APPENDIX A_1 E&S GAP ANALYSIS AND INITIAL BIODIVERSITY REVIEW: WIND FARM IN LAO PDR (FINAL REPORT)

E&S Gap Analysis and Initial Biodiversity Review: Wind Farm in Lao PDR

Final Report

3 March 2021

Project No.: 0573186

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E&S Gap Analysis and Initial Biodiversity Review: Wind Farm in Lao PDR

Final Report

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Acronyms and Abbreviations

Name	Description
ADB	Asian Development Bank
AZEs	Alliance for Zero Extinction sites
BOD	Biological Oxygen Demand
CEPF	Critical Ecosystem Partnership Fund
CH	Critical Habitat
CIA	Cumulative Impact Assessment
COD	Commercial Operations Date
COD	Chemical Oxygen Demand
CR	Critically Endangered
dB	Decibel
DO	Dissolved Oxygen
E&S	Environment & Social
EAAA	Ecologically Appropriate Area of Analysis
EDL	Electricity Du Laos
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EKF	Eksport Kredit Fonden
EN	Endangered
EOO	Extent of Occurrence
EP4	Equator Principles 4
ERM	ERM-Siam Company Limited
ESMP	Environmental and Social Management
ESMS	Environmental and Social Management System
ESS	Environmental and Social Standards
GRM	Grievance Redress Mechanism
HRIA	Human Rights Impact Assessment
Hz	Hertz
IBA	Important Bird and Biodiversity Area
IBAT	Integrated Biodiversity Assessment Tool
IEAD	Impact Energy Asia Development Limited
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
km	kilometre
kV	Kilovolt
kW	Kilowatt
LRP	Livelihood Restoration Plan
m	Metre
m/s	Metre per Second

Name	Description
m^2	metre squared
Mn	Manganese
MONRE	Ministry Of Natural Resources and Environment
MoU	Memorandum of Understanding
NO_2	Nitrogen Dioxide
PA	Protected Area
PDA	Project Development Agreement
PDA	Project Development Agreement
PDR	People's Democratic Republic
PM	Particulate Matter
PS	Performance Standards
RAP	Resettlement Action Plan
RAP	Resettlement Action Plan
REA	Rapid Ecological Assessment
ROW	Right of Way
SCADA	Supervisory Control and Data Acquisition
SEP	Stakeholder Engagement Plan
SO_2	Sulphur Dioxide
ToR	Terms of Reference
TSP	Total Suspended Particulates
UNGP	UN Guiding Principles on Business and Human Rights
V	Volt
VP	Vantage Point
WBG	World Bank Group
WWF	World Wide Fund for Nature

1. INTRODUCTION

1.1 Project Background

Impact Energy Asia Development ("IEAD" and/ or "the Project Proponent" is developing a wind farm facility with an installed capacity of 600 MW (113 turbines of 5.3 MW capacity each which is understood to be optimized from the earlier design which included 240 turbines) in Dak Cheung District of Sekong Province and Sanxai District of Attapue Province in Lao PDR. The development also includes a 500 kV transmission line extending 22 km connecting to the grid in Vietnam ("the Project"). The Right of Way (ROW) of the transmission line is 60 m (30 m on each side from the centre line) which primarily passes through Protected Area (PA) in Lao PDR towards the Vietnam border (***Figure 2.1***, ***Figure 2.2*** and ***Figure 2.3***).

The generated electricity is expected to be sold to Vietnam Electricity (EVN). It is unclear if the Project will require additional facility for construction power and where it will be sourced from.

IEAD signed a Memorandum of Understanding (MoU) with the Government of Lao PDR in 2011 to explore the possibility of developing a wind power project. Following the initial feasibility study, IEAD signed a Project Development Agreement (PDA) with the Government of Lao PDR on August 7, 2015 for the development of Wind Power Project with a capacity of 600 MW. The concession period for the Project is understood to be 25 years from the commercial operations date (COD). Construction is estimated to take approximately 30 months.

An Environment Impact Assessment (EIA) study was conducted in June 2014 (EIA 2014), and a second revision was conducted in May 2018 (EIA 2018). ERM understands that Innogreen on behalf of the Project Proponent is currently preparing the local EIA (EIA 2020) which is understood to be an updated version from the 2014 and 2018 EIAs. The English translated version of the updated EIA was reviewed to finalize the gap analysis report (this report).

IEAD is seeking financing from Multi-Lateral Agency (MLAs) including International Finance Corporation (IFC), Asian Development Bank (ADB), US International Development Finance Corporation (DFC) and Eksport Kredit Fonden (EKF). ERM-Siam Company Limited (ERM) is contracted by IEAD to conduct an Environmental and Social gap analysis of the local EIA against the Lenders' applicable standards (***Section 3.1***) including an initial biodiversity review, findings from which is presented in this report.

1.2 Objectives

The objective of the E&S Gap Analysis Report is to:

- Evaluate major Environment & Social (E&S) risks and potential impacts of the Project that need to be considered by IEAD as a part of the planning and development phase of the proposed wind farm project to conform to the Lender's Applicable Standards (refer to ***Section 3.1***);
- Identify key biodiversity and social risks (including impacts to vulnerable and ethnic communities) and issues that need to be considered by IEAD as a part of the planning and development phase of the proposed wind farm project;
- Assessment of compliance of other environment, health, safety and social aspects with respect to various requirements under applicable reference framework; and
- Provide recommendation on the next steps approach to close the gaps.

1.3 Limitations

This report has been prepared by ERM, the trading name of Environmental Resources Management Inc., with all reasonable skill, care and diligence within the terms of the Contract with the Client, and taking account of the resources devoted to it by agreement with the Client. Specific limitations on this assessment are as follows:

- Raw data of baseline surveys conducted for the Project were only available in Lao language and were not reviewed;
- The English version of SMMP of the updated report was not available for review;
- This report is based primarily upon information obtained through documents provided in English.
- No primary data collection, site visit, nor sampling or testing of soils, waters, flora, fauna or other materials were undertaken to inform the report. However, reference has been made to previously reported testing and sampling;
- ERM's findings are accurate and complete only to the extent that information provided to ERM was itself accurate and complete; and
- The information provided in this report is not to be construed as legal advice.

1.4 Report Structure

The structure of this report is as follows:

- Section 1: Introduction
- Section 2: Project Description
- Section 3: Approach and Methodology
- Section 4: Key Findings
- Section 5: Summary and Recommendations
- Section 6: Conclusion
- Section 7: Terms of Reference for Supplementary Environmental, Social and Health Studies

The Report is also supported by a series of appendices as follows:

- Appendix A: Threatened Species
- Appendix B: Endemic/Restricted Range Species
- Appendix C: Migratory Species
- Appendix D: Critical Habitat Screening
- Appendix E: Rapid Ecological Assessment Survey Approach
- Appendix F: Bid Vantage Point Survey Approach
- Appendix G: Bat Survey Approach
- Appendix H: Summary of Applicable International Standards

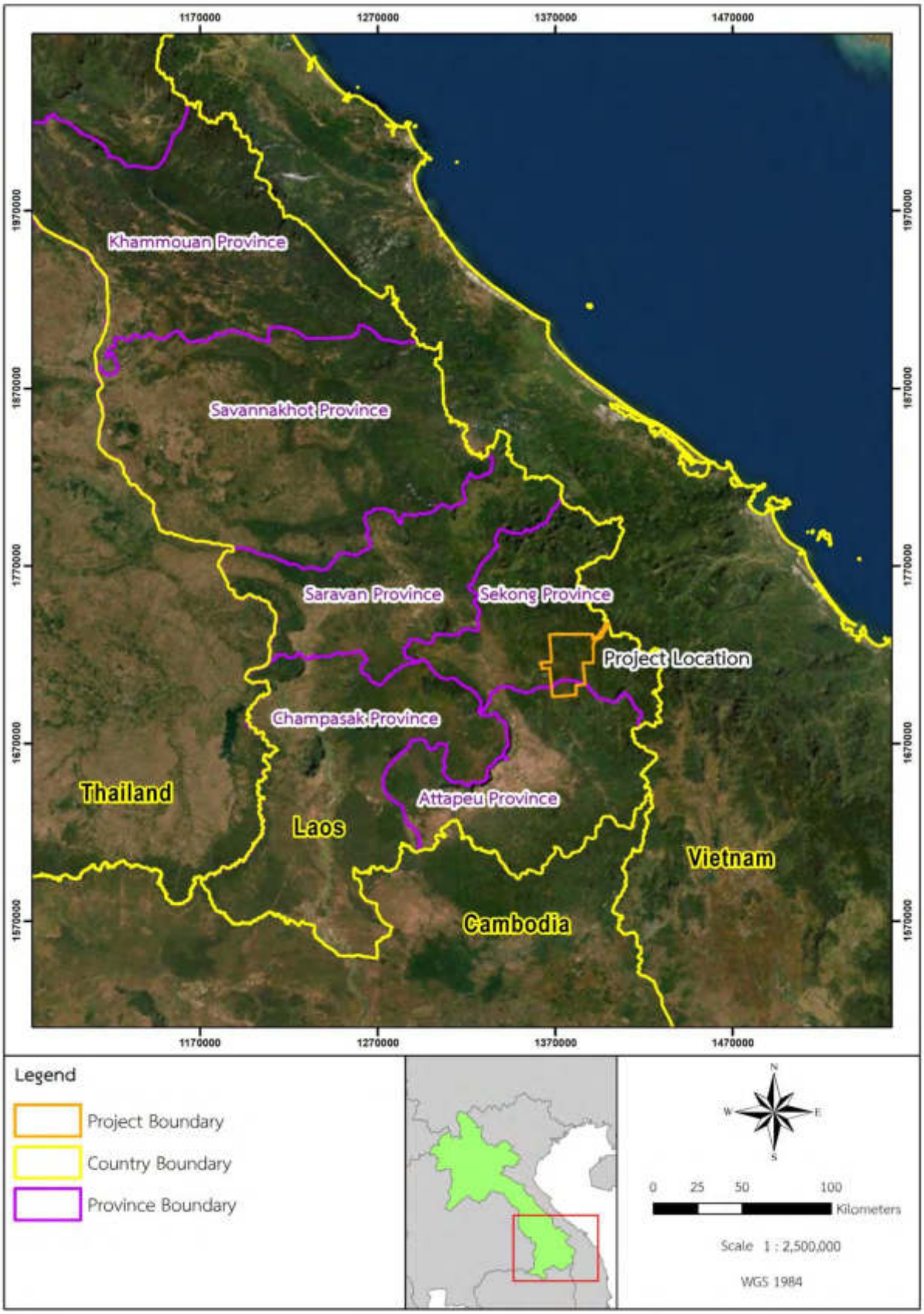
2. PROJECT DESCRIPTION

This Chapter presents an overview of the Project information that will form the basis of understanding potential impacts and risks against the international lenders' applicable standards and requirements. The intention of this Section is to provide high level information to sufficiently support the E&S gap analysis. The information provided by the Project Proponent is the main source of information at this stage to inform the gap analysis assessment.

2.1 Project Location

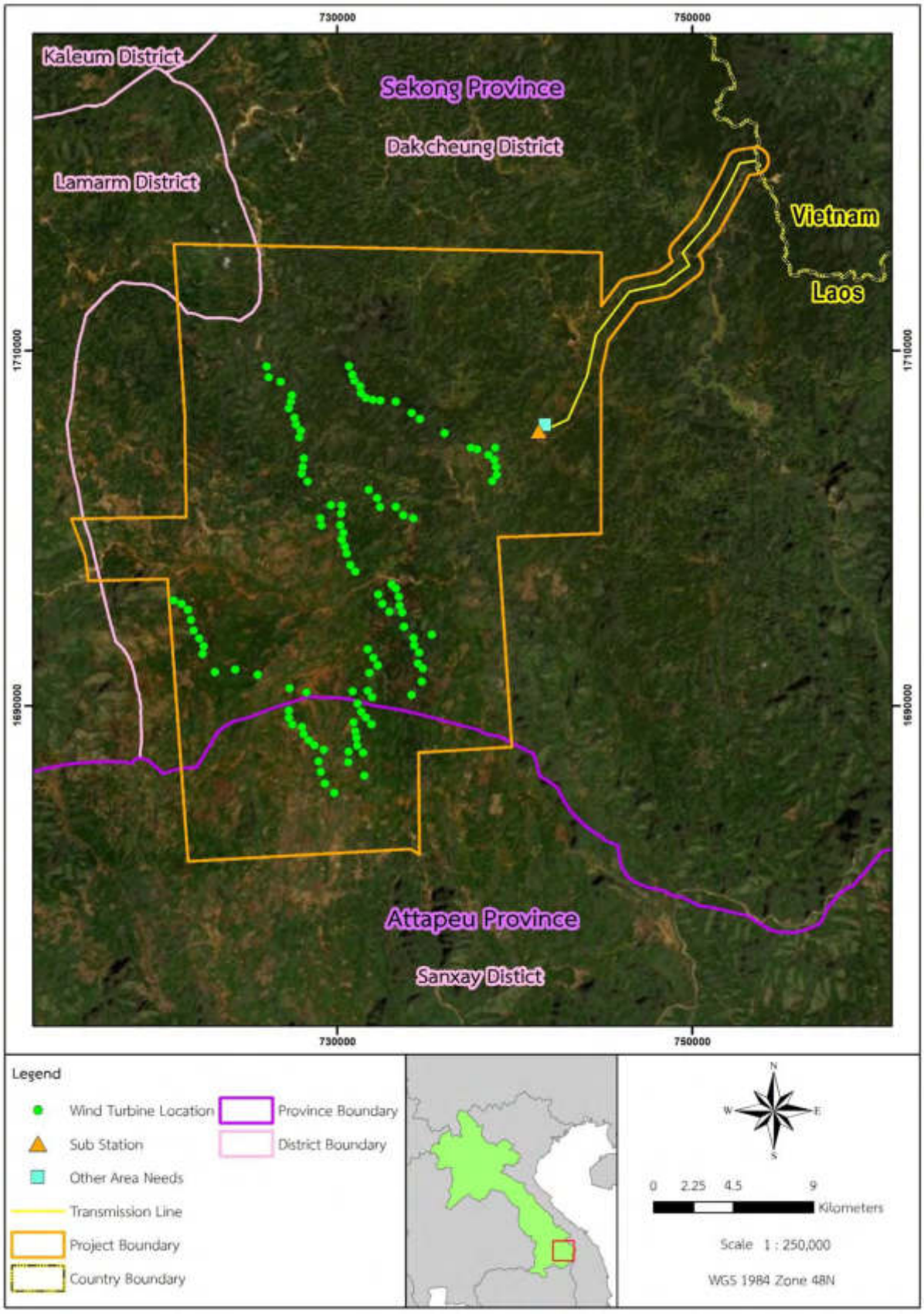
The size of the Project area (excluding the Transmission Line) is approximately 70,828 hectares and is located in Dak Cheung District of Sekong Province and Sanxai District of Attapue Province in Lao PDR. The Transmission Line is approximately 22 km and extends northeast from the Project area towards to Laos-Vietnam border. The overall Project location is shown in ***Figure 2.1***. The location of wind turbines and other Project facilities are shown in ***Figure 2.2***. The Transmission Line alignment is shown in ***Figure 2.3***.

