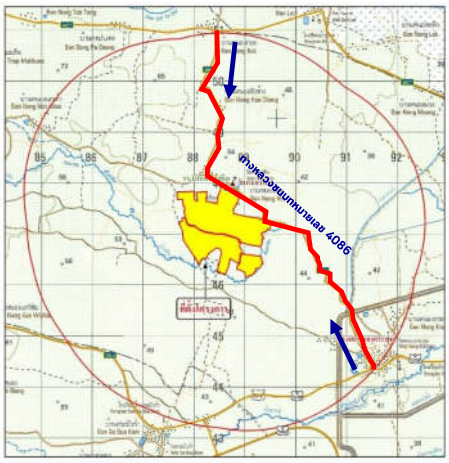
T1 : ทางหลวงชนบทหมายเลข 4086 (ก่อนถึงจุดตัด ทล.4027)

T2 : ทางหลวงชนบทหมายเลข 4086 (รพ.สต.หนองกระทุ่ม)

การคมนาคมขนส่ง

- เส้นทางการขนส่งทางหลวงชนบทหมายเลข 4086

ประเภทของการขนส่ง	จำนวน (คัน/วัน)	ความถี่ (เที่ยว/วัน)	PCU factor	PCU/วัน	PCU/ชั่วโมง
รถขนส่งพนักงาน					
- รถโดยสารขนาดกลาง (รถบรรทุก 6 ล้อ)	27	108	1.0	108	13.5
- รถกระบะ	1	2	1.0	2	0.25
รถขนส่งอุปกรณ์ก่อสร้าง					
- รถบรรทุกอุปกรณ์ก่อสร้าง (18 ล้อ)	5	10	2.5	25	3.125
- รถบรรทุก (6 ล้อ)	4	8	1.0	8	1.0
- รถบรรทุกขนส่งกากของเสีย (4 ล้อ)	2	4	1.0	4	0.5
รวม	**133**	**266**	**-**	**147**	**18.375**



ระดับการบริการจราจร

ปัจจุบัน	A
ช่วงก่อสร้าง	A

ระดับการจราจร (A) หมายถึง การจราจรมีสภาพคล่อง ยวดยานสามารถเคลื่อนที่ได้ด้วยความเร็วอิสระไม่มีข้อจำกัดในการหลบหลีก ความล่าช้าที่เกิดจากการหยุดรถบริเวณทางแยกมีน้อย

ผลกระทบการจราจรในระยะก่อสร้างโครงการไม่เปลี่ยนแปลงจากสภาพปัจจุบัน

มาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม

- **จัดให้มีป้ายหรือสัญญาณเตือนที่เห็นได้ชัดเจน** ทั้งเวลากลางวันและกลางคืนก่อนถึงพื้นที่ก่อสร้างอย่างน้อย 100 เมตร
- **อบรมและควบคุมพนักงานขับรถ**ที่เกี่ยวข้องกับการก่อสร้างทุกชนิดให้ปฏิบัติตามกฎจราจรอย่างเคร่งครัด
- **หากกิจกรรมการก่อสร้าง ทำให้ป้าย สัญญาณไฟ หรือผิวถนนชำรุดต้องรีบดำเนินการซ่อมแซมอย่างเร่งด่วน**



มูลฝอยและกากของเสีย

<u>ข้อห่วงกังวลจากการประชาสัมพันธ์โครงการเบื้องต้น</u>

- โครงการมีการจัดการแผงเซลล์เสื่อมสภาพหรือแบตเตอรี่ที่มีการใช้งานในโครงการอย่างไร

แหล่งกำเนิด ช่วงก่อสร้าง

เศษเหล็ก เศษวัสดุ บรรจุภัณฑ์



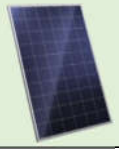
กิจวัตรประจำวัน

ของคนงานก่อสร้าง



แหล่งกำเนิด ช่วงดำเนินการ

แผงเซลล์แสงอาทิตย์ที่ชำรุด



ระยะก่อสร้าง

แหล่งกำเนิด	เศษวัสดุจากกิจกรรมการก่อสร้าง ปริมาณ 10 ตันต่อเดือน	คนงานก่อสร้าง ปริมาณ 1,276.80 กิโลกรัมต่อวัน (คำนวณอัตราการเกิดขยะ 0.8 kg/คน/วัน x 1,596 คน)
การจัดการ	นำกลับมาใช้ประโยชน์ให้มากที่สุด ในส่วนที่ไม่สามารถนำกลับมาใช้ได้ กำหนดให้บริษัทผู้รับเหมารับผิดชอบในการเก็บขน เพื่อนำไปกำจัดให้ถูกต้องตามหลักวิชาการ	จัดให้มีถังรองรับมูลฝอยขนาด 200 ลิตร เพื่อรองรับมูลฝอยที่เกิดขึ้น ก่อนติดต่อให้หน่วยงานที่ได้รับอนุญาตนำไปกำจัดอย่างถูกหลักวิชาการ

มาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม

- จัดเตรียมวัสดุอุปกรณ์รองรับขยะที่เกิดขึ้นจากคนงานไว้ตามบริเวณพื้นที่ปฏิบัติงานและบริเวณที่พักคนงานให้พอเพียงและประสานกับหน่วยงานท้องถิ่นเพื่อดำเนินการกำจัดขยะ
- กรณีกิจกรรมการก่อสร้างมีของเสียอันตรายที่มีลักษณะและคุณสมบัติตามที่กำหนดในประกาศกระทรวงอุตสาหกรรม เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว พ.ศ. 2548 ให้หน่วยงานที่ได้รับอนุญาตจากกรมโรงงานอุตสาหกรรมมารับไปกำจัดอย่างถูกต้อง และกำหนดวิธีปฏิบัติงานเรื่องการแยกทิ้งขยะหรือของเสียอันตราย และอบรมให้คนงานที่เกี่ยวข้องห้ามทิ้งมูลฝอยลงในทางระบายน้ำ ท่อน้ำทิ้งและแหล่งน้ำในบริเวณใกล้เคียงพื้นที่ก่อสร้าง

ระยะดำเนินการ

ทางโครงการได้กำหนดให้**ดำเนินการตามประกาศกระทรวงอุตสาหกรรม เรื่องการกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว พ.ศ. 2548 หรือกฎหมายที่มีผลบังคับใช้ฉบับล่าสุด**