Figure 2.1: Overall Project Location



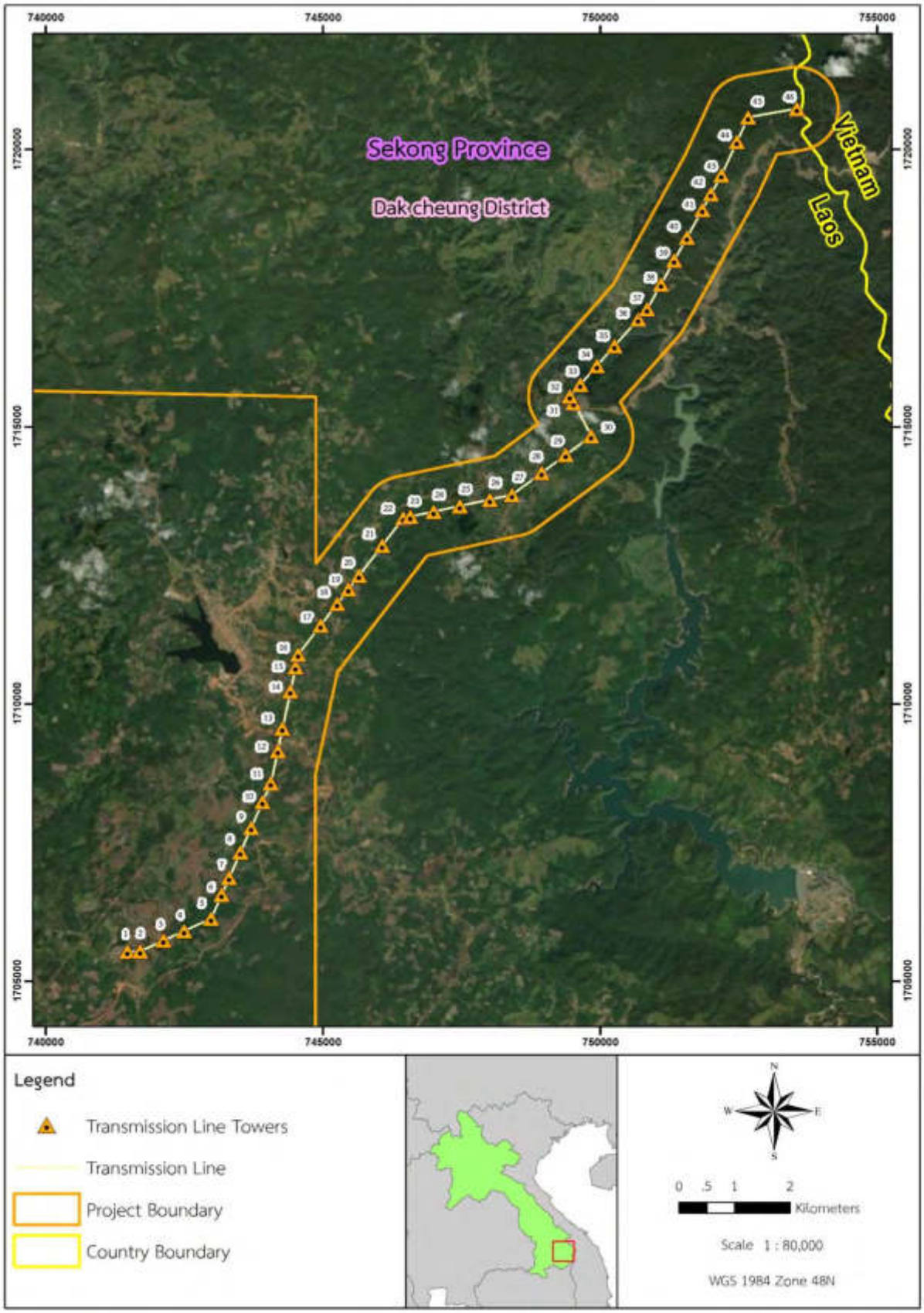
Source: IEAD, 2020 (modified by ERM)

Figure 2.2: Location of Wind Turbines and Other Project Facilities



Source: IEAD, 2020 (modified by ERM)

Figure 2.3: Transmission Line Alignment



Source: IEAD, 2020 (modified by ERM)

2.2 Project Key Components

The key Project components include the Wind Turbines, Substation, and Transmission Line.

Table 2.1: Wind Turbine Specification

Component/ Specification	Description/ Purpose
Number of Turbines	113
Technical Specification	
Total Capacity	600 MW (5.3 MW mean capacity each)
Rated Power	2,530 kW
Wind Turbine Hub Height	120 – 160 m
Wind Turbine Blade Diameter	158 – 162 m
Cut-in Wind Speed	3 m/s
Rated Wind Speed	11 m/s
Cut-out Wind Speed	20 m/s
Hub Height	141 m
Direction	Upwind
Swept Area	11,310 m^2
Rotational Direction	Clockwise
Rotor Speed Range	8 – 13 rpm
Maximum Speed of Blade Tip	78.5 m/s
Blade Type	3-bladed and horizontal axis
Blade Length	60 m
Speed Regulation	Pitch Control
Aerodynamic Brake	Full Feathering
Tower Type	Steel Tower
Electrical Specification	
Frequency	50/60 Hz
Generator Type	Doubly Fed Induction Generator
Transformer Specification	
Input Voltage	690 V
Output Voltage	33 kV
Control System	Supervisory Control and Data Acquisition (SCADA)
Sound Power	
3 m/s	94.6 dB(A)
4 m/s	98.9 dB(A)
5 m/s	104.4 dB(A)
6 m/s	106 dB(A)
7 m/s	106 dB(A)
8 m/s	106 dB(A)
9 m/s	106 dB(A)

Component/ Specification	Description/ Purpose
10 m/s - Cut-out	106 dB(A)

Source: IEAD, 2020.

The Substation and the Transmission Line information is shown in ***Table 2.2*** below.

Table 2.2: Transmission Line Length and Substation Capacity

Component/ Specification	Description/ Purpose
Substation Capacity	500 kV
Transmission Line Length	22 km

2.3 Source: IEAD, 2020.Demography and Settlement Pattern

Based on the filed survey conducted by InnoGreen in September 2020, there are 18 villages located within the Project boundary. These 18 villages have a total number of 1,530 families, 1,195 houses and a total population of 8,600 peoples, of whom 4,341 are female (***Table 2.3***). The field survey also examined ethnic groups within the villages; there are three main ethnic groups, namely Triang (94.84%), Katu (2.48%) and Yae (2.68%).

Table 2.3: Number of Population of Each Village in the Project Area

S/N	District	Village in the Project Area	Number of Families	Number of Houses	Number of Population	
					Total	Female
1	Dakchung District	Dak Tiem	111	102	654	337
2		Dak Seng	83	58	392	200
3		Xieng Luang	94	84	565	268
4		Dak Teub	130	104	607	340
5		Dak Yang + Dak Brang	65	42	389	194
6		Dak Yrand (Dak Derm)	46	32	237	119
7		Dak Xieng Ar	36	29	206	97
8		Dak Kang	37	27	194	92
9		Dak Yoin	58	54	319	153
10		Dak Run	63	58	433	230
11		Dak Dor	103	81	521	267
Total of Dakcheung District			826	671	4,517	2,297
12	Sanxay District	Dak Xied	16	13	115	63
13		Dak Dor	135	83	731	358
14		Dak Nhok	103	58	545	262
15		Dak Samor	94	73	734	363
16		Dak Nong	112	64	580	272
17		Nam Ngon Neua	168	168	1,031	528
18		Dak Padoo	76	65	347	170
Total of Sanxay District			704	524	4,083	2,016
Grand Total			**1,530**	**1,195**	**8,600**	**4,313**

Source: Results of the Field Survey Conducted in September 2020

2.4 Project Associated Facilities

It is understood that the main access road (highway no. 16B) will be used as a primary existing access road, please refer to ***Section 2.5.1***. However, the details of connecting roads, other associated facilities (laydown area, worker camp, etc.) are not available at this stage.

2.5 Project Activities

The following project activities are envisioned to be undertaken under the Project.

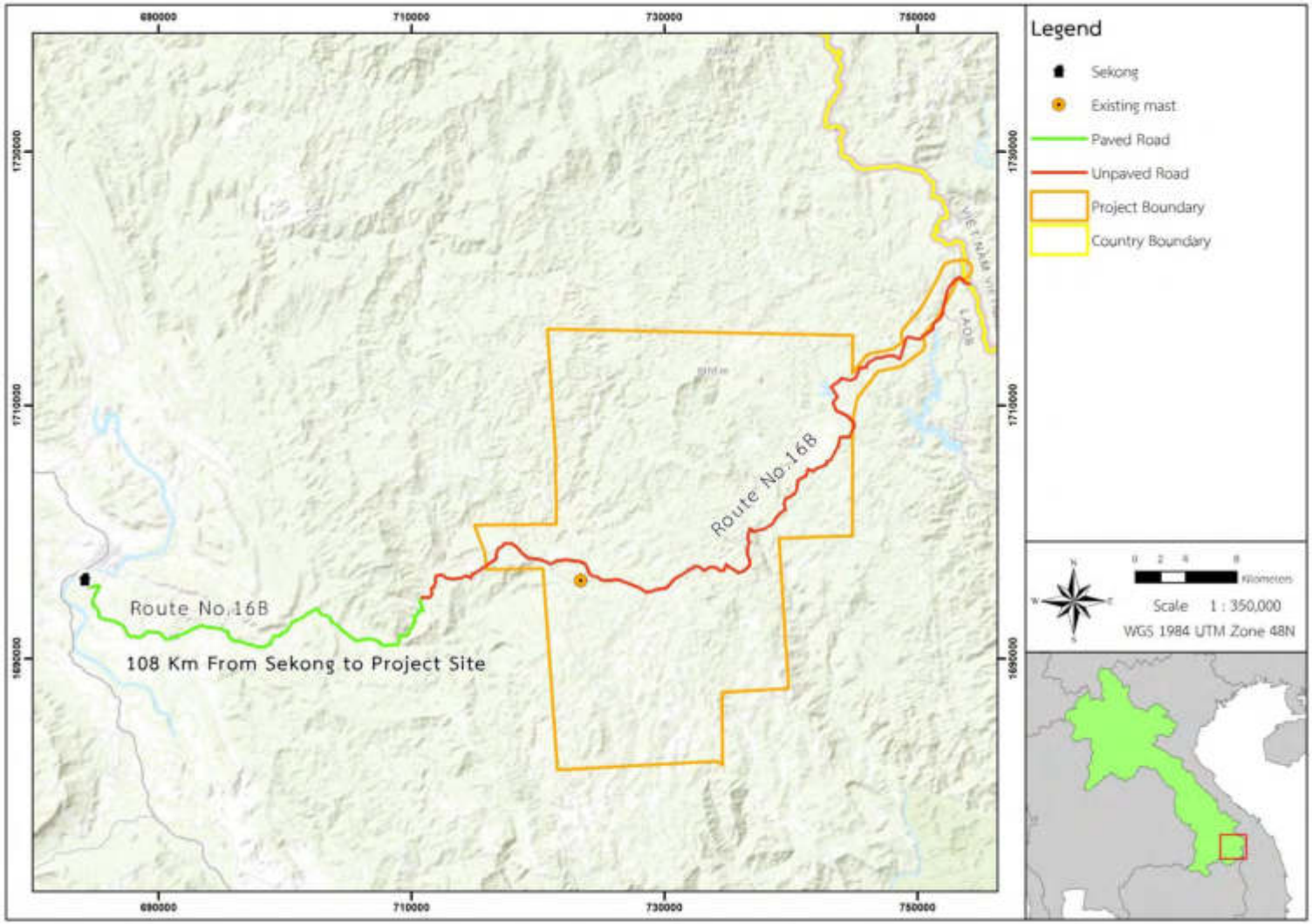
2.5.1 Road Construction

The highway road (no.16B) is the main road connecting Thailand, Lao PDR, and Vietnam from West to East, and will be utilized as the main access road to the Project. The distance from the municipality of Sekong Province to Project site is approximately 108 kilometres (***Figure 2.4***). Renovation work of road no.16B has been completed to be entirely paved. It is understood that the width of this road is sufficient for transportation of construction equipment. Section 4.5.6.1 of the local EIA suggests that access road to the village not situated along the national road may require improvement and upgradation. Details of all access roads required for the project will need to be assessed for any possible impacts.

In order to reach all 113 wind turbine locations during construction, the Engineering, Procurement and Construction (EPC) contractor will construct site roads that will connect road no.16B to each wind turbine. However, following the completion of construction, the road will be renovated and used as access road for inspection and monitoring. The following vehicular frequency is expected during construction and operation phases:

- Transportation of construction materials and workers with a maximum frequency of 15 times/day via highway no.16 and Project's access road;
- Transportation of components and machinery for installation of wind turbine generators consisting rotor blade, nacelle and tower through a trailer with a maximum frequency 10 times / per one wind turbine (50 times/day) via highway no.16 and Project's access road;
- During the operation phase, transportation of materials will not be required and the road usage will be limited to vehicular movement for 25 employees.

Figure 2.4: Transportation Route to the Project Area



Source: IEAD, 2020 (modified by ERM)

2.5.2 Site and Foundation Preparation

Site preparation will be conducted by adjusting and levelling land. It is anticipated that 1.5 hectare will be required for each wind turbine for equipment placing, turbines components placing and installation of the cranes. Foundation preparation is expected to include drilling into the ground in an octagon shape with a depth of 4.2 meters and a width of 11-18 meters for each wind turbine. It is not clear either land for preparation purposes will be temporarily or permanently acquired. The spoil disposal site is not clear from the ESIA and whether it is included within the required land footprint.

2.5.3 Electricity Transmission

The transmission line of the Project includes the construction of above and underground 33 kV transmission cables to transfer electricity to the substation in the Project area. The substation will be connected with a 500 kV transmission cable to transmit electricity to Vietnam. The total distance of transmission line is estimated to be 66km (with a total distance of 23.5 km within Lao PDR and remaining 42.5km in Vietnam). Land use restrictions on RoW (both above and underground) will need to be clarified further to understand impacts of land acquisition. It is unclear which section of the transmission line will be built by the Project.

2.5.4 Site Restoration

Following the construction and installation of wind turbines, the Project will restore the land to its original condition to the extent possible.

2.5.5 Current Status

According to the discussion with IEAD, the current status of the Project is understood to be the following:

- Preparing the local EIA study (2020) which is understood to be the updated version from 2014 and 2018 EIAs. However, it is not known if the updated EIA has been submitted to the Government of Lao PDR;
- Preparing the local EIA for the proposed transmission line between the substation and the Laos-Vietnam Border;
- Conducting two (2) additional rounds of stakeholder engagement (Ministry Of Natural Resources and Environment (MONRE) and Technical Consultation);
- Finalizing contractors for additional biodiversity survey including birds and bat surveys, and Rapid Ecological Assessment (REA).
- The REA has been conducted between December 2020 and January 2021. The results of the REA has identified priority areas for specialist surveys in the north of the project area and the transmission line. Survey requirements and methods are currently being discussed.
- Two trips (out of the total 6 trips) has been conducted for the Bird Survey, one in December 2020 and another in January 2021.
- At the time of this Gap Analysis submission, one trip (out of the total 4 trips) has been conducted in February 2021.

3. APPROACH AND METHODOLOGY

3.1 Applicable Reference Framework

The gap analysis assessment will be conducted against applicable standards and requirements including:

- Applicable local and national (Lao PDR) environmental and social legislations;
- IFC Performance Standards (PS) (2012);
  - PS 1: Assessment and Management of Environmental and Social Risks and Impacts;
  - PS 2: Labour and Working Conditions;
  - PS 3: Resource Efficiency and Pollution Prevention;
  - PS 4: Community Health, Safety and Security;
  - PS 5: Land Acquisition and Involuntary Resettlement;
  - PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
  - PS 7: Indigenous Peoples; and
  - PS 8: Cultural Heritage.
- IFC General Environmental, Health and Safety (EHS) Guideline (2007);
- The Equator Principles (EP4);
- World Bank Group (WBG) Environmental and Social Standards (ESS) (2018);
- World Bank Group (WBG) EHS Guidelines for Wind Energy (2015);
- World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines for Electric Power Transmission and Distribution (2007); and
- ADB Safeguards Policy Statement (ADB SPS).

Details of the requirement under each applicable framework is included in ***Appendix H***.

3.2 Technical Approach

The technical approach undertaken to complete this assessment is further explained in the sections below.

3.2.1 Kick-off Meeting

A kick-off meeting via conference call was hosted by ERM on 22 October 2020 to confirm ERM's approach on the gap analysis. Key point of contacts, access to documentation and timelines for deliverable submissions were also discussed. The call was attended by ERM Team and IEAD team.

3.2.2 Desktop Review

ERM reviewed key documents that was made available by IEAD. This included:

- ToR for the Local EIA, prepared by Innogreen Engineering Co., Ltd and Greener Consultant Co., Ltd, (Oct 2014) (Unofficial English Translation).
- Draft Local EIA Report – 1st Submission prepared by Innogreen Engineering Co., Ltd and Greener Consultant Co., Ltd, (Jun 2016) (Unofficial English Translation).
- Raw baseline data and sampling locations files prepared by Innogreen Engineering Co., Ltd and Greener Consultant Co., Ltd.

- Draft revised Local EIA Report (September 2020 version- unofficial translation).
- Draft revised Environmental Management and Monitoring Report (September 2020 version- unofficial translation).

3.2.3 Analysis and Reporting

This report is the **Final E&S Gap Analysis report** that presents the detailed findings that has been assessed for compliance vis-à-vis applicable reference framework. The compliance assessment and gaps with respect to compliances have been identified and presented in respective sections. Recommendations on gap closure based on the identified gaps are also included.

3.2.4 Key Terminology

The following table summarizes the key project documents, their objectives, and who is responsible for preparing the document.

Table 3.1: Key Project Documents

Project Documents	Progress/Status	Requirement	Objectives	Responsibility
Environmental and Social Impact Assessment (ESIA)	In the process of collecting baseline information	ADB SPS, IFC PS, Equator Principles	To document and disclose project impacts, proposed mitigation measures, and other project commitments	Project sponsor
Environmental Impact Assessment (EIA)	In progress	Lao PDR	To satisfy host country permitting requirements	Project sponsor
Environmental and Social Management and Monitoring Plan (EPMP and SMMP)	In progress	IFC, Equator Principles and Lao PDR	To document project mitigation and management measures and for use by the Construction Contractor so they understand their requirements at the time of bidding	Project sponsor
Environmental and Social Management System (ESMS)	In progress	Equator Principles	To document the system the Project sponsor proposes to use to manage the Project's environmental and social risks	Project sponsor
Resettlement Action Plan (RAP) and Livelihood Restoration Plan (LRP)	Not yet begun	Equator Principles, IFC PS, ADB SPS	To document how the Project will mitigate physical and economic displacement impacts, including indirect impacts on livelihoods	Project sponsor
Stakeholder Engagement Plan (SEP)	In progress	Equator Principles, IFC PS, ADB SPS	To identify the key Project stakeholders and how the Project intends to engage with them throughout the life of the Project	Project sponsor
Cumulative Impact Assessment	Not yet developed	Equator Principles, IFC PS, ADB SPS	To document potential cumulative impacts to valued resources, the Project's relative contribution to these impacts, and the Project sponsor's proposed actions to mitigate these impacts	Project sponsor

4. KEY FINDINGS

The following sub-sections present details of findings from gap analysis study conducted on the EIA with respect to the international standards and guidelines (as stated in ***Section 3.1***). The ultimate objective of this Section is to provide details on the Scope of Work required for the Project to achieve international investors' standards as IEAD is seeking financing from international lenders. The key findings are discussed in respect to each Performance Standards (IFC PS).

4.1 Alignment with IFC Performance Standards

4.1.1 PS 1: Assessment and Management of E&S Risks and Impacts

4.1.1.1 ESMS

IFC PS 1 includes requirements for an Environmental and Social Management System (ESMS), as well as information on the Owner's corporate environmental and social governance and capacity. Documents related to corporate governance was not available for review, and not included in the EIA.

It is understood that IEAD has not developed an ESMS for the Project yet. A project specific ESMS is required per IFC PS for large/high risk projects, such as this Project, to help ensure the Project complies with government requirements, project commitments, and good international industry practice. ***Figure 4.1*** shows the IFC PS requirement for ESMS.

Figure 4.1: IFC PS 1 ESMS Requirements

Requirements

Environmental and Social Assessment and Management System

5. The client, in coordination with other responsible government agencies and third parties as appropriate,[8] will conduct a process of environmental and social assessment, and establish and maintain an ESMS appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts. The ESMS will incorporate the following elements: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.

It is recommended that the Project set up an ESMS in the early stages of the project, including staffing plan with adequate capacity and competency to ensure environmental and social performance and compliance.

4.1.1.2 Identification of Risks and Impacts

While the Project area of influence is defined to be 5 km in the EIA, risks and impacts are not identified at length in the EIA. For example, impacts from connecting roads to the communities, community resources including ecosystem services, and temporary impacts during the construction period amongst others are not included in the EIA. It is not clear what methodology was used for household surveys. However, additional information on several social and environmental aspects are required to meet the Lenders' applicable standards (refer to the gaps identified in this Report). It is recommended that an "E&S Supplementary Studies" be conducted to bring the Project to compliance with the applicable standards.

4.1.1.3 Alternative Analysis

The local EIA currently does not include a discussion on proposed alternatives and justification for the selected alternative. It includes discussion on Project's contribution to meeting the country's energy

demand with clean and renewable energy, resulting in reduced GHG emission and dependency on fuel energy.

As per IFC PS1 paragraph 7, a full and detailed justification for any proposed alternatives is required, and the justification should demonstrate that the choice for any alternative performance level is protective of human health and the environment. It is understood that IEAD is currently exploring three alternatives. It will be critical to demonstrate how environmental and social aspects were taken into consideration in minimizing impacts and finalizing the Project location.

4.1.1.4 Stakeholder Engagement

Socio-economic Baseline

Primary data was collected through household surveys conducted in 18 villages during the field survey in September 2020. Secondary data from official resources (e.g., District Health Office, District Education Office, and Socio-Economic Development Plan) were collected to present a high-level socio-economic profile of the Project area. However, the local EIA does not identify numbers of household surveys, survey sampling methods (census survey versus sampling survey). It is not evident that stakeholder mapping was undertaken prior to the baseline surveys.

The social analysis provides an overview of socio-economic aspects of the villages within the Project area such as population, ethnicity and religion of each village, ratio of poor families within each village, gender role (in the households) and public health situation (e.g., access to clean water and toilet, waste disposal, and common diseases). It also includes information on overview of occupation and livelihoods of the local people, employment rate, average household income, local business and local production, land entitlements, and existing facilities (e.g., road, transmission line, water and energy resources, school, and health facilities).

While the local EIA includes information and discussion on poverty and risk/vulnerable groups (ethnic groups, women and children), it presents such information at a village and overall Project area level. It is unclear if the survey methods were designed appropriate to the vulnerable groups and if the data is available at households or individual levels. Additionally, it is unclear if the local EIA has considered other forms of vulnerability such as physical and mental disability, literacy, sickness, dependence on unique natural resources, and landless[1]. Moreover, the local EIA does not take into account informal settlers within the Project area (individuals or households that may inhabit and/or use the land but have no legal permits to the land).

As per IFC PS1 Guidance Note paragraph 50, gender-differentiated impacts should be assessed and the risks and impacts identification process should propose measures designed to ensure that one gender is not disadvantaged relative to the other in the context of the project. The local EIA presents some disaggregated data in relation to gender role of men and women in the villages. The local EIA recognizes the impacts of the Project on gender role i.e. livelihoods of women which depends on collecting non-timber forest products as a result of decreased forest area from the Project development. However, the local EIA also does not include gender disaggregated data. The current socio-economic data available might not be sufficient to conduct detailed gender analysis at this stage. In addition to an absence in detailed gender disaggregated data, the EIA does not mention the Project's potential contribution to gender mainstreaming, nor corporate policies and strategies related to gender.

In summary, the existing socio-economic survey undertaken for the local EIA did not include the following key information:

- Stakeholder mapping and impacts and influence of each stakeholder groups;

[1] As of June 2018, Lao PDR has not yet achieved universal birth registration, with statistics showing that 73% of children under 5 years of age were registered in 2017. Consequently, they are unable to acquire nationality and are subject to the status of statelessness. (Lao PDR, Voluntary National Review on the Implementation of the 2030 Agenda for Sustainable Development (17 July2018), page 59

- Gender disaggregated socio-economic data;
- Socio-economic data on vulnerable individuals or groups directly affected by the Project, including informal settlers;
- Details on land use, customary land ownership, ethnic communities;
- Information on customary land use, customary decision making structures if any, cultural heritage resources of the ethnic communities to determine whether the ethnic communities may be considered indigenous;
- Information on ecosystem services and community resources;
- Poverty and vulnerability assessment; and
- Corporate and Project policies and strategies for gender mainstreaming.

Stakeholder Engagement Plan

Stakeholder engagement activities were undertaken as part of the local EIA report preparation (Chapter 7— Public Consultation and Participation). Project affected people and relevant participants such as governmental organizations, relevant ministries and NGOs were included in the stakeholder engagement activities. Such activities include consultation meetings at village level (November 2014 and September 2020), district level (May 2016), technical level (July 2018), and at provincial/central level (pending to be undertaken).

However, the EIA does not include a Stakeholder Engagement Plan (SEP) which is a critical component of all applicable international standards and a basis for all consultations undertaken for the Project. While the EIA includes the outcome of stakeholder engagement and consultation conducted with 18 villages (Chapter 7), a SEP is not included in the EIA.

IFC PS1 paragraph 35, requires that a Grievance Redress Mechanism (GRM) for Affected Communities should be in place and communicated during engagement activities. While the local EIA includes GRM in Section 7.8 (Grievance Mechanism and Resolution), roles and responsibilities of the Project is unclear in solving complaints, grievance receiving channels have not been identified (e.g. where can grievances be submitted to, if people can submit grievances anonymously), how the grievances will be documented and whether such a record will be made publicly accessible and how quickly they will be resolved.

4.1.1.5 Environmental and Social Management Plan

The local EIA currently does not include detailed environmental or social management and monitoring plan (EMMP/SMMP). The ESMMP outlines roles and responsibilities of the Project developer and relevant governmental authorities for implementation and monitoring. Monitoring and evaluation methods, period of implementation, training and equipment requirements, relevant legal and environmental standards, and budget for implementing. The ESMMP provides guidance on the management of impacts and propose mitigation measures for such impacts during the construction and operation phases of the Project. While mitigation measures are identified and discussed at some length in the EMMP, this will need to be detailed out in management plans. For instance, the ESMMP indicates that hazardous waste should be stored and handled separately with proper burying methods and locations, however a waste management plan will need to be detailed out as per lenders' requirements.

The updated local EIA includes an environmental or social management and monitoring plan (EMMP/SMMP). However, English version of SMMP was not available for review. The management plan is intended to guide the management of impacts and mitigation measures proposed for such impacts during the construction and operation phases of the Project. While mitigation measures are identified and discussed at some length, this will need to be detailed to meet the lenders requirements in the management plans.

4.1.2 PS 2: Labour and Working Conditions

Apart from occupational health and safety and inclusion of Emergency Response Plan for workers as discussed in Section 3.7 of the EIA, there is limited discussion on the process that will be followed in employing and managing workers.

4.1.2.1 Project Workforce

It is estimated that a maximum workforce required for the construction is approximately 400 workers (for some specific period when multiple tasks are performed simultaneously), and 25 workers for the operations phase. Preference will be given to local workforce. It is expected that there will be workers from other localities (including non-Lao nationals); however, the estimated number of migrant workforce is not known. The EIA is limited in its consideration of labour and working conditions. Information on workers accommodation and camps are not included in the EIA.

It is understood that Laos Labour Law is largely in line with Performance Standard 2 on all key aspects. Laos Labour Law requires the Project to set-up labour units, prepare labour regulations for approval by the relevant government authority. It also includes monthly inspections by the Provincial Labour and Social Welfare Department. The ESIA suggests that the Project will be in compliance with Lao laws, however the following is not included in the EIA.

Direct Workers

IFC PS-2 (8-22) requires Project to adopt and implement human resources policies and procedures intended to manage workers consistent with the requirements of the Performance Standard and national law. The Project currently has indicated that the Law on Labor will govern company practices on labour relations of own employees and contractors. The local EIA includes grievance mechanism in Section 7.8 which is established for both Project staffs and affected communities. Nonetheless, the EIA does not provide details on grievance receiving channels, roles and responsibilities, how the mechanism will be informed to the workers, and if anonymous complaints will be allowed.

Workers Engaged by Third Parties

IFC PS-2 (24-26) requires third parties hiring any workers have an appropriate ESMS in place consistent with the requirement of the Performance Standards. Compliance with this requirement is not described specifically in the EIA documents. All contractors and third parties engaged by the project are expected to adhere to the ESMMP, and this requirement should be included in any subcontracts executed for the Project. Risks of non-conformance to IFC PS 2 is mostly seen in supply chains including contractors contractor, petty contractors etc. This will need a focused attention and a comprehensive management plan to avoid such risks.