สำหรับการจัดการแผงเซลล์แสงอาทิตย์ของประเทศไทยในปัจจุบัน ทางสำนักงาน กกพ. ได้กำหนดให้ทางผู้ประกอบการต้องจัดให้มีระบบการดูแลแผงเซลล์เมื่อหมดอายุควบคู่ไปด้วย ทั้งนี้ หากแผงเซลล์เกิดการชำรุดหรือเสื่อมสภาพจนไม่สามารถใช้การได้ **ส่วนประกอบต่างๆ ภายในแผงเซลล์ เช่น โครงอลูมิเนียม สายไฟ กระจก นั้นสามารถนำไป Recycle ได้ทั้งหมด** เว้นเพียง<u>เซลล์รับแสง</u>เท่านั้นที่ต้องส่งเข้ากระบวนการกำจัดต่อไป

ด้วยเหตุนี้ ทางกระทรวงอุตสาหกรรมจึงได้มีแนวทางในการ**สนับสนุนโรงงานอุตสาหกรรมที่ตั้งขึ้นเพื่อทำธุรกิจรับคืนแผงเซลล์** เพื่อลดปัญหาจากแผงเซลล์ชำรุด/เสื่อมสภาพ ซึ่งเป็น**แนวทางการจัดการในอนาคต** ดังนี้

1) การรับคืนแผงเซลล์ที่หมดอายุ
2) การเปิดโรงงานซ่อมแซมแผงเซลล์เพื่อนำกลับมาใช้ใหม่
3) การรับซากแผงเซลล์กลับมาผ่านกระบวนการรีไซเคิล



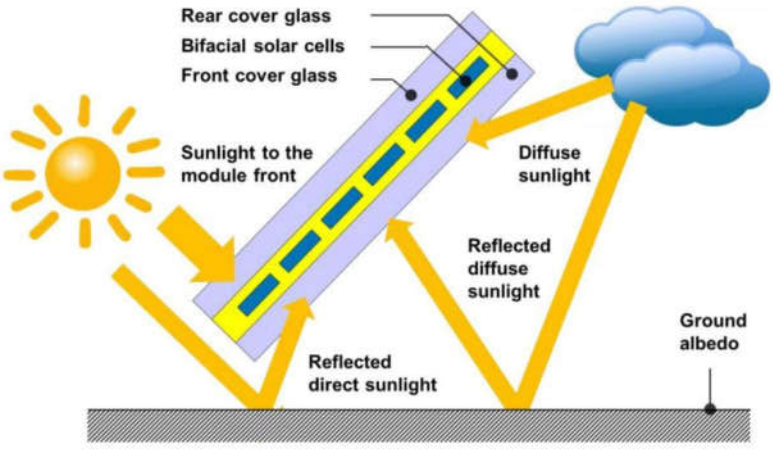
แสงสะท้อนและความร้อน

ข้อห่วงกังวลจากการประชาสัมพันธ์โครงการเบื้องต้น

- กังวลผลกระทบแสงสะท้อนและความร้อนต่อชุมชนด้านทิศใต้ เนื่องจากทิศทางการวางแผงจะหันไปทางทิศใต้ ขอให้ทางโครงการพิจารณาออกแบบการวางแผงโดยเว้นระยะห่างจากชุมชนเพื่อลดผลกระทบที่อาจเกิดขึ้น
- ขอให้มีการปรับภูมิทัศน์ด้านหน้าโครงการให้น่ามอง พร้อมทั้งการเพิ่มพื้นที่สีเขียวเพื่อช่วยลดอุณหภูมิภายในพื้นที่โครงการ

ด้านแสงสะท้อนและความร้อน

การผลิตไฟฟ้าของเซลล์แสงอาทิตย์นั้นไม่ได้อาศัยอุณหภูมิหรือความร้อนในการทำงาน แต่ใช้ความเข้มแสงจากดวงอาทิตย์ในการผลิตไฟฟ้า ดังนั้น การติดตั้งแผงเซลล์แสงอาทิตย์จึงไม่ได้ส่งผลทางตรงต่อการเปลี่ยนแปลงอุณหภูมิของสภาพอากาศโดยรอบ



ด้านแสงสะท้อนและความร้อน



โครงการจัดวางแผงเซลล์ใน**แนวทิศเหนือ-ใต้**

โดยทำมุมจากพื้นดินประมาณ 10 องศา

เพื่อให้แผงเซลล์สามารถรับแสงอาทิตย์ได้มากที่สุด

โดยหันแผงเซลล์เพื่อรับแสงทางด้าน**ทิศใต้**



บริเวณด้านทิศใต้ของโครงการ ไม่มีพื้นที่ชุมชน

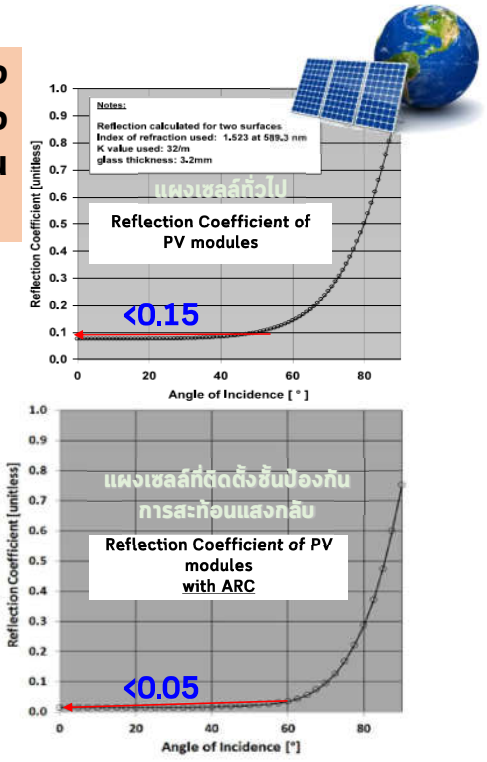
ทั้งนี้ โครงการได้**เว้นระยะห่างโดยรอบพื้นที่โครงการ**เพื่อป้องกันผลกระทบต่อพื้นที่ข้างเคียง ไว้เป็นที่เรียบร้อยแล้ว

จากเทคโนโลยีที่พัฒนาขึ้น (การติดตั้งชั้นป้องกันการสะท้อนแสงกลับ (Anti-Reflection Coating, ARC)) ทำให้ค่าการสะท้อนแสงของเซลล์แสงอาทิตย์มีค่าเพียง 0.05 ซึ่งน้อยกว่าค่าการสะท้อนของถนนคอนกรีต