Child Labour

The EIA documents have not addressed high risk of child labour or forced labour in the supply chain, partly because the supply chain is unknown at the EIA stage. The EIA briefly mentions that the construction contractor shall not use child labour and avoid involving cases of human trafficking. Children's involvement in employment is fairly common in Laos PDR[1], with approximately 15% of the total children are employed.[2]

In Vientiane, approximately 1.2 percent of children aged 6-13 years are involved in employment. Children's employment is much more common in rural locations. The agriculture sector accounts for by

[1] the Labour Law 2006 of Lao P.D.R which permits one to enter the labour market from the age of 14 years, and the usual practice of considering all persons up to age 17 years as 'children'

[2] International Labour Organization and Lao Statistics Bureau (LSB) (2012). Report on the National Child Labour Survey 2010 of Lao PDR

far the largest share (87%) of children's employment in Laos (mostly children work without wages for their own families), the remainder are self-employed (10%) and only two percent are paid workers.

Occupational Health & Safety

The local EIA has outlined general occupational health and safety, which entails work place safety, personal safety, equipment and machinery safety, and safety inspection; fire prevention; and emergency plan in Section 3.8. Moreover, the local EIA has taken into consideration the risks of and unexploded ordnances (UXO) to workforce, the ESMMP has included UXO survey and disposal as one of its sub-plans. The sub-plan stipulates that the Project developer will coordinate with the Local UXOs Clearance Office to conduct UXO survey and clearance in order to ensure safety before commencing the construction work. In addition, the ESMMP entails sub-plans for workers health and safety management, construction and management of worker camps and emergency response and preparedness. However, these plans are only in place for construction phase.

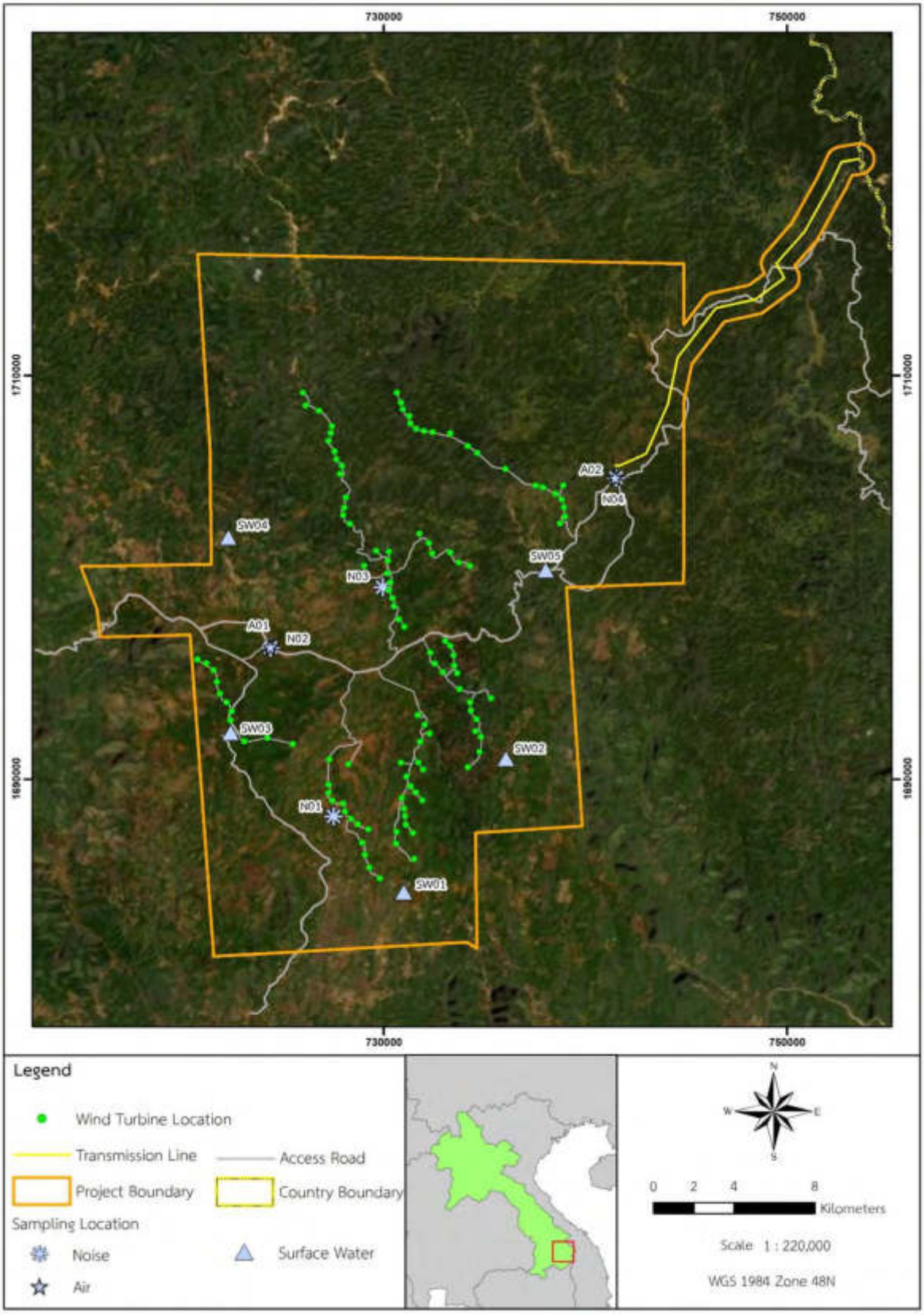
4.1.3 PS 3: Resource Efficiency and Pollution Prevention

The local EIA includes a baseline section comprised of combination of primary (e.g. sampling, monitoring, site surveys) and secondary (e.g. meteorology station, previously conducted surveys, government published documents) baseline information summary of which is presented in ***Table 4.1***. Objective of this is to inform the local EIA of the existing environmental condition, appropriately assess the impacts and propose effective mitigation and monitoring measures. Furthermore, map of samplings and surveys location is presented in ***Figure 4.2***.

Table 4.1: Summary of Baseline Sampling and Surveys Conducted for the Local EIA

Physical Environmental Aspect	Sampling / Survey Date	Location	Parameters	Frequency and Duration
Air Quality	17-19 September 2020	Ban Xieng Luang	**Based on National Environmental Standards:** ■ Total suspended particulates (TSP); ■ Particulate matters of 10 microns or less (PM_{10}); ■ Particulate matters of 2.5 microns or less ($PM_{2.5}$); ■ Carbon Monoxide (CO); ■ Sulphur Dioxide (SO_2); and ■ Nitrogen Dioxide (NO_2).	**Frequency:** Once **Duration:** 72 hours continuously
	21-23 September 2020	Ban Dak Run		
Ambient Noise Level	9-10 September 2020	Ban Dak Dor	■ L_{eq24hr} ■ L_{max} ■ $L_{90\ Day}$ ■ $L_{90\ Night}$	**Frequency:** Once **Duration:** 24 hours continuously
	11-12 September 2020	Ban Xieng Luang		
	12-13 September 2020	Ban Dak Yang		
	18-19 September 2020	Ban Dak Run		
Surface Water Quality	23 September 2020	Houay Nam Ngon in Ban Nam Ngon	**Observations:** ■ Odour and Colour. **In-situ measurements:** ■ pH, DO (Dissolved Oxygen), Conductivity, COD (Chemical Oxygen Demand), TSS (Total Suspended Solids). **Laboratory analysis:** ■ Arsenic (As), Cadmium (Cd), Copper (Cu), Chromium (Cr^{6+}), Cyanide (CN^-), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni), Nitrate Nitrogen (NO_3-N), Phenol, Phosphate (PO_4), Zinc (Zn), Ammoniacal Nitrogen (NH_3-N), Ammonium (NH_4^+).	**Frequency:** Once **Duration:** N/A
		Houay Joon in Ban Dak Padoo		
		Houay Preed in Ban Xieng Luang		
		Houay Air in Ban Sieng Mai		
		Houay Nheung in Ban Dak Dor		

Figure 4.2: Location of Baseline Sampling and Surveys Conducted for the Local EIA



Source: Innogreen Engineering Company, 2016 (modified by ERM)

4.1.3.1 Air Quality

Air quality primary baseline data survey was conducted as part of the local EIA study. From the two (2) air quality monitoring location, it was found that all parameters that was recorded were within the National Environmental Standards No. 81/GOV, dated 21 February 2017.

Impact assessment for air quality, particularly dust dispersion impact, was evaluated through the use of mathematical model AERMOD (a software developed by EPA). AERMOD model is applied to forecast dispersion of air pollutants with consideration to metrological condition such as wind direction, wind speed, temperature. This was conducted only for construction phase, whereas during operation phase, the air quality impact was expected to be considerably low (determined by the local EIA study), hence no modelling assessment was required.

Gaps Identified

Air quality baseline data that was collected has not covered all parameters that is required by the WBG EHS General Guidelines. Based on WBG air quality guidelines which makes reference to the WHO ambient air quality guidelines, the standard air quality parameter to monitor during the development of the Project includes Sulphur Dioxide, Nitrogen Dioxide, Particulate Matters and Ozone. However, given this Project is a wind farm development where limited long-term air emission is expected, the following parameters are determined to be of interest to the air impacts:

- **Particulate Matter** (PM_{10}) at 1 year and 24 hour averaging period; and
- **Particulate Matter** ($PM_{2.5}$) at 1 year and 24 hour averaging period.

Moreover, considering the Project lactation is within remote area and it is estimated that the above mentioned parameters will be relatively low. We do not recommend additional primary baseline data collection for air quality. Local EIA study does not cover all potential sources of impact on air quality. It has made attempt to include dust dispersion from vehicles used transporting materials however has not covered all potential access route. Further consideration is required for additional sensitive receptors (i.e. settlements) along all transportation route including the connecting roads, as transportation activities during the preparation and construction phase could potentially cause significant impacts to these receptors. The additional mitigation measures suggested in the EIA will be required as part of the ESMP.

4.1.3.2 Ambient Noise

Ambient noise level was monitored continuously for 24 hours as part of the local EIA study. Based on the four (4) locations that noise monitoring equipment was deployed and data was collected from, only at one (1) location (Ban Dak Dor) where $L_{Daytime}$ and $L_{Nighttime}$ was above the IFC EHS noise standard (55 dB(A) and 45 dB(A) respectively for residential areas). Leq at the exceeding instance was recorded at 56.5 dB (A) and 48.1 dB (A) for daytime and nighttime respectively.

No noise impact assessment was conducted for construction phase as during this stage, the local EIA study deemed the noise impact would not be significant.

Moreover, in regards to operation phase, mathematical modelling was implemented in order to properly assess the noise impacts. The chosen model was *SPM9613*, developed by *Power Acoustics, Inc. PMB302* which corresponds to *ISO9613* Part 1 (1993) and 2 (1996). Generally, this model is applied project that required predicting noise behaviour over distance, which also reflects the ground absorption, noise-barrier absorption and atmospheric absorption aspects. Four (4) receptors were monitored for noise level from the model output during operation phase. Monitoring locations were selected based on the presence of social receptors (i.e. settlements) that are located near construction site (e.g. wind turbine, substation, and transmission line) or transportation route as it is anticipated that these area will be impacted by noise generated during the construction and operation activity of the Project. These locations are the same locations as where the noise monitoring during pre-project was

conducted and is determined be a good representative of the noise baseline condition. The mathematical modelling assessment (SPM9613 model) considers six (6) scenarios as follows:

- **Scenario 1:** Noise level at wind speed 4 meter/second;
- **Scenario 2:** Noise level at wind speed 5 meter/second;
- **Scenario 3:** Noise level at wind speed 6 meter/second;
- **Scenario 4:** Noise level at wind speed 7 meter/second;
- **Scenario 5:** Noise level at wind speed 8 meter/second; and
- **Scenario 6:** Noise level at wind speed more than 9 meter/second.

Each scenario entails different motor rotation speed henceforth varying noise level generated from the turbine. Results from the simulation allows the Project to draw a noise contour during the tested scenarios and enable the EIA to inform noise levels from the Project operation and its impact significance at the selected receptors.

Gaps Identified

Noise monitoring were conducted for 24 hours, however, to adhere to IFC standard, the noise baseline monitoring must be conducted for at least 48 hours continuously.

The predicted noise levels are compared to assessment criteria to assess the likely significant noise impacts. However, the criteria used do not accord with best international practice in assessing impacts, as follows. In condition where the baseline (pre-project) noise level has already exceeded the IFC noise standard, the EIA shall opt to a +3dB (A) from current baseline level as a new noise standard value. The additional mitigation measures suggested in the EIA will be required as part of the ESMP.

Additionally, during construction phase, the Project is expected to generate noises, especially through operation of construction machineries and equipment and trucks transporting equipment. The assessment of noise impact during construction will be required.

4.1.3.3 Shadow Flickering

Shadow flickering is one of the key impacts generated from wind farm projects. IFC Wind Energy Guidelines report states that shadow flicker occurs when the sun passes behind the wind turbine and casts a shadow. As the rotor blades rotate, shadows pass over the same point causing an effect termed shadow flicker. Shadow flicker may become a problem when potentially sensitive receptors (e.g., residential properties, workplaces, learning and/or health care spaces/facilities) are located nearby, or have a specific orientation to the wind energy facility.

Key points identified in the IFC guidelines include:

- Potential shadow flicker issues are more likely at higher latitudes where the sun is lower in the sky and therefore are longer shadows that will extend the radius within which potentially significant shadow flicker impact will be experienced;
- If it is not possible to locate the wind turbines where neighbouring receptors experience no shadow flicker effects, it is recommended that the predicted duration of shadow flicker effects experienced at a sensitive receptor should not exceed 30 hours per year and 30 minutes per day on the worst affected days, based on a worst-case scenario; and
- Recommended prevention and control measures to avoid significant shadow flicker impacts include siting wind turbines appropriately to avoid shadow flicker being experienced or to meet limits placed on the duration of shadow flicker occurrence or programming turbines to shut down at times when shadow flicker limits are exceeded.

In an attempt to determine the impact level of this effect, the local EIA has selected the WindPRO model (developed by EMD International A/S, Denmark). Furthermore, the local EIA has adopted the German

guideline for shadow flicker standards, which suggested that the impacted household shall not be affected more than 30 hours/year or 30 minutes per day (similar to IFC guidelines), by the flickering effect. Details of the Project were added to the model to carefully determine the potential shadow flickering impacts.

Further assumptions such as, 24 hours operation time with clear sky (maximum sunlight exposure) and blade angle with respect to the sun of 3° (where it caused maximum flickering) were made to assess for the worst case scenario. A total of 15 sensitive receptors were considered for this impact assessment where the model would estimate the annual maximum shadow flickering duration for each receptors. This has helped the local EIA to determine the level of impact significance.

Based on the result presented in shadow flickering impact assessment of the local EIA, no sensitive receptors (i.e. settlement) is impacted by shadow flickering that exceeds the IFC standards.

Gaps Identified

Result from shadow flickering impact assessment has shown that no receptors were found to have been affected by the Project at a significant level (i.e. above IFC acceptable standard). However, as best practice suggests, the Project developer shall provide mitigation measures or management measures to further reduce or compensate the shadow flickering impact towards the receptors. Such management measures include grievance mechanisms to allow channels for receiving comments from nearby communities and appropriately address, mitigate and monitor their concerns. This impact towards human will also be in relation to the Community Health and Safety (IFC PS4).

4.1.3.4 Water Quality

Surface water quality sampling were conducted as part of the local EIA study. From laboratory analysis of the five (5) samples collected, only phenol were found to exceed the national environmental standards No. 81/GOV, 2017.

The local EIA study conducted a descriptive surface water quality impact assessment with consideration to the use of machineries and construction equipment by the EPC contractors. Furthermore, during construction phase, other site preparation activities and civil work such as soil digging, removing and grading the site and access road to tower foundation will be needed. These construction works are deemed to potentially impact water quality if conducted during rainy season. Pollutants from these activities includes but not limited to, oil waste, chemical contaminated substances, and cement waste. Additional wastewater will be generated from residential places from workers water consumption and uses. With the in-place controls (i.e. contractors providing mobile toilets to workers and waste being treated by authorized organization) proposed in the local EIA Study, these will form part of the ESMP.

The EIA study assessed that during operation phase, there will be no impact on water quality.

Gaps Identified

To conform to IFC standard, both national and international water quality standards will need to be applied to the analysis of surface water laboratory result. Where there are duplicates of standards under the same parameters, the analysis shall identify the more stringent value and apply it to the study.

The local EIA Study has conducted water quality impact assessment through a descriptive manner without quantitative analysis. As stated in IFC Wind Energy EHS Guidelines, water quality impacts are more concentrated towards construction, specifically activities such as installation of turbine foundations, underground cables, construction and upgrading of access roads, and other ancillary infrastructures. Related impacts that could amplify the degradation of water quality are increased erosion, soil compaction, increased runoff and sedimentation of surface water.

One of the key potential impact towards water bodies, particularly open surface water bodies (e.g. pond, lake, etc.) is surface runoff during precipitation events. Rainfall on Project area, especially during construction phase, has the possibility of drawing pollutants and contaminants into runoff stream and

eventually into open water bodies (and subsequently groundwater, through infiltration). Some of the pollutants that may be introduced into the surface runoff and consequently nearby water bodies includes, but not limited to fugitive dust from operation of vehicles and construction machineries settling on surfaces, spills or leaks of hazardous chemicals. Moreover, the local EIA report is silent on the groundwater impact from the Project activity and surface runoff and infiltration from the Project site.

To fully understand the implications and potential impact significance of these Project activities towards water quality (both surface and groundwater as well as during operation and maintenance phase), additional information, such as the quantity and type of wastewater expected from the Project site, will be needed to determine the level of impact significance. The EIA study and subsequently the Project is required to provide management method and monitoring details of the wastewater and run-off water during construction and operation phase. These mitigation measures will need to be sufficient to the impact significance evaluated and integrated as part of the ESMP. In parallel, the ESMP will need to be updated regularly, implemented and communicated through an effective means to the communities who access and co-uses the streams.

4.1.3.5 Climate Change Assessment and Climate Change Resilience

Local EIA does not include any study related Climate Change impact assessment and Climate Change Resilience. Understandably, during operation phase whereby GHG generated is negligible (as most of the operation activities that has GHG emission is limited to maintenance activity and is not expected to occur often), omission of GHG impact assessment is acceptable. However, during the construction phase, large volume of equipment transportation and construction machineries is required for the site development henceforth causing GHG emission. This impact significance is particularly greater in rural site where generally a larger distance is required to be covered between equipment origin area (where equipment and raw material is stored) and the Project site.[1] Therefore, appropriate GHG impact assessment will be required for the site preparation and construction phase of the Project.

In addition, as per the requirement stated in the EP4, Project are required to consider Climate Change Resilience as part of its development. It is recommended that this study be included in E&S Supplementary Studies.

4.1.4 PS 4: Community Health, Safety and Security

Performance Standard 4 recognizes that there may be community exposure to risks and impacts from project activities, equipment, and infrastructure. Section 5.7 of the local EIA discusses health and safety impact assessment, including potential impacts of the Projects to public health during pre-construction phase, construction phase, and operational phase. The impacts of community exposure to diseases and risks of violence and trafficking against women and children due to migrant worker influx, traffic impacts are not considered in the EIA. Based on secondary information, Laos PDR is a source and, to a lesser extent, a transit and destination country for women, children, and men subjected to sex trafficking and forced labour.[2] Domestic trafficking is also prevalent in Laos, especially in border areas where there is the highest demand from tourists, but also from migrant workers hired for big construction projects. Approximately 90% of Lao trafficking victims going to Thailand.[3]. Considering the Project is located near Thailand-Lao PDR boarder, particular attention should be given to affected communities with regards to risks of human trafficking and forced labours.

Other community health impacts such as dust generated from the Project activities to community health, and accidents and injuries from construction or operation activities were discussed to some extent as part of community health and safety. However, the assessment does not consider additional impacts

[1] The full transportation route will need to be confirmed if this is true, however this information was not available at the time of writing; the travel distance will also use as part of the GHG impact assessment.

[2] Department of State, USA (2018). Trafficking in Person Report 2018.

[3] UNODC. 2017. “Trafficking in persons from Cambodia, Lao PDR and Myanmar to Thailand.”

that may be experienced by vulnerable groups, impacts from shadow flicker, use of community resources that may strain the existing resources, traffic impacts etc.

4.1.4.1 Hazardous Materials Management and Safety

The local EIA identifies potential hazardous waste generation from materials containing oil of machinery, and management plan for handling of such material has been provided (e.g., separate containers, disposal in separate area, and proper burying methods and landfill). Sub-Plan 5 Waste Control of the ESMMP outlines that hazardous waste requires a proper burying method and location. However, it does not include a detailed hazardous material management plan.

4.1.4.2 Traffic Safety

The updated EIA includes traffic volume baseline and impact assessment of traffic for construction and operation phases. It is anticipated that during construction, the maximum transport frequency of wind turbine components (i.e. rotor blade, nacelle and tower sets) using special trailers is approximately 10 times/ 1 wind turbine (50 times/day), and transportation of machinery used for installation is at maximum 25 times/day. All the construction activities will cause impacts to general transport and traffic system on public roads, however these impacts will be temporary (only construction period) and transportation of large size wind turbine components and equipment/machinery will request permits from the local state agency. The updated EIA also includes mitigation measures for traffic impacts by the Project.

The ESMMP includes management of traffic in the Project area sub-plans for construction and operational phases. The plans layout traffic management and traffic safety for workers and communities, such as avoid transporting equipment and machinery during rush hours, impose speed limit within construction areas, provide training for drivers, control truck loads, organize traffic systems, install traffic signs, and provide a coordinating team in case of occurrence of accidents. However, transportation of waste and hazardous waste/materials, which may result in toxic, fire, explosion, or other hazards during transportation is not discussed.

4.1.4.3 Community Exposure to Diseases

The updated EIA considers community exposure to diseases (both communicable and non-communicable diseases) which may cause by the influx of workforce from outside communities and the management of the Project's waste. However, the updated EIA does not include discussion/assessment of potential impacts and risks associated regardingCOVID-19.

The updated ESIA also proposes mitigation measures for community exposure to diseases, which includes health check before hiring workers, waste management, organize training for workers, and provide sufficient drinking and domestic water, provide sufficient toilets and prohibition on open toilets near riverbanks and management of worker's accommodation in consistence with hygienic principles.

It is recommended to develop a community health and safety management plan, which outlines prevention and mitigation measures for community exposure to diseases, particularly COVID-19 and other communicable diseases for both construction and operational phases as part of the ESMMP.

4.1.4.4 Ecosystem Services

The local EIA does not include discussion on ecosystem services explicitly. It considers the impacts of the construction of the Project components on agricultural areas of the local people and reduced forest area for non-timber collection. The EIA stipulates that the Project will provide compensation and vocational promotion programs for households or individuals losing agriculture land. EIA suggests that the water requirement for the Project activities and workers will not affect the water availability to the local communities, as it will be sourced from different resources, although these sources are not clearly defined.

The ESMMP recognizes that almost 60 ha of forest area will be lost due to Project development, and indicates that compensation must be undertaking by means of reforestation in accordance with the regulations set out by the Forestry Department to ensure the growth and maintenance of the forest.

4.1.4.5 Use of Water Resources

EIA suggests that there are no piped drinking water supply system in the area. The communities source water from wells and gravity-fed water system. The EIA recognizes that water is not enough for communities during the dry season.

The Project has estimated a total of 30 cubic meters/day water consumption for construction work as well for use by construction workers to be sourced from “nearby area” during the construction phase. It is unclear where water will be sourced from and its possible impacts on the community. In addition, Project is expected to supply bottled water for drinking purposes to Project workers. Appropriate disposal of such waste is not discussed. During the operations phase, 1.25 cubic meter/day water will be required.

The ESMMP indicates that in case it is necessary for the Project to pump the water from the streams for construction activities, it shall inform the local communities and consult with the relevant authorities and a water use plan may be submitted to the relevant authorities. However, it will be important to ensure that the Project does not stress on the existing water resources, and ensure appropriate mitigation measures in place.

4.1.4.6 Emergency Preparedness and Response

Section 3.8 of the EIA report and Sub-Plan 14 of the ESMMP includes an outline of a Emergency Response Plan of the Project. However, a detailed emergency preparedness and response plan is missing in the EIA.

4.1.4.7 Security Personnel

Details of security personnel should be included in the EIA. It is likely that this will be developed by the project once the project organization is set-up and in place. There should be clear guidance regarding how the security personnel will interact with local residents and whether they will be armed.

4.1.4.8 Waste Management

The local EIA estimated that during construction period, construction waste of approximately 320 kg/day will be generated from 400 workers, and 20 kg/day of municipal waste will be generated from 25 workers during operational period. Hazardous waste generated from materials containing oil roof machinery is expected during construction. The potential impacts of the Project’s waste management to communities’ exposure diseases is considered in the local EIA.

The ESMMP Sub-Plan 5 outlines Waste Control Plan, it includes requirements for the construction contractor to jointly identify a proper disposal site with relevant authority, includes separation of waste and disposal in separate sites. Hazardous waste requires proper burying methods and site. It is recommended that the Waste Control Plan should be upgraded with additional details.

4.1.4.9 Labor Influx

The Project requires 400 workers during peak construction period. As indicated in Table 2.3, some villages have as less as 32 households in a village. Ethnic communities such as Traing ethnic group often live close together often in a cluster of 15-20 houses. Labor influx, particularly in smaller villages, may pose additional safety and security concerns for the local communities, especially women and vulnerable communities. Management plans to minimize such risks is currently missing in the EIA and the SMMP.

4.1.5 PS 5: Land Acquisition and Involuntary Resettlement

Socio-economic data were collected for the EIA report preparation via questionnaire survey and interviews with affected people in 18 villages in the Project area in September 2020. Additional baseline data including land use survey was collected in 2020, and the details of land use within the Project area has been included in the EIA.

4.1.5.1 Land Requirement

The installation of wind turbine towers requires a total area of 33.9 ha (0.3 ha per one tower and for the 113 towers); the construction of access road with the width of 6 m requires an area of 55.84 ha, and the area required for construction of sub-station and offices is 12.8 ha. In total, the required area for the Project is 102.54 ha. This will affect the forest area of about 60 ha, consisting of 20.23 ha of mixed deciduous forest, 29.62 ha for unstacked forest (old slash and burn cultivation area) and pine forest of 10.98 ha. In addition, agricultural land will be affected, consisting of paddy field (0.66 ha), coffee plantation (2.09 ha), animal stock (0.41 ha), and cassava plantation (0.04 ha). In addition, 2.43 ha of cemetery/graveyard is also affected by the Project. The EIA does not include disaggregation on public versus private land or the presence of communal land, if any. Additionally, it is not clear if the Project will require any additional land on a temporary basis such as land for worker camps, warehouse and ancillary offices.

It is understood that no physical displacement is envisioned under the current project design. Agricultural land (fruit-trees and coffee plantation) of 95 households in eight villages will be directly affected by land acquisition, mostly from clearances and improvements of access road to undertake construction and installation of wind turbine towers. However, information on access road connecting each wind turbine tower was not available for review.

EIA suggests that majority of the households within the Project does not have land title certificates. In lieu of land title certificate, land use certificates and land tax documents are used to verify land ownership. The government is currently in the process of issuing land title certificates. Customary land ownership and land legacy issues will need to be further assessed. Information on land users and tenancy is currently missing in the EIA. Impacts from land acquisition (both physical and economic) will need to be detailed out in the Resettlement Action Plan (RAP).

4.1.5.2 Resettlement and Livelihood Restoration Plan Vulnerability Analysis

IFC requires particular attention to be given to the needs of vulnerable groups. Vulnerable or “at-risk” groups include people who, by virtue of gender, ethnicity, age, physical or mental disability, economic disadvantage or social status may be more diversely affected by displacement than others and who may be limited in their ability to claim or take advantage of resettlement assistance and related development benefits. Vulnerable groups in the context of displacement also include people living below the poverty line, the landless, the elderly, women- and children-headed households, Indigenous Peoples, ethnic minorities, natural resource dependent communities or other displaced persons who may not be protected through national land compensation or land titling legislation. Persons identified as vulnerable should be assisted to fully understand their options for resettlement and compensation and encouraged to choose the option(s) with the lowest risk.

The Project has conducted a poverty situation analysis which is a good step forward in understanding impacts on vulnerable people. However, it is a good practice to include both economic and social vulnerabilities. EIA notes that the two districts where the Project is located are amongst 47 poor districts in Lao PDR. Particular focus on vulnerability will need to be assessed during land acquisition and resettlement planning.

4.1.6 PS 6: Biodiversity Conservation and Sustainable Management of Living Resources

This section assesses the extent to which the EIA complies with IFC PS 6 on the basis of five elements of the performance standard:

- Adequacy of the biodiversity baseline;
- Categorization of habitat type;
- Application of the mitigation hierarchy;
- Impacts on ecosystem services; and
- Protected areas.