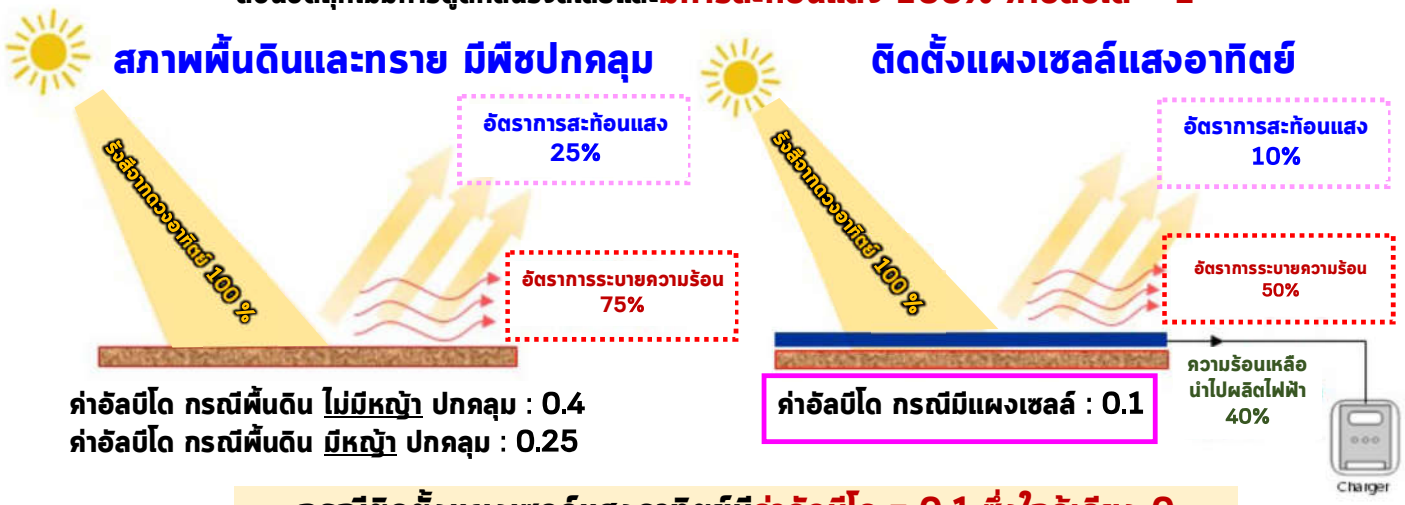
สัมประสิทธิ์การสะท้อน
(Reflection Coefficients of Various Surfaces)

เงินขัดเงา (Highly polished silver)	0.9
กระจกเงา (Glass lined mirrors)	0.85
กระดาษขาว (White paper)	0.7
กระดาษสีดำ (Black paper)	0.05
ผ้าสีอ่อน (Light gray suit)	0.1
ผิวหนัง (Caucasian)	0.3
ถนนคอนกรีต (Concrete roadway)	0.15
แผงเซลล์แสงอาทิตย์ (Solar cell)	<0.05



ความสามารถในการสะท้อนแสงของพื้นผิว : “อัลบีโด” (Albedo)

วัตถุที่มีการดูดกลืนรังสีอย่างสมบูรณ์ **ไม่มีการสะท้อนรังสีกลับคืนเลย ค่าอัลบีโด = 0**
ส่วนวัตถุที่ไม่มีการดูดกลืนรังสีเลยและ**มีการสะท้อนแสง 100% ค่าอัลบีโด = 1**



ค่าอัลบีโด กรณีพื้นดิน ไม่มีหญ้า ปกคลุม : 0.4
ค่าอัลบีโด กรณีพื้นดิน มีหญ้า ปกคลุม : 0.25

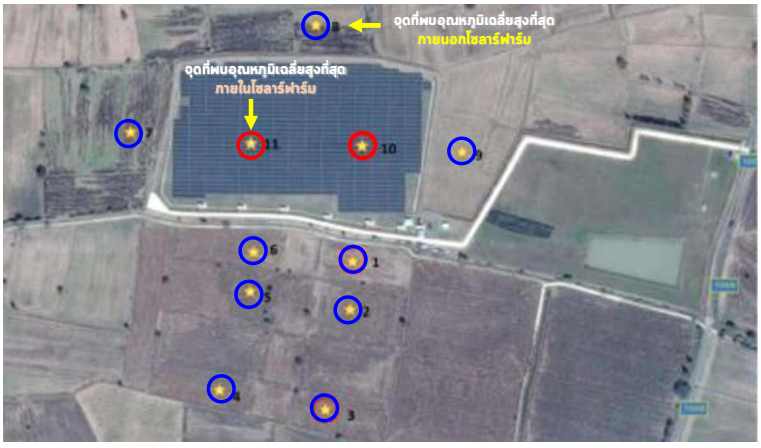
ค่าอัลบีโด กรณีมีแผงเซลล์ : 0.1

กรณีติดตั้งแผงเซลล์แสงอาทิตย์มีค่าอัลบีโด = 0.1 ซึ่งใกล้เคียง 0
ซึ่งหมายความว่า อัตราการสะท้อนแสงกลับอยู่ในระดับที่น้อยมาก

ที่มา: Assessing the Impact of Solar Photovoltaic and Air Conditioning Waste Heat on Urban Heat Island Effects. www.environment.nsw.gov.au

ด้านแสงสะท้อนและความร้อน

จากการศึกษาเพื่อประเมินและเปรียบเทียบการเปลี่ยนแปลงของอุณหภูมิโดยรอบโซลาร์ฟาร์มที่ติดตั้งบริเวณแปลงนาข้าว จ.ลพบุรี พบว่า ค่าเฉลี่ยอุณหภูมิอากาศภายในโซลาร์ฟาร์ม**มีค่าสูงกว่า**บริเวณโดยรอบประมาณ 0.5 องศาเซลเซียส



- ค่าเฉลี่ยอุณหภูมิอากาศ **ภายในโซลาร์ฟาร์ม** มีค่าอยู่ระหว่าง 27.5 - 31.6 องศาเซลเซียส
- ค่าเฉลี่ยอุณหภูมิอากาศ **บริเวณภายนอก** มีค่าอยู่ระหว่าง 27.3 - 31.1 องศาเซลเซียส

ที่มา: ความผันแปรของอุลภูมิอากาศรอบโซลาร์ฟาร์ม, มานิกา แย้มสุข, วิภาวี อุ้ยแก้วพะเนา, นงภัทร ไชยชนะ และ ทิวา พาโคกทม, 2561

ทั้งนี้ จากงานวิจัยการตอบสนองและรับรู้การเปลี่ยนแปลงอุณหภูมิของ Gloria Angelica Vargas Palma, 2015 พบว่า การเปลี่ยนแปลงของอุณหภูมิจะส่งผลต่อการรับรู้**เมื่ออุณหภูมิที่เปลี่ยนไปแตกต่างกัน 4 องศาเซลเซียสขึ้นไป** ดังนั้น อุณหภูมิเฉลี่ยภายในโซลาร์ฟาร์มที่สูงกว่าบริเวณโดยรอบ 0.5 องศาเซลเซียสนั้น จึง**ยังไม่ส่งผลต่อความรู้สึกของมนุษย์**

เศรษฐกิจ สังคม และการมีส่วนร่วมของประชาชน

แหล่งกำเนิด ช่วงก่อสร้าง

แรงงานก่อสร้างสูงสุด ประมาณ 1,596 คน

แหล่งกำเนิด ช่วงดำเนินการ

การผลิตไฟฟ้าของโครงการ



ข้อห่วงกังวลจากการประชาสัมพันธ์โครงการเบื้องต้น

- ขอให้โครงการจัดให้มีการรับเรื่องร้องเรียนของชุมชนในระยะก่อสร้าง
- นอกจากการนำส่งเงินเข้าสู่กองทุนฯแล้ว ทางโครงการมีการดูแลชุมชนอย่างไรบ้าง กังวลว่าหากเปิดดำเนินการแล้วจะไม่สามารถติดต่อเจ้าหน้าที่โครงการได้
- การจัดสรรเงินเข้าสู่กองทุนฯ จะมีงบประมาณในการพัฒนาชุมชนประมาณเท่าไร และมีระยะเวลาในการส่งเงินเข้าสู่กองทุนต่อเนื่องหรือไม่

ระยะก่อสร้าง

แรงงานก่อสร้างสูงสุด ประมาณ 1,596 คน

การจ้างงานและอาชีพ

ความปลอดภัยในชีวิตและทรัพย์สิน

ความห่วงกังวลจากการดำเนินงานการรับรู้ข่าวสาร

กำหนดให้ผู้รับเหมากำกับดูแลแรงงานก่อสร้างที่นำเข้ามาทำงานในพื้นที่ไม่ให้ส่งผลกระทบต่อชุมชนใกล้เคียง

ที่พักคนงาน | **พื้นที่ก่อสร้าง**

มีเจ้าหน้าที่ชุมชนสัมพันธ์ ทำหน้าที่สร้างความสัมพันธ์ที่ดีกับชุมชนโดยรอบ พร้อมทั้งสื่อสารข้อมูลระหว่างชุมชนและโครงการ

ระยะดำเนินการ

โครงการมีพนักงานประจำ 5 คน

ส่วนกิจกรรมที่จะมีบุคคลภายนอกเข้ามาในพื้นที่โครงการ
มีเพียงการล้างแผงเซลล์แสงอาทิตย์เท่านั้น (ประมาณ 20 คน/ครั้ง)

โครงการจะพิจารณาผู้รับเหมาในพื้นที่เป็นอันดับแรก
จึงไม่มีกิจกรรมใดที่จะส่งผลให้เกิดการเปลี่ยนแปลง
สภาพทางสังคมในพื้นที่ศึกษาอย่างมีนัยสำคัญ

การติดตามตรวจสอบการดำเนินงานของโครงการ

โครงการจะมีการเผยแพร่และประชาสัมพันธ์โครงการให้ชุมชนใกล้เคียงได้รับทราบถึงกิจกรรมต่างๆ ของโครงการอย่างสม่ำเสมอ โดยการประชาสัมพันธ์ผ่านทางที่ติดประกาศของชุมชน นอกจากนี้ โครงการจะจัดให้มีคณะทำงานต่างๆ ดังนี้

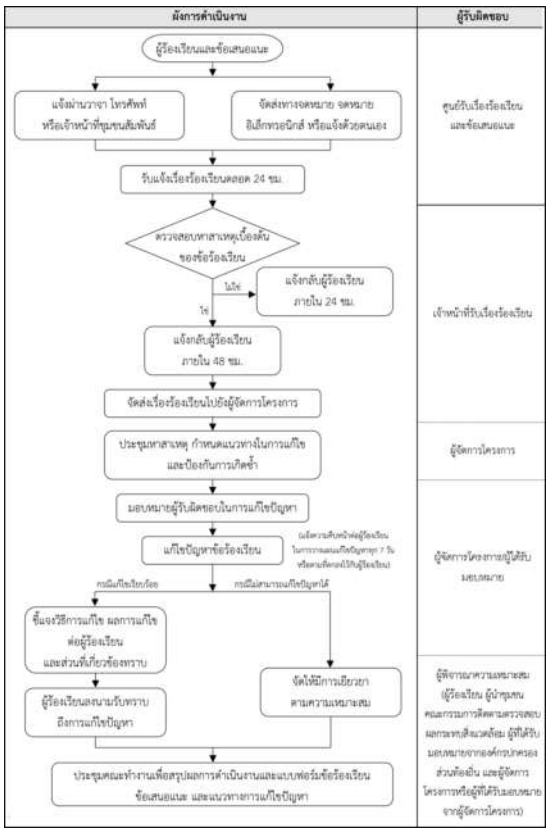
เจ้าหน้าที่มวลชนสัมพันธ์ของโครงการ

ทำหน้าที่ศึกษา วางแผน และจัดทำงบประมาณด้านงานมวลชนสัมพันธ์ รับเรื่องร้องเรียนพร้อมทั้งหาแนวทางแก้ไข รวมถึงการติดตาม ประเมินผลด้านสิ่งแวดล้อมและงานมวลชนสัมพันธ์ เป็นต้น

คณะกรรมการตรวจสอบผลกระทบสิ่งแวดล้อม

ประกอบด้วยตัวแทน 3 ฝ่าย ประกอบด้วย ตัวแทนภาคประชาชน ตัวแทนหน่วยงานภาครัฐ และตัวแทนจากโครงการ





ผังรับเรื่องร้องเรียนของโครงการ

ประโยชน์ที่ชุมชนจะได้รับ



มีการจ้างงานในท้องถิ่นเพิ่มขึ้น
(มีการจ้างแรงงานเป็นพนักงานของโครงการ)