4.1.6.1 Ecological Context from Local EIA

Forest Resources

Flora surveys were conducted by determining an area of 100 m^2 which was then divided into 5 parts, from size 2x2 m to 10x10 m; therefore, the methodology is sufficient to a certain extent. The survey locations were conducted at four locations, which includes, 1) Ban Dak Tiem, 2) Ban Dak Yell, 3) Ban Dak Run, and 4) Ban Dak Treub, as shown in ***Figure 4.3***. The survey locations did not include areas of the less disturbed and probably more biodiversity rich Annamite Range in the northern part of the project. The survey focused on plant species and the number of plant species found within the sample area. The impact assessment provides justification drawn upon the forest baseline findings; however, there is no clear criteria or consistent methodology for assessing the impacts, no rating was provided to the impacts during pre-construction, construction, and operation phase. According to the Local EIA, the mitigation measures proposed for impacts to forest resources are as follows:

- Pre-construction Phase:
  - Even in the survey and design period, there is no impact on forest and land use, but the working team conducting the survey must be careful during the field survey in order to avoid causing impact to forest and to the moral of the people who are likely to be affected in relation to the forest land use. There must be the consultation and participation between the project, the State Authority and the peoples of the affected villages. Even they are not subject to relocation impact, but the people have lost certain part of land use in the areas where the project will be constructed, including the sub-station, transmission line route and project components construction sites.
- Construction Phase:
  - Coordinate with the relevant sector to take actions in accordance with the process prescribed in the revised Law on Forestry (2019) and the revised Law on Land (2019).
  - The forest area of about 60 ha will be lost due to the project construction. This includes the areas of mixed deciduous forest, pine forest and unstacked forest. The project will provide the compensation through undertaking the reforestation in accordance with the regulations set out by the Forestry Department of the Ministry of Agriculture and Forestry.
  - With a view to preventing significant impact to forest areas, the project must conduct the inspection the construction activities of the contractors to ensure that they take precaution in site preparation for construction of wind turbine towers and project components, and must not clear the area outside the construction area, especially the forest area surrounding the project.
  - Before undertaking the site clearance for construction activities, the project must coordinate with the relevant State Authorities of the province and district to conduction the inspection and assessment of the actual affected area, especially the forest areas, which will potentially be affected.

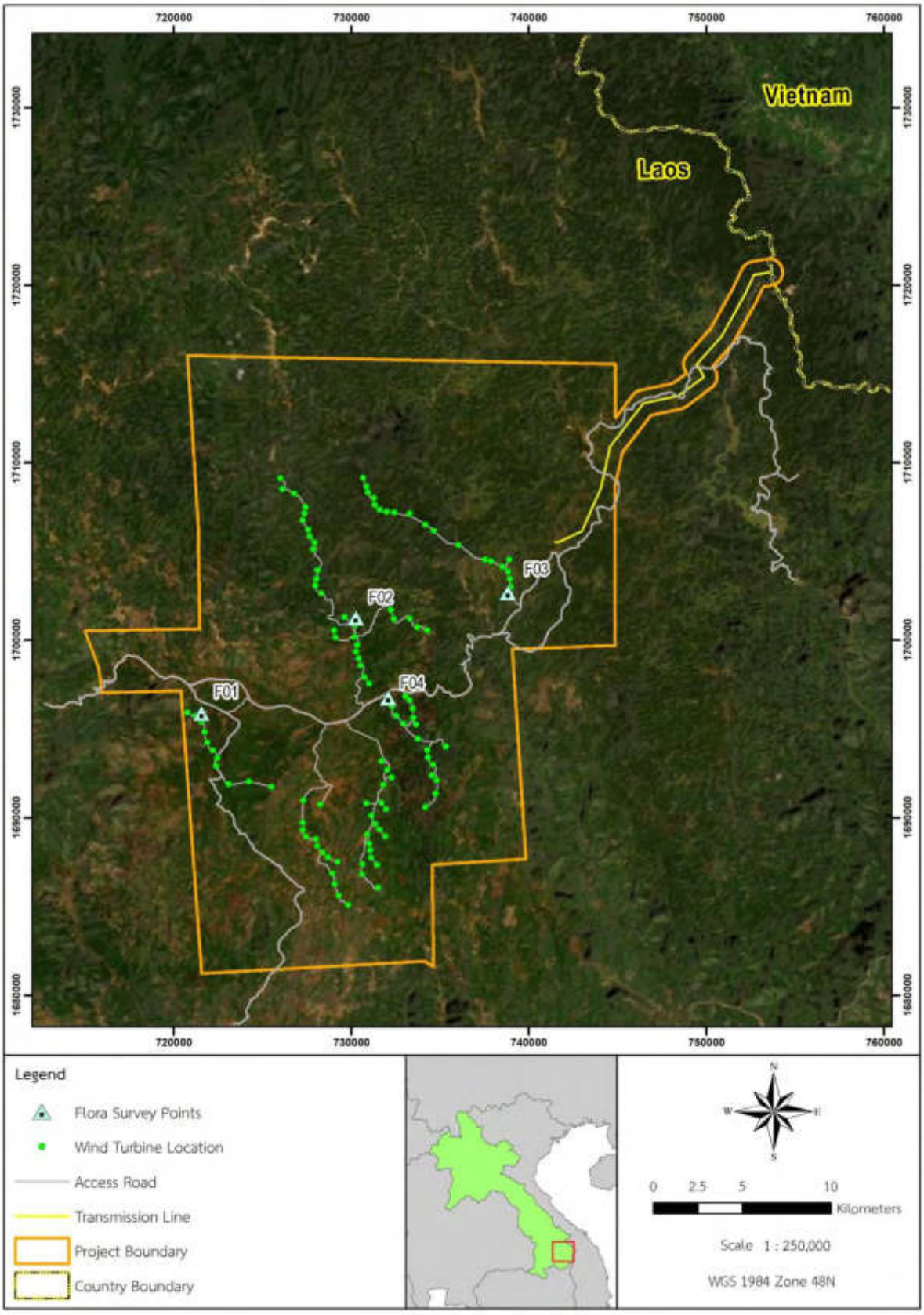
- Provide training to staff and workers who go to work in the project construction site to allow them to have the understanding about forest conservation, forbid them to enter for using the forest outside the project area. Rules must be issued for implementation and offenders must be subject to fine and immediate dismissal from work.

- The project shall cooperate with the State Authority to conduct regular monitoring of the construction activities of the contractors.

- Operation Phase:

- In the operation phase, there will be the management and maintenance of forest and plant species, which exist within the project area and in the project surrounding areas. In addition, the project will also plant trees of various species around the tower foundations and the sub-station to allow them to become green scenery areas with vegetation surrounding the project throughout the season.

Figure 4.3: Flora Survey Collection Points



Source: InnoGreen, 2020.

Wildlife

Surveys conducted for wildlife were categorized into three groups: Reptiles and Amphibians, Birds, and Mammals. Two methods were used during the field surveys, which include direct and indirect counting. Direct counting involves direct observation of the animal, traces, nests, burrow, hairs, remains, and sound. Indirect counting involves using survey data from past reports within the same area, and interviewing local people within the area.

The site data collection was conducted from 7-26 September 2020 (during the wet season). The recorded species are listed in Table 4-8, 4-9, and 4-10 of the local EIA Report. The survey for direct counting was conducted in two areas. The first of these included the Project area associated with the transformer and storage plant, and including nearby wind turbines. The second was areas around the villages situated in the proximity of the project, including the transmission line route. The exact location of the survey is not provided (in the form of coordinates). A KMZ file has been provided; however, it is difficult to relate these locations with the results, or identify if these are for the forest survey and wildlife surveys or if the wildlife surveys were undertaken in fewer, separate location. The survey results focuses on the species found, frequency in which the species was found or if it was reported based on interviews, national classification and status, and the International Union for Conservation of Nature (IUCN) Red List status.

The impact assessment for wildlife was categorized into pre-construction, construction, and operation phases. The impact assessment provides justification drawn upon the wildlife and habitats baseline findings, focusing on habitat as a major factor. According to the Local EIA, the mitigation measures proposed for impacts to wildlife are as follows:

- Pre-Construction Phase:

  - As mentioned above, according to the actual situation in the study area of the project, in the Pre-construction phase, there is already the impact on various wildlife species because in the project area, land and forest are widely used especially the expansion of agricultural land area for upland paddy cultivation, coffee plantation, economic crops cultivation. These activities require the clearing & destruction of wildlife habitat and resulting in the decrease of the number of wild animals. Furthermore, hunting is also practiced in the locality. Thus, the main mitigation measures consist of strict enforcement of law and regulations relating to wildlife hunting and control the land use to avoid the intrusion of forests, which are the habitats of wild animals.

  - However, while undertaking the activity of survey and technical and environmental and social design in the field in each time, each working team must take the precaution, especially while walking to collect information in unstacked forest and grassland, it is prohibited to hunt the animals and make loud noise that will cause disturbance to wildlife of reptile and bird categories living in the project area.

- Construction Phase:

  - The project must advise the construction contractor to control the noise from the use of machinery and transport vehicles to comply with the environmental standards. The noise must be controlled at the level not exceeding 85 dB (A) in order to reduce the disturbance and panic to wildlife.

  - During the construction & installation of wind turbine tower and during the testing of wind turbine, it is required to be careful and monitor the fly of the birds to known whether there are birds, which fly over and are likely to be in danger and in what time of the day. It is required to follow-up and make records in order to develop efficient measures to mitigate the impacts.

  - Heavy work must be halted on Van Sinh days (the 15th day of the waxing and waning moon in the lunar calendar) which are Buddhist important days or on taboo days for the local people in the project area.

- Organize the training for staff and workers who come to work in the project construction sites to allow them to understand the conservation of all types of wildlife, not engage in hunting and purchase of wild animals; issue rules for implementation and impose the fine to offenders including the penalty of immediate dismissal from work.

- According to the lessons on construction of other projects involving the construction and land excavation in natural area, large and rare reptiles are usually found, such as: python. If such case is found in the project construction site, the constructor must report to the State Authority or the relevant technical staff to remove such animal to live in other forest area where it is safe. It is not allowed to take such wildlife, which are found as food.

- The Project Environmental Unit shall conduct the monitoring in collaboration with the relevant State Authority and provide feedback to the construction contractor for improving their tasks.

- All construction activities and the management and monitoring of all parties must use the applicable law and regulations relating to wildlife management as prescribed in Chapter on legal requirement of this report as important basis for implementation.

- Operation Phase:

  - The project shall continue to issue rules to prohibit staff and workers working in the project during this phase not engaging in unlawful hunting or purchase of wild animals, especially prohibited animals. Offenders shall be subject to fine and dismissal from work.

  - Conduct a joint survey of all rare species of wildlife and develop the action plan for the management of such wildlife in case they are found in some parts of the project area.

  - Undertake the monitoring of the birds flying over the area; record and collect data on birds in the project area.

  - Invite domestic and foreign researchers who are interested in wildlife, especially researchers and students from universities and educational institutions, to participate in seeking the methods for conservation and management of wildlife to ensure their survival and sustainability in the project nearby forests.

Aquatic Biological Resources

This survey focused on fish species, and invertebrates. The number of fish survey points and the exact location of the fish survey points was not provided. The fish survey was conducted on September 2020; the majority recorded fish are considered IUCN LC or IUCN NE, with the exception of Pla Jard Tham (*Poropuntius speleops*) with a Red List criteria of IUCN VU. However, it shall be noted that the record for *Poropuntius speleops* is Endemic to the subterranean stream of Tham (cave) Phatewada in the Phu Khiew Wildlife Sanctuary in Chayaphum Province, Thailand (Mekong Khorat Plateau Ecoregion); since the habitat and location are not aligned with the Project area, caution is recommended about accepting this record on face value.

The invertebrate survey was conducted at five (5) points; however, no exact location was provided. The date/time the survey was not provided. The collection method used is the American Public Health Association – Water Environment Federation (APHA-WEF 2005). The survey results focused on the species collected, and water condition, and the mark of vulnerability of each species, which is a bio-indicator for calculating water quality. According to the results, two samples indicated good water quality, while three samples indicated average water quality. According to the Local EIA, the mitigation measures proposed for impacts to aquatic biological resources are as follows:

- Construction Phase:

  - The project must advise the construction contractor to take the precaution while carrying out the activity of soil digging, levelling and filling to prevent erosion into the river and occurrence of muddy water, especially the construction during the dry season which is the season of reproduction

and growth of the aquatic plants and aquatic animals which are valuable for the livelihood of the local people.

- In order to reduce oil wastes from the construction equipment that may cause the contamination of the river, the project must make the contract on imposition of fine with the construction contractor to prevent the contractor from washing the machinery of all types and the construction equipment into the river and streams in the project area. The relevant State Authority must pay attention in conducting the test and evaluation in accordance with the specified environmental management plan. The test shall consist of the collection of water quality samples for analysis. The collection of samples of aquatic plants and aquatic animals requires to conduct field collection and scientific analysis by comparing with the baseline information for which the samples were collected and recorded in the Environmental Impact Assessment Report of the project.

- The implementation of mitigation measures by the contractor, the management and monitoring of the Project Environmental Unit must be carried out in collaboration with the relevant State Authority. All activities and implementation process of each party shall be based on the applicable laws and regulations as prescribed in the Chapter on legal requirements of this ESIA Report.

- Operation Phase:

  - Even during this period, there is direct impact on the aquatic plants and aquatic animals, but the project has to pay attention to the maintenance of the structure of the project components, such as: water drainage system, making the fence around the foundation of the wind turbine towers, around the sub-station and other components of the project, ensuring water drainage during the rainy season, preventing the occurrence of erosion that will cause the flow of wastewater into the river which is the habitat of the aquatic plants and aquatic animals; ensuring the maintenance of the water closets or the system of treatment of wastewater from the residential building of the project and each wastewater treatment system must ensure the treatment of water waste in compliance with the required standards.

4.1.6.2 Desktop Review

Global Ecological Regions (Ecoregion)

An ecoregions in an area that is defined based on its general ecology and geography; although, the defined area is large in size. Its area is smaller than that of a bioregion. The Project lies within the Southern Annamites Montane Rain Forests (IM0152) ecoregion as defined by the World Wide Fund for Nature (WWF), which is shown in ***Figure 4.4***. WWF has characterised this ecoregions as vulnerable because a lot of the natural habitat has been cleared for agricultural activities and/or logging. The Project is located on both modified and natural habitat.

Key Biodiversity Areas and Protected Areas

Key Biodiversity Areas (KBA) are places of international importance for the conservation of biodiversity. KBAs are typically sites where there is a regular occurrence of significant numbers of one or more globally threatened species, restricted-range species and/or congregator species. KBAs include Alliance for Zero Extinction sites (AZEs), BirdLife Important Bird and Biodiversity Areas (IBAs), IUCN Freshwater KBAs and KBAs identified through the Critical Ecosystem Partnership Fund (CEPF) hotspot profiling process. These sites are maintained in the World Database of Key Biodiversity Areas (WDKBA).

Under the provisions of IFC PS6 paragraph 20, a project within a Protected Area (PA) and/or Internationally Recognized areas must meet specific requirements if development proceeds within the boundary. These include legal compliance, consultation with protected area sponsors and managers, and the community, acting in accordance with any management plans, and contributing to the conservation aims of the area.