เกิดการพัฒนาเศรษฐกิจในชุมชน ทำให้ชุมชนมีรายได้มากขึ้นจากการค้าขายและอาชีพอื่น ๆ



หน่วยงานท้องถิ่นสามารถจัดเก็บภาษีบำรุงท้องที่ ภาษีโรงเรือน และภาษีอื่นๆ ได้มากขึ้นทำให้มีงบประมาณมาใช้ในการพัฒนาชุมชนได้มากยิ่งขึ้น



กองทุนพัฒนาไฟฟ้า

ประโยชน์ที่ชุมชนจะได้รับ

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

• กองทุนพัฒนาไฟฟ้า

ประกาศคณะกรรมการกำกับกิจการพลังงาน

เรื่อง การนำส่งเงินเข้ากองทุนพัฒนาไฟฟ้าสำหรับผู้รับใบอนุญาตประกอบกิจการไฟฟ้า ประเภทใบอนุญาตผลิตไฟฟ้า (ฉบับที่ 2) พ.ศ. 2559

มีวัตถุประสงค์เพื่อเป็นทุนสนับสนุนให้มีการให้บริการไฟฟ้าไปยังท้องที่ต่างๆ อย่างทั่วถึง และกระจายความเจริญไปสู่ท้องถิ่น

อีกทั้งพัฒนาชุมชนในท้องถิ่นที่ได้รับผลกระทบจากการดำเนินงานของโรงไฟฟ้า

การใช้ประโยชน์จากกองทุนฯ

- การพัฒนาอาชีพ
- การสนับสนุนการศึกษา ศาสนา วัฒนธรรมประเพณี กีฬา และดนตรี
- การสนับสนุนการสาธารณสุขและสิ่งแวดล้อม
- การพัฒนาคุณภาพชีวิต
- การพัฒนาพลังงานหมุนเวียน
- อื่นๆ ตามที่คณะกรรมการบริหารกองทุนเห็นสมควร

กองทุนพัฒนาไฟฟ้า
เพื่อการพัฒนาชุมชนที่ยั่งยืน



• การจ้างงาน ภาษีท้องถิ่น กิจกรรมชุมชนสัมพันธ์ของโครงการ

กองทุนพัฒนาไฟฟ้า

กำลังผลิตของโครงการ 144 เมกะวัตต์

อัตราการนำส่งเงินเข้าสู่กองทุนฯ

ระยะก่อสร้าง : 50,000 บาท/เมกะวัตต์/ปี

ระยะดำเนินการ : 1.0 สตางค์/หน่วย

ตัวอย่างการคำนวณจำนวนเงิน ที่ทางโครงการต้องนำส่งเข้าสู่กองทุนฯ

เงินที่นำส่งเข้าสู่กองทุนใน**ระยะก่อสร้าง**
= กำลังการผลิต x 50,000 บาทต่อปี

เงินที่นำส่งเข้าสู่กองทุนใน**ระยะดำเนินการ**
= จำนวนหน่วยไฟฟ้าที่ผลิตได้ x 0.01 บาทต่อเดือน

สำหรับพื้นที่รอบโรงไฟฟ้าที่ได้รับเงินกองทุน
ทางสำนักงานคณะกรรมการกำกับกิจการพลังงาน (กกพ.) เป็นผู้กำหนดเขตพื้นที่ประกาศ

ระยะรื้อถอนบางส่วนหรือทั้งหมด

- **เสียง**
  จากการรื้อถอนโครงสร้างแผงเซลล์แสงอาทิตย์
- **น้ำเสียและการระบายน้ำ**
  จากคนงานและกิจกรรมในช่วงรื้อถอน
- **การคมนาคม**
  จากการขนส่งคนงานและอุปกรณ์ในการรื้อถอน
- **มูลฝอยและกากของเสีย**
  จากคนงานและเศษวัสดุจากการรื้อถอน

ระยะรื้อถอนบางส่วนหรือทั้งหมด

- ❑ ติดตั้งป้ายประกาศเตือนแนวเขตพื้นที่รื้อถอนของโครงการในสถานที่ที่มองเห็นได้ชัดเจน
- ❑ ประชาสัมพันธ์และเผยแพร่ข้อมูลที่เกี่ยวข้องกับการดำเนินการรื้อถอนอุปกรณ์ เครื่องจักรหรืออาคารโรงไฟฟ้า โดยการติดป้ายประกาศบริเวณพื้นที่ตั้งโครงการ หรือรูปแบบอื่นที่เหมาะสม เพื่อให้ประชาชนและผู้มีส่วนได้เสียรับทราบโดยทั่วกัน ล่วงหน้าอย่างน้อย 7 วันก่อนการดำเนินการรื้อถอน
- ❑ ภายหลังการรื้อถอนอุปกรณ์ต่างๆ แล้วเสร็จ ต้องดำเนินการปรับสภาพพื้นโครงการให้มีลักษณะที่เหมาะสมต่อการพัฒนาการใช้ประโยชน์ที่ดินให้สอดคล้องกับสภาพแวดล้อมปัจจุบันให้มากที่สุด โดยไม่เป็นอุปสรรคในประเด็นด้านสิ่งแวดล้อมและความปลอดภัย





รับฟังความคิดเห็นและข้อเสนอแนะ

1. โดยวาจาในที่ประชุม
2. เขียนคำถามใส่กระดาษ (สีขาว)
3. ตอบแบบประเมินหลังการประชุม



การดำเนินงานในขั้นตอนต่อไป



การรับฟังความคิดเห็นต่อเนื่อง 15 วัน
ถึงวันที่ 6 กรกฎาคม พ.ศ. 2566

- เอกสารแสดงความเห็นส่งทางไปรษณีย์
- โทรศัพท์ โทรสาร อีเมล

(รายละเอียดในเอกสารแนะนำโครงการ)

ช่องทางการติดต่อสอบถามข้อมูลเพิ่มเติม

บรีซแอนด์ไชน์ เพาเวอร์
Breeze and Shine Power

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด (เจ้าของโครงการ)
87 อาคารเอ็มไทย ทาวเวอร์ ออลซีซั่น เพลส ชั้น 26 ถนนวิทยุ แขวงลุมพินี เขตปทุมวัน กรุงเทพมหานคร 10330
ติดต่อ
(ผู้ประสานงานโครงการ)
โทรศัพท์ : **[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]**(ผู้ประสานงานโครงการ)
โทรศัพท์ :

C O T

บริษัท คอนซัลแทนท์ ออฟ เทคโนโลยี จำกัด (บริษัทที่ปรึกษาด้านสิ่งแวดล้อม)
39 ซอยลาดพร้าว 124 ถนนลาดพร้าว แขวงพลับพลา เขตวังทองหลาง กรุงเทพมหานคร 10310
ติดต่อ **[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]**(ผู้ประสานงานโครงการ)
โทรศัพท์ : อีเมล :
(นักวิชาการมวลชนสัมพันธ์)
โทรศัพท์ : อีเมล :

Appendix 6-10

Letter to disseminating meeting summary report (public meeting)

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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Appendix 6-11

Additional activities after public meeting

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

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ประชาสัมพันธ์

โครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์
ของบริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด
ตั้งอยู่ที่หมู่ที่ 8 ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี

ตามที่ บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด (เจ้าของโครงการ) มีแผนที่จะพัฒนาโครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์ ซึ่งเป็นโครงการผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ด้วยเทคโนโลยีแผงโฟโตโวลเทอิก หรือเซลล์แสงอาทิตย์แบบติดตั้งบนพื้นดินร่วมกับระบบกักเก็บพลังงาน เพื่อจำหน่ายไฟฟ้าให้แก่ภาครัฐตามนโยบายให้การสนับสนุนการผลิตไฟฟ้าจากพลังงานทดแทนหรือพลังงานทางเลือก และได้มอบหมายให้บริษัท คอนซัลแทนท์ ออฟ เทคโนโลยี จำกัด (บริษัทที่ปรึกษาฯ) เป็นผู้ดำเนินการศึกษาและจัดทำรายงานประมวลหลักการปฏิบัติ (CoP) รวมทั้งจัดให้มีกระบวนการมีส่วนร่วมของประชาชนตามระเบียบคณะกรรมการกำกับกิจการพลังงานว่าด้วยการรับฟังความเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสียในการพิจารณาออกใบอนุญาตประกอบกิจการผลิตไฟฟ้า พ.ศ. 2565 โดยได้ดำเนินการจัดประชุมรับฟังความเห็นของประชาชนฯ เมื่อ**วันพุธที่ 21 มิถุนายน พ.ศ. 2566 เวลา 08.30-12.00 น. ณ อาคารอเนกประสงค์เทศบาลตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี** โดยปัจจุบันอยู่ระหว่างการเผยแพร่รายงานสรุปผลการจัดประชุมรับฟังความเห็นให้ทุกภาคส่วนได้รับทราบและให้ประชาชนและผู้มีส่วนได้เสียแสดงความคิดเห็นและท้วงติงต่อรายงานสรุปดังกล่าว ทั้งนี้ ในช่วงเวลาเดียวกัน โครงการได้ดำเนินการออกแบบรายละเอียดโครงการให้มีความชัดเจนมากขึ้น โดยมีการเปลี่ยนแปลงขนาดบ่อหน่วงน้ำฝนของโครงการ จากเดิมที่มีขนาด 600 ลูกบาศก์เมตร เป็น 700 ลูกบาศก์เมตร พร้อมทั้งเพิ่มเติมรายละเอียดอุปกรณ์ซึ่งเดิมถูกรวมไว้อยู่ในชุดติดตั้งแผงเซลล์แสงอาทิตย์ของโครงการ ได้แก่ หม้อแปลงไฟฟ้าขนาด 3.437 MVA จำนวน 48 ชุด และระบบแปลงไฟฟ้า (PCS) จำนวน 21 ชุด อย่างไรก็ตาม การเปลี่ยนแปลงและเพิ่มเติมรายละเอียดข้อมูลดังกล่าวมิได้ส่งผลกระทบต่อสิ่งแวดล้อม รวมทั้งมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อมและมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อมที่นำเสนอไว้แต่อย่างใด

รายละเอียดที่มีการเปลี่ยนแปลง/เพิ่มเติม

ขนาดบ่อหน่วงน้ำฝน (ออกแบบให้สามารถรองรับน้ำฝนในระยะเวลา 3 ชั่วโมงได้อย่างเพียงพอ)	**รายละเอียดเดิม**	**รายละเอียดภายหลังเปลี่ยนแปลงฯ**
	600 ลูกบาศก์เมตร	700 ลูกบาศก์เมตร
	รองรับได้เพียงพอ ✓	รองรับได้เพียงพอ ✓
การติดตั้งอุปกรณ์ไฟฟ้า	**รายละเอียดเดิม**	**รายละเอียดภายหลังเปลี่ยนแปลงฯ**
หม้อแปลงไฟฟ้าขนาด 3.437 MVA	ไม่มีการระบุไว้ในรายงาน โดยเป็นองค์ประกอบที่รวมอยู่ในชุดติดตั้งแผงเซลล์แสงอาทิตย์	48 ชุด
ระบบแปลงไฟฟ้า (PCS)		21 ชุด

ดังนั้น โครงการฯ จึงขอแจ้งข้อมูลดังกล่าวเพื่อเป็นการประชาสัมพันธ์เผยแพร่ข้อมูลข่าวสารของโครงการให้กับผู้มีส่วนได้เสียและผู้ที่สนใจได้รับทราบและรับฟังความเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสียเพิ่มเติม ตั้งแต่วันที่ 5-20 สิงหาคม พ.ศ. 2566

ช่องทางการติดต่อและสอบถามข้อมูลเพิ่มเติม

แสดงความคิดเห็นผ่าน Google form (QR code)

ประชาสัมพันธ์และรับฟังความเห็นเพิ่มเติม
ตั้งแต่วันที่ 5-20 สิงหาคม พ.ศ. 2566

บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด
(เจ้าของโครงการ)
87 อาคารเอ็มไทย ทาวเวอร์ ออลซีซั่น เพลส
ชั้น 26 ถนนวิทยุ แขวงลุมพินี เขตปทุมวัน
กรุงเทพมหานคร 10330

[This information has been removed as it falls within the exceptions to disclose specified in paragraph 17(2) of ADB's Access to Information Policy.]