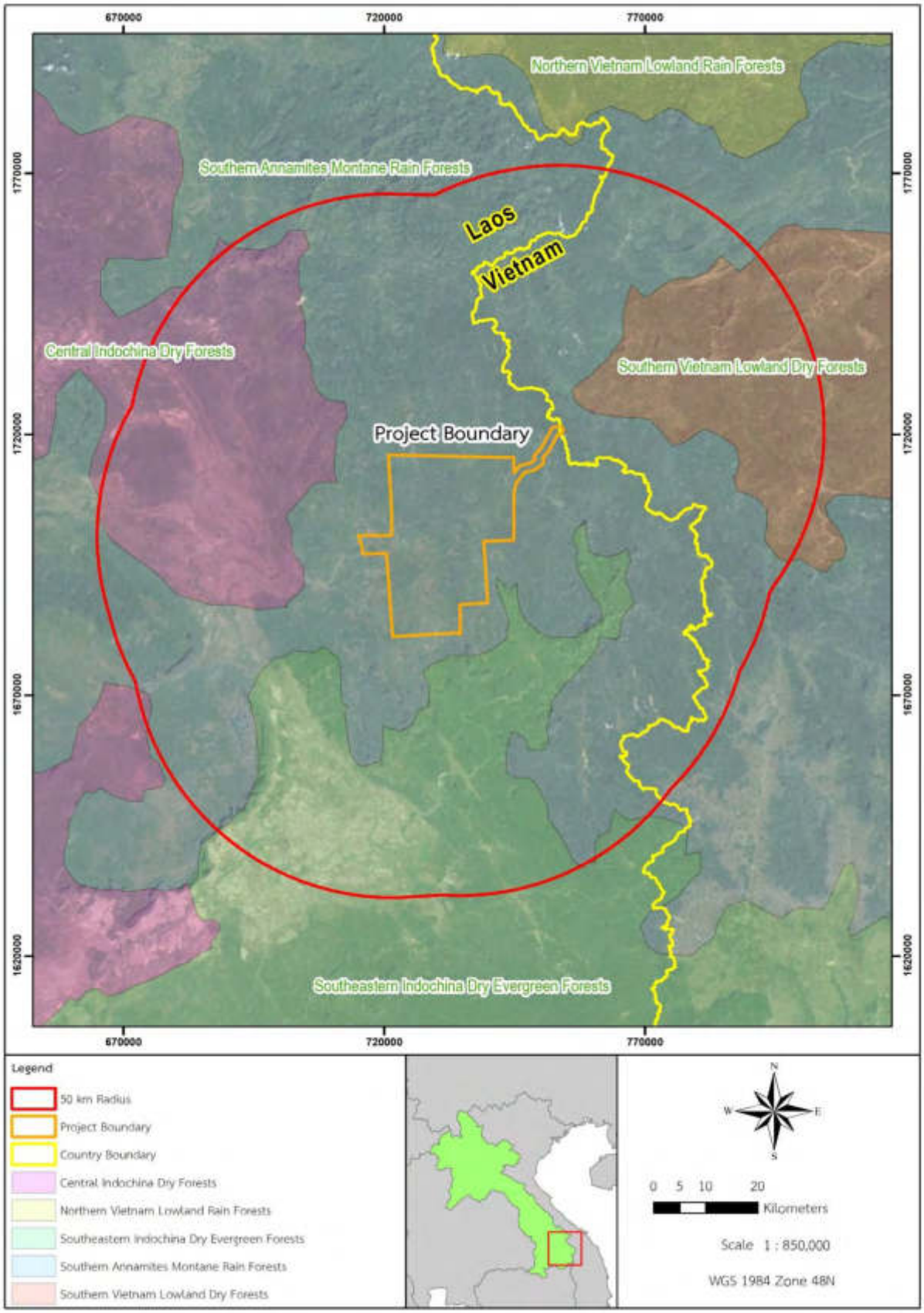
According to the Integrated Biodiversity Assessment Tool (IBAT), there is one (1) KBA (Dakchung Plateau) that overlaps with the Project boundary, and a total of 11 KBAs within 50 km of the Project. The KBAs are listed in ***Table 4.2***, and are shown in ***Figure 4.5***. There are nine (9) PAs that are located within 50 km of the Project; these areas are listed in ***Table 4.2***, and are shown in ***Figure 4.6***.

Table 4.2: Key Biodiversity Areas and Protected Areas in Proximity to the Project Site

No.	Name	Designation	Area (ha)	Location in Buffer Distance
1	**Key Biodiversity Areas**			
1.1	Dakchung Plateau	IBA	5,140	≤ 1 km
1.2	Phou Ahyon	IBA, AZE	148,900	≤ 1 km
1.3	Ngoc Linh	IBA, AZE	29,763	≤ 10 km
1.4	Upper Xe Kaman	IBA	34,780	≤ 10 km
1.5	Phou Kathong	KBA	94,000	≤ 10 km
1.6	Lo Xo Pass	IBA	15,000	≤ 50 km
1.7	Attapu Plain	IBA	71,400	≤ 50 km
1.8	Bolaven North-east	KBA	73,000	≤ 50 km
1.9	Song Thanh	KBA	95,000	≤ 50 km
1.10	Macooih	KBA	5,1270	≤ 50 km
1.11	Dong Ampham	IBA	180,220	≤ 50 km
2	**Protected Areas**			
2.1	Song Thanh	Nature Reserve	75,274	≤ 10 km
2.2	Phou Kathong	Not Reported	88,000	≤ 10 km
2.3	Dong Ampham	National Biodiversity Conservation Area	200,000	≤ 50 km
2.4	Ngoc Linh (Kon Tum)	Nature Reserve	41,420	≤ 50 km
2.5	Phu Luang (Bolovens Southwest)	Not Reported	62,000	≤ 50 km
2.6	Phou Kateup (Bolovens Northeast)	Not Reported	93,500	≤ 50 km
2.7	Xe Xap	Not Reported	113,000	≤ 50 km
2.8	Phou Theung	Not Reported	113,000	≤ 50 km
2.9	Xekhampo-Boloven Plateau	Hunting Reserve	78,000	≤ 50 km

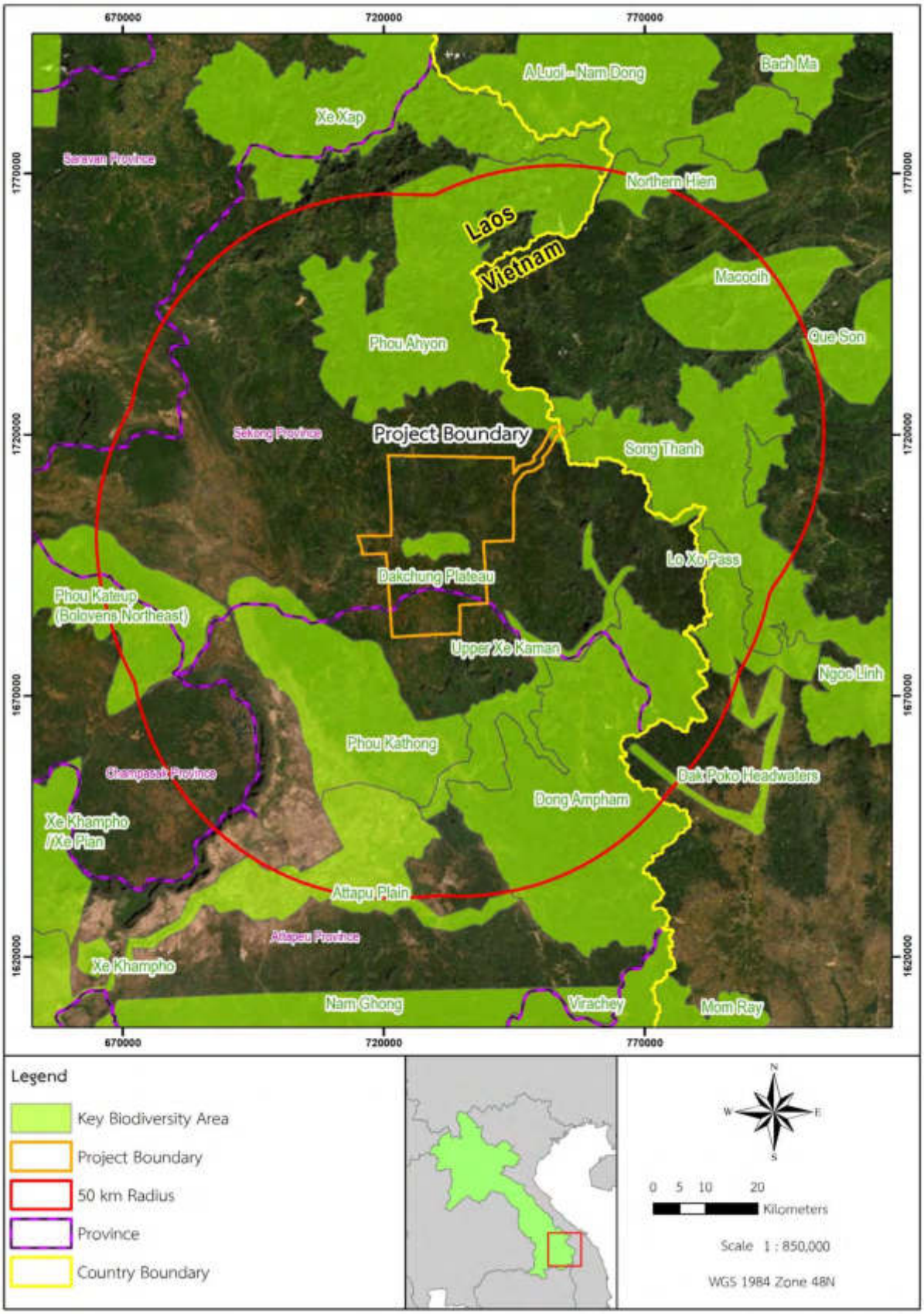
Source: IBAT, 2020.

Figure 4.4: Ecoregions that Overlap with the Project



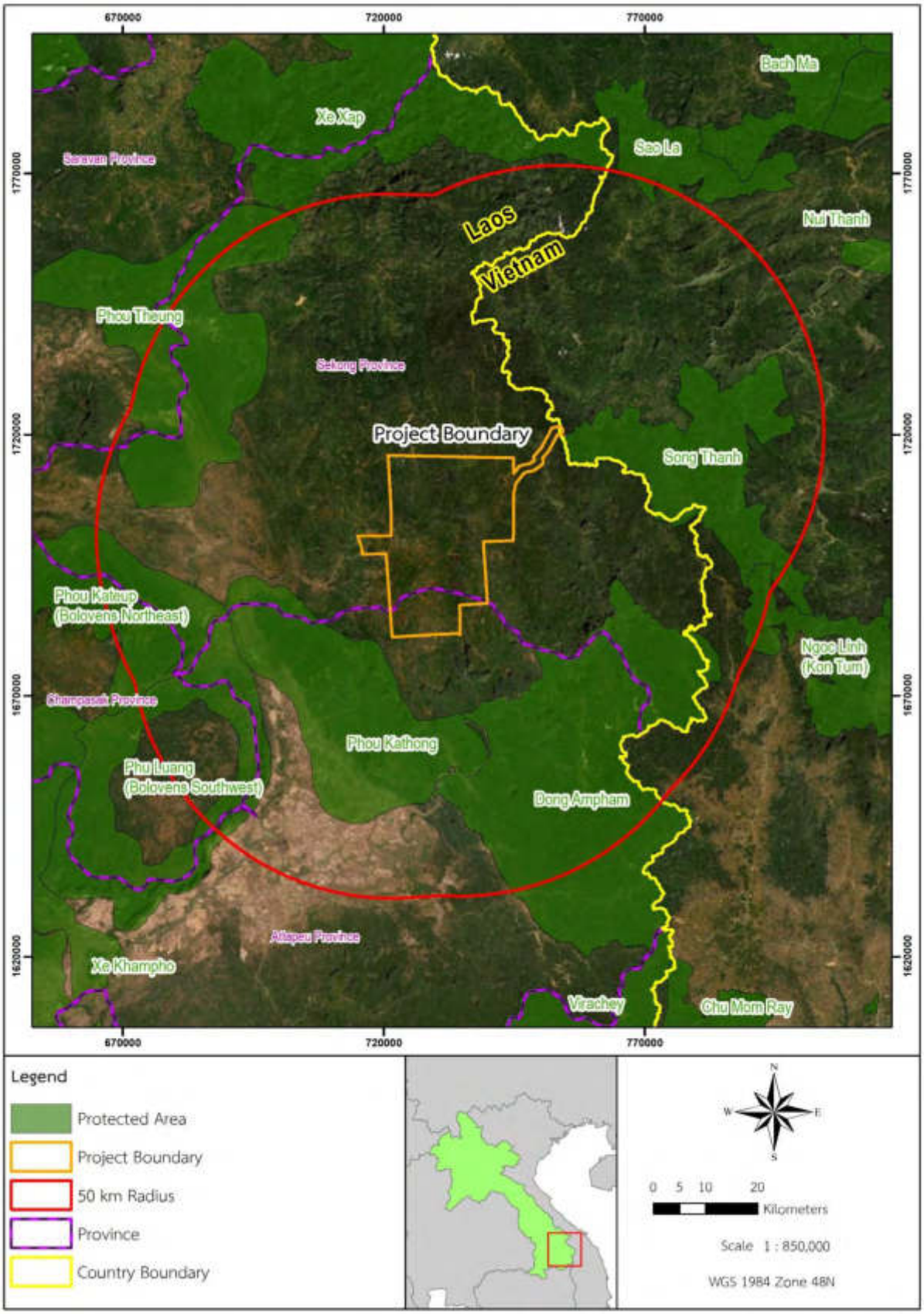
Source: ERM, 2020.

Figure 4.5: Location of Key Biodiversity Areas in Proximity to the Project Site



Source: ERM, 2020.

Figure 4.6: Location of Protected Areas in Proximity to the Project Site



Source: ERM, 2020.

Threatened Species

Threatened species are identified as those classified on the IUCN Red List of Threatened Species. The Red List provides the conservation status of these listed species as being Critically Endangered (CR) and Endangered (EN). CR and EN species are considered to be at a heightened risk of extinction and are awarded an elevated level of consideration under IFC PS6. These species are candidates for screening against Critical Habitat Criterion 1.

According to the IBAT, 56 threatened species that have been identified within the Project area and the 50 km buffer zone are listed in ***Appendix A***.

Restricted Range Species

According to IFC PS6, restricted range species are defined as species with an estimated extent of occurrence (EOO) of ≤ 50,000 km^2 for terrestrial vertebrates and ≤ 100,000 km^2 for marine species. These species are candidates for screening against Critical Habitat Criterion 2.

According to the IBAT, 31 restricted range species that have been identified within the Project area and the 50 km buffer zone are listed in ***Appendix B***.