บริษัท คอนซัลแทนท์ ออฟ เทคโนโลยี จำกัด
(บริษัทที่ปรึกษาด้านสิ่งแวดล้อม)
39 ซอยลาดพร้าว 124 ถนนลาดพร้าว
แขวงพลับพลา เขตวังทองหลาง
กรุงเทพมหานคร 10310

Appendix 6-12

Brochure for consultation in regarding to transmission line



04 ข้อมูลโครงการเบื้องต้น

เจ้าของโครงการ : บริษัท บรีซแอนด์ไชน์ เพาเวอร์ จำกัด
ที่ตั้งโครงการ : ต.หนองกระทุ่ม อ.เดิมบางนางบวช จ.สุพรรณบุรี
ขนาดพื้นที่โครงการ : **1,051.96** ไร่
ประเภทโครงการ : ผลิตไฟฟ้าจากพลังงานแสงอาทิตย์ แบบติดตั้งบนพื้นดินร่วมกับระบบกักเก็บพลังงาน
กำลังการผลิตไฟฟ้าติดตั้ง : **144.000** MW_{AC} (**199.456** MW_p)
พลังงานไฟฟ้าที่ผลิตได้ต่อปี : **334.904** จิกะวัตต์ชั่วโมงต่อปี (GWh/year)

เครื่องจักรหลัก :
- **แผงเซลล์แสงอาทิตย์ (Solar Panel)**
  ขนาด **605** วัตต์ต่อแผง หรือเทียบเท่าประมาณ **329,680** แผง
- **เครื่องแปลงกระแสไฟฟ้า (Inverter)**
  ขนาดกำลังการผลิต **300** กิโลวัตต์ จำนวน **480** ชุด หรือเทียบเท่า
- **หม้อแปลงไฟฟ้า (Transformer)**
  ขนาด **90** เมกะโวลต์แอมแปร์ จำนวน **1** ชุด
- **ระบบกักเก็บพลังงาน (Battery Energy Storage System; BESS)**
  ขนาด **2.752** MWh จำนวน **42** ชุด

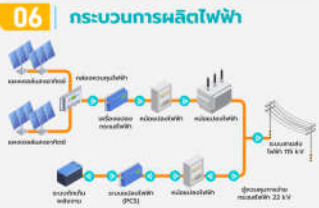


05 พื้นที่ศึกษาโครงการ

โครงการกำหนดพื้นที่ศึกษารัศมี 3 กิโลเมตร จากขอบเขตพื้นที่ตั้งโครงการ ตามระเบียบคณะกรรมการกำกับกิจการพลังงาน ว่าด้วยการรับฟังความคิดเห็นและทำความเข้าใจกับประชาชนและผู้มีส่วนได้เสีย ในการพิจารณาออกใบอนุญาตประกอบกิจการผลิตไฟฟ้า พ.ศ. 2565 ซึ่งครอบคลุมพื้นที่บางส่วนของตำบลหนองกระทุ่ม ตำบลบ่อกรุ อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี และตำบลหนองมะค่าโมง อำเภอด่านช้าง จังหวัดสุพรรณบุรี

จังหวัด	อำเภอ	ตำบล	หมู่ที่
สุพรรณบุรี	เดิมบางนางบวช	หนองกระทุ่ม	1,2,3,5,6,7,8
		บ่อกรุ	3,4
	ด่านช้าง	หนองมะค่าโมง	1,7

06 กระบวนการผลิตไฟฟ้า



กระบวนการผลิตกระแสไฟฟ้า จะเริ่มจากแสงอาทิตย์ซึ่งเป็นคลื่นแม่เหล็กไฟฟ้ามากระทบกับแผงเซลล์แสงอาทิตย์ที่มีสารกึ่งตัวนำจนเกิดอนุภาคที่มีประจุไฟฟ้าบวกและลบเคลื่อนที่ไปในทิศทางตรงกันข้าม ซึ่งการเคลื่อนที่ของอนุภาคประจุบวกและลบดังกล่าวจะทำให้เกิดไฟฟ้ากระแสตรงขึ้น โดยไฟฟ้ากระแสตรงดังกล่าวจะถูกส่งไปยังอุปกรณ์ที่เรียกว่า "เครื่องแปลงกระแสไฟฟ้า (Inverter)" เพื่อแปลงกระแสไฟฟ้ากระแสตรงให้เป็นไฟฟ้ากระแสสลับ แล้วส่งเข้าสู่หม้อแปลงไฟฟ้าเพื่อแปลงให้เป็นไฟฟ้าแรงดันสูงและจ่ายไฟฟ้าเข้าสู่ระบบสายส่งขนาด 115 กิโลโวลต์ ซึ่งมีจุดเริ่มต้นจากสถานีไฟฟ้าย่อยในพื้นที่โครงการ และสิ้นสุด ณ จุดเชื่อมต่อสายส่งไฟฟ้า (Cut and Turn) ระหว่างสถานีไฟฟ้าแรงสูงเดิมบางนางบวช ของการไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) และสถานีไฟฟ้าด่านช้างของการไฟฟ้าส่วนภูมิภาค (กฟภ.) โดยกฟภ. เป็นผู้รับผิดชอบดำเนินการก่อสร้างสายส่งขนาด 115 กิโลโวลต์ และมีแผนก่อสร้างตั้งแต่ 1 มกราคม พ.ศ. 2567 และสิ้นสุด 31 ตุลาคม พ.ศ. 2567

นอกจากนี้ โครงการยังมีระบบกักเก็บพลังงาน (Battery Energy Storage System; BESS) หรือแบตเตอรี่ ซึ่งระบบกักเก็บพลังงานจะทำหน้าที่ในการกักเก็บไฟฟ้าส่วนเกินที่ผลิตได้ไว้ภายในแบตเตอรี่ และในช่วงที่ผลิตไฟฟ้าได้น้อย พลังงานไฟฟ้าที่กักเก็บไว้ภายในแบตเตอรี่จะถูกส่งเข้าสู่ระบบสายส่ง เพื่อจำหน่ายให้แก่การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) ต่อไป

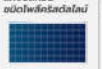
07 การคัดเลือกพื้นที่โครงการและเทคโนโลยี

การคัดเลือกพื้นที่โครงการ : โครงการกำหนดให้พื้นที่โครงการต้องสามารถใช้ประโยชน์ในการประกอบกิจการผลิตไฟฟ้าได้ โดยไม่ขัดต่อกฎหมายหรือระเบียบที่มีการบังคับใช้

- ต้องไม่ขัดต่อกฎหมายว่าด้วยผังเมือง
- ต้องไม่ขัดต่อกฎหมายว่าด้วยการส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติ
- ต้องไม่ขัดต่อกฎหมายว่าด้วยโบราณสถานและโบราณวัตถุ
- ต้องไม่ขัดต่อมติคณะรัฐมนตรี

ทั้งนี้ พื้นที่โครงการโรงไฟฟ้าบรีซแอนด์ไชน์ เพาเวอร์ ตั้งอยู่ที่ตำบลหนองกระทุ่ม อำเภอเดิมบางนางบวช จังหวัดสุพรรณบุรี ซึ่งจากการตรวจสอบพบว่าพื้นที่ดังกล่าวสามารถดำเนินการได้โดยไม่ขัดต่อกฎหมายที่มีผลบังคับใช้ในปัจจุบัน

การคัดเลือกเทคโนโลยี : โครงการเลือกใช้แผงซิลิคอน ***ชนิดโมโนคริสตัลไลน์ (Monocrystalline)*** เนื่องจากเป็นเทคโนโลยีที่มีประสิทธิภาพการผลิตไฟฟ้าดีที่สุด

แผงซิลิคอนชนิดโมโนคริสตัลไลน์	แผงซิลิคอนชนิดโมโนคริสตัลไลน์	แผงซิลิคอนชนิดอะมอร์ฟัส
		
• ผลิตไฟฟ้าได้ดีที่สุด • ใช้พื้นที่น้อย • อายุงาน > 25 ปี • เงาบังผลกระทบต่อการผลิตไฟฟ้า	• ผลิตไฟฟ้าน้อยกว่าโมโนคริสตัลไลน์ • ใช้พื้นที่มาก • อายุงาน > 25 ปี • เงาบังผลกระทบต่อการผลิตไฟฟ้า	• ผลิตไฟฟ้าได้น้อยที่สุด • ใช้พื้นที่มากที่สุด • เสื่อมสภาพเร็ว • เงาบังผลกระทบต่อการผลิตไฟฟ้าน้อย

08 ระบบสาธารณูปโภค

น้ำใช้ :
ระยะก่อสร้างและดำเนินการ
โครงการจะรับน้ำประปาจากการประปาส่วนภูมิภาค สาขาด่านช้าง เพื่อนำมาใช้ภายในโครงการ

ไฟฟ้า :
ระยะก่อสร้าง
โครงการจะใช้ไฟฟ้าจากการไฟฟ้าส่วนภูมิภาค
ระยะดำเนินการ
จะนำไฟฟ้าที่ผลิตได้มาใช้ภายในโครงการ หรือรับไฟฟ้าจากการไฟฟ้าส่วนภูมิภาคในช่วงที่ไม่สามารถผลิตไฟฟ้าได้

09 ผลกระทบสิ่งแวดล้อมและการจัดการ

ระยะก่อสร้าง

ปัจจัย	กิจกรรมที่ก่อให้เกิดผลกระทบ	มาตรการเบื้องต้น
คุณภาพอากาศ	• การปรับสภาพพื้นที่/ขุดเจาะดิน • การขนส่งอุปกรณ์และคนงานก่อสร้าง	• ฉีดพรมน้ำบริเวณพื้นที่ก่อสร้างโครงการและถนนของโครงการ • ล้างล้อรถบรรทุกก่อนออกจากพื้นที่โครงการ • ดูแลอุปกรณ์ที่ช่างในการก่อสร้างให้มีสภาพดีเสมอ
ระดับเสียง	• การเดินเครื่องยนต์เครื่องจักร • การปรับสภาพพื้นที่/ขุดเจาะดิน	• เลือกใช้เครื่องจักรที่มีได้มาตรฐานและมีการตรวจสอบประสิทธิภาพเครื่องจักรอยู่เสมอ • กำหนดช่วงเวลาดำเนินงานที่ก่อให้เกิดเสียงเฉพาะในช่วงเวลากลางวันเท่านั้น
คมนาคม	• การขนส่งอุปกรณ์และคนงานก่อสร้าง	• จัดให้มีป้ายหรือสัญญาณเตือนที่เห็นได้ชัด • อบรมและควบคุมพนักงานขับรถให้ปฏิบัติตามกฎจราจรอย่างเคร่งครัด
การใช้น้ำ/น้ำทิ้ง	• กิจกรรมการก่อสร้างและคนงานก่อสร้าง	• รับน้ำจากการประปาส่วนภูมิภาค • หลีกเลี่ยงการใช้น้ำร่วมกับชุมชน • เลือกวิธีการจัดการน้ำทิ้งอย่างเหมาะสม

ระยะดำเนินการ

ปัจจัย	กิจกรรมที่ก่อให้เกิดผลกระทบ	มาตรการเบื้องต้น
การใช้น้ำ/น้ำทิ้ง	• กิจกรรมการล้างแผงเซลล์แสงอาทิตย์ • กิจกรรมการใช้น้ำของพนักงาน	• รับน้ำจากการประปาส่วนภูมิภาค • หลีกเลี่ยงการใช้น้ำร่วมกับชุมชน • บำรุงรักษาระบบบำบัดน้ำเสียให้มีประสิทธิภาพในการบำบัดเพียงพอ

10 การศึกษาสภาพแวดล้อมปัจจุบัน

การศึกษาสภาพแวดล้อมปัจจุบันของโครงการจะดำเนินการในรัศมี ***พื้นที่ศึกษา 3 กิโลเมตร*** จากขอบเขตพื้นที่ตั้งโครงการ โดยกำหนดการสำรวจสิ่งแวดล้อม ภาคสนามตามประเด็นปัจจัยสิ่งแวดล้อมที่เกี่ยวข้อง ประกอบด้วย คุณภาพอากาศ บรรยากาศ ระดับเสียง คุณภาพน้ำผิวดิน นิเวศวิทยาทางน้ำ และคมนาคมขนส่ง

จุดตรวจวัดคุณภาพสิ่งแวดล้อม ดังนี้

- **คุณภาพอากาศ**
  2 สถานี 5 วันต่อเนื่อง
  จำนวน 2 ครั้ง
  A1: โรงเรียนบ้านหนองคีม
  A2: ร.พ.สต. หนองกระทุ่ม
- **ระดับเสียง**
  2 สถานี 5 วันต่อเนื่อง
  จำนวน 1 ครั้ง
  N1: โรงเรียนบ้านหนองคีม
  N2: ร.พ.สต. หนองกระทุ่ม
- **คุณภาพน้ำผิวดินและนิเวศวิทยาทางน้ำ**
  3 สถานี จำนวน 1 ครั้ง
  SW1: ห้วยคีม (ต้นเกิดละวันตกโครงการ)
  SW2: ห้วยคีม (ต้นเกิดใต้โครงการ)
  SW3: ห้วยคีม (ต้นเกิดละวันออกโครงการ)
- **จุดตรวจวัดปริมาณจราจร**
  T1: ทางหลวงชนบทหมายเลข 4086 (ก่อนถึงจุดตัด ทล.4027)
  T2: ทางหลวงชนบทหมายเลข 4086 (รพ.สต. หนองกระทุ่ม)