Migratory and/or Congregatory Species

Species identified as migratory and/or congregatory within the Study Area using the IBAT database, which incorporates information from the relevant BirdLife International database, and IUCN species profiles are also listed in order to assess against the thresholds for critical habitat Criterion 3 (Migratory and/or congregatory species).

According to the IBAT, 31 restricted range species that have been identified within the Project area and the 50 km buffer zone are listed in ***Appendix C***.

4.1.6.3 Critical Habitat Screening

The Screening Process

The data identified in previous sections are used in this section to determine if the project site, set within the wider landscape and using an Ecologically Appropriate Area of Analysis (EAAA), has the potential to trigger critical habitat.

A desktop based initial Critical Habitat screening has been undertaken based on the criteria provided in IFC PS6 paragraph 16. These criteria are:

1. Habitat of significant importance to Critically Endangered and/or Endangered species;
2. Habitat of significant importance to endemic and/or restricted-range species;
3. Habitat supporting globally significant concentrations of migratory species and/or congregatory species;
4. Highly threatened and/or unique ecosystems; and/or
5. Areas associated with key evolutionary processes".

Critical Habitat may not be limited to pristine or highly biodiverse areas, but can include both modified and natural habitats where these meet the Critical Habitat criterion.

The screening process against the paragraph 16 criteria is informed by the additional guidance provided in GN69 to 97 of the 2019 update of the 2012 guidance. ***Table 4.3*** details the quantitative qualifying requirements for Criteria 1 to 3 (i.e. thresholds). The likely qualifying interests for Criterion 4 and 5 are subject to research and expert opinion. The criteria listed have been used to complete this assessment.

The five 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. This approach is generally more cautious but is used more widely in conservation. Critical Habitat criteria therefore have two distinctive characteristics. First, components of biodiversity are essentially assigned to only two levels of conservation significance, those that trigger Critical Habitat and those that do not. Secondly, each criterion is applied separately and not in combination, meaning that the scores are not cumulative. A species may be screened in on more than one criterion (e.g. a CR species that is also endemic or range restricted).

Table 4.3: Critical Habitat Criteria

Criteria	Thresholds
Criterion 1: Critically Endangered (CR) / Endangered (EN) species:	(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (0.5 % of the global population AND 5 reproductive units of a CR or EN species); (b) Areas that support globally-important concentrations of an IUCN Red-listed VU species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in (a). (c) As appropriate, areas containing nationally/regionally-important concentrations of an IUCN Red-listed EN or CR species.
Criterion 2: Habitat of significant importance to endemic and/or restricted-range species;	(a) Areas that regularly hold ≥ 10 % of the global population size AND ≥ 10 reproductive units of a species.
Criterion 3: Habitat supporting globally significant concentrations of migratory species and/or congregatory species;	(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 % of the global population of a migratory or congregatory species at any point of the species' lifecycle. (b) Areas that predictably support ≥ 10 % of the global population of a species during periods of environmental stress.
Criterion 4: Highly threatened and/or unique ecosystems; and/or	(a) Areas representing ≥ 5 % of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. (b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.
Criterion 5: Areas associated with key evolutionary processes	No set thresholds

Note: Restricted-range/ Endemic Species = Species with global distributions of less than 50,000km^2; Migratory species = Any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem); Congregatory Species = Species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis.

Source: IFC, 2019.

The complete critical habitat screening table is provided in ***Appendix D***. Those considered relevant to the assessment of critical habitat are discussed further in this section.

Identification of the Ecologically Appropriate Area of Analysis (EAAA)

The IFC guidance requires that the project is set within the broader landscape, and establishes an area of analysis based on species and ecosystems (GN59)[1].

In terms of landscape the project is set within the extensive montane rainforest ecoregion, the natural vegetation being dominated by evergreen deciduous forest growing on igneous substrate, with high levels of rainfall. The southern Annamite range, forms part of a chain that that connects all the way to

[1] GN59 states: The project should identify an ecologically appropriate area of analysis to determine the presence of critical habitat for each species with regular occurrence in the project's area of influence, or ecosystem, covered by Criteria 1-4. The client should define the boundaries of this area taking into account the distribution of species or ecosystems (within and sometimes extending beyond the project's area of influence) and the ecological patterns, processes, features, and functions that are necessary for maintaining them.

the Himalayas, and supports both large range species and a high level of endemism. The latter reflecting the high level of natural habitat diversity and, perhaps a role as refugia during repeated glaciation periods (Dr. Neil Furey, pers comm). In some area, particularly those in the centre of the project and associated with the Dakchung Plateau KBA, there has been extensive modification for agriculture and forest clearance. To the south, east and west the montane rainforest gives way to dry forest ecoregions as rainfall amounts reduce. The project sits within the high plateau part of this montane forest and its elevation is the primary distinction from surrounding areas.

EAAA are usually anticipated to be greater than the Area of Influence (AoI) and take into account individual species ecology, although it is permissible to have EAAA that capture a number of species or to have a series of EAAA depending on ecosystem or ecological factors. For wind farms identifying the AoI can be particularly challenging as unlike most other developments the primary impacts arise from mortality or displacement of mainly volant species (e.g. bats and birds) that interact with the risk window created by the rotation of the turbine blades.

In such circumstances, one way of understanding potential AoI and framing an EAAA is to identify the likely catchment of volant species likely to interact with the turbines. For migratory birds in particular this would often trigger a requirement to include KBA and IBA's up to tens of kilometres from the project if there is a likelihood of migratory flows through the site towards or between such sites. In this instance, however the IBA/ KBA's within 50km of the project are designated primarily for their endemic or restricted range species.

Scottish Natural Heritage (now NatureScot) pioneered the concept of connectivity to understand potential effects on birds in relation normal foraging and daily movement ranges[1]. Similarly, bat workers have identified that many species of bats may have large foraging ranges but rely on core substance zones to support colonies.[2]

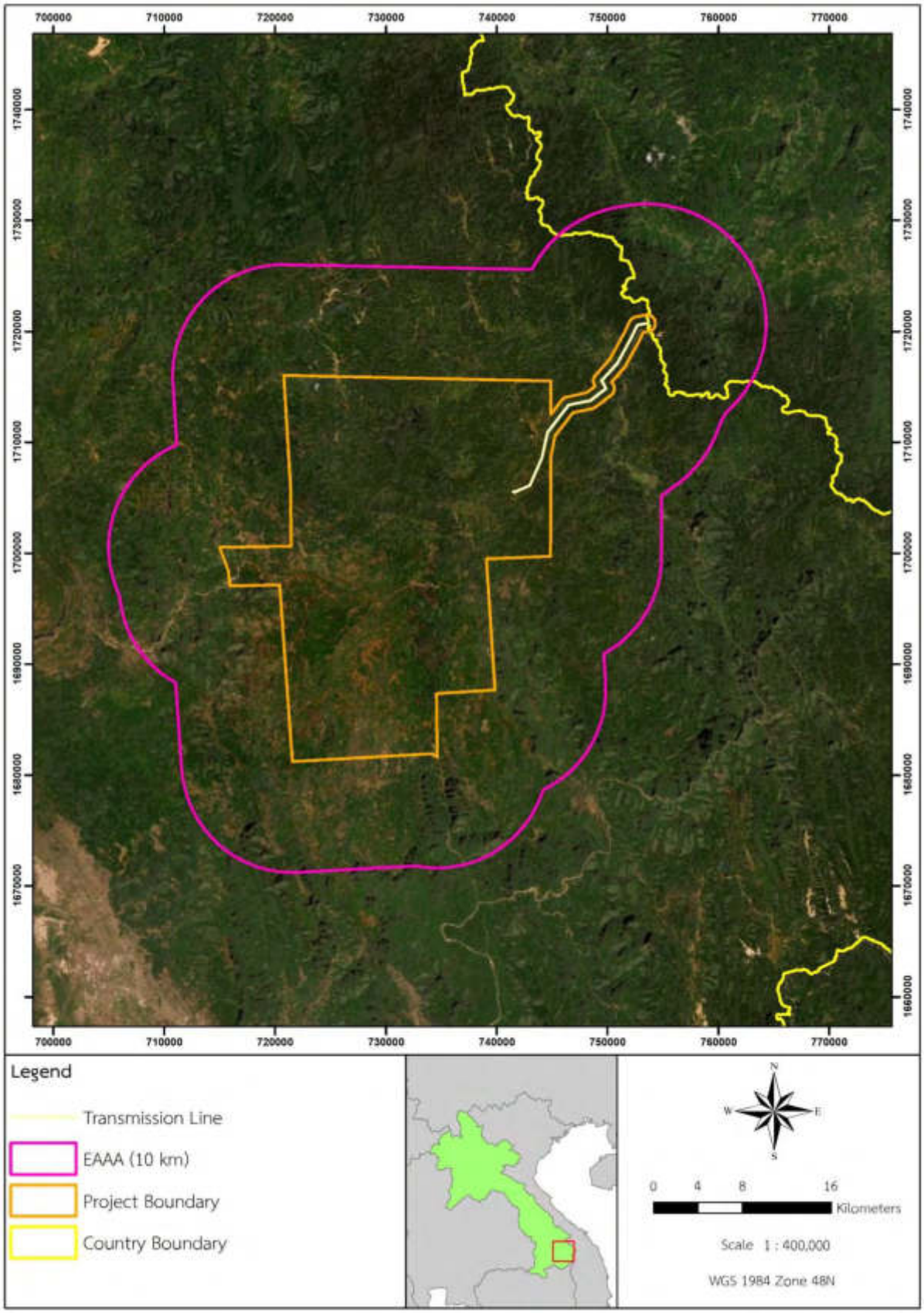
Although some species have the potential to forage over long distances most species will rarely travel beyond 10km on a daily basis, and where they do they become progressive more dispersed over the landscape. For volant species, and for many longer ranging terrestrial species, an EAAA of 10km provides a reasonable ecological basis for analysis. For some particularly long distance range species such as tiger the IFC guidance indicates that regular occurrence, migration and congregation need to be taken into account. Connectivity with wider dispersed populations does therefore need to be understood when assessing critical habitat for such species but not necessarily expressed in the geographical boundaries of the EAAA adopted for assessment.

The EAAA for the project is therefore centred on the project and covers all the main habitat types, including degraded area, within and adjacent to the project planning boundary and includes a 10km buffer to encompass mobile and volant species, and shown in ***Figure 4.7***.

[1] Pendlebury, C., Zisman, S., Walls, R., Sweeney, J., McLoughlin, E., Robinson, C., Turner, L. & Loughrey, J. (2011). Literature review to assess bird species connectivity to Special Protection Areas. Scottish Natural Heritage Commissioned Report No. 390

[2] Collins, J. (Ed) 2016. Bat surveys for professional ecologists: good practice guidelines (3rd Edition). Bat Conservation Trust, London

Figure 4.7: Ecologically Appropriate Area of Analysis



Source: ERM, 2020.

Results of Critical Habitat Screening

This section aims to identify Critical Habitat candidate species within the EAAA based on the Critical Habitat criteria defined in ***Table 4.3***. The Critical Habitat criteria aim to identify habitat important for threatened species (e.g. endangered, critically endangered species), endemic or range-restricted species, migratory species, threatened or unique ecosystems and areas associated with key evolutionary processes. Critical Habitat determination follows these steps:

- Species likely to be regularly occurring within the project area;
- Identification of EAAA and landscape context;
- Identification and verification of available desk study data; and
- Assessment of data against IFC Critical Habitat criteria.

This screening assessment is based only on information available within the EIA, EMP, database and secondary literature sources. No primary data collection in support of the screening exercise has been undertaken. The critical habitat screening has applied a precautionary approach where there is uncertainty about the population, range and distribution of potentially occurring biodiversity features within the Project study area and EAAA. It is therefore possible that once further data is available some species may be subsequently screened out, or additional species or receptors identified.

As a result of the initial screening assessment, 1,078 species are considered conservation significant species, and are candidate species for the Critical Habitat Screening Assessment. Conservation significant species include 71 critically endangered species and endangered species (in accordance with the IUCN Red List), 18 range-restricted species and 117 migratory and/or congregatory species. The following sections determine if the candidate species assessed trigger critical habitat within the EAAA against the relevant criteria.

Criterion 1

Critically Endangered (CR) and Endangered (EN) are identified as those classified on the IUCN Red List of Threatened Species and considered to be at a heightened risk of extinction. Candidates for Criterion 1 include 13 freshwater fish, 18 birds, 29 mammals, 11 reptiles, four amphibians, one mollusc, one fungus and two flowering plants. Based on the desktop screening assessment, 6 species have been identified as potentially triggering critical habitat within the EAAA on the basis of the qualifying criteria. These species are as follows:

- *Asarcornis scutulata*, White-winged Duck
- *Elephas maximus*, Asian Elephant
- *Muntiacus vuquangensis*, Large-antlered Muntjac
- *Nesolagus timminsi*, Annamite Striped Rabbit
- *Pygathrix nemaeus*, Red-shanked Douc Langur
- *Viverra megaspila*, Large-spotted Civet

The description of the desktop screening results for each species above is provided in ***Appendix D***.

Criterion 2

Endemic or Restricted Range Species are species that occur within a limited distribution and/or with specific habitat requirements. These species are considered to be at a heightened risk of extinction due to their habitat and range requirements.

Based on the desktop screening assessment, **11 species have been identified as potentially triggering critical habitat under Criterion 2 within the EAAA**. These species are as follows:

- *Asarcornis scutulata*, White-winged Duck
- *Pavo muticus*, Green Peafowl
- *Poropuntius deauratus*, Yellow Tail Brook Barb
- *Calostoma insigne* (a fungus)
- *Muntiacus vuquangensis*, Large-antlered Muntjac
- *Nesolagus timminsi*, Annamite Striped Rabbit
- *Nomascus annamensis*, Northern Yellow-cheeked Crested Gibbon
- *Pygathrix nemaeus*, Red-shanked Douc Langur
- *Viverra megaspila*, Large-spotted Civet
- *Bungarus slowinskii*, Red River Krait
- *Protobothrops sieversorum*, Three Horned-scaled Pitviper

The description of the desktop screening results for each species above is provided in ***Appendix D***.

Criterion 3

Migratory species are classified as animals that spend a proportion of their time in different locations throughout the world, depending on wintering and breeding habitat requirements. Congregatory species are defined as species that meet in globally significant numbers at a particular place at a certain time of year for feeding, breeding or resting. These species are considered to be at a heightened risk of extinction due to habitat and population requirements.

Based on the screening assessment, no species have met the criteria for criterion 3.

Criterion 4

IFC PS6 describe this Criterion trigger to be one of the following:

- the ecosystem is at risk of significantly decreasing in area or quality;
- has a small spatial extent; and /or
- contains unique assemblages of species including assemblages or concentrations of biome-restricted species.

Highly threatened or unique ecosystems are defined by a combination of factors such as long-term trend, rarity, ecological condition, and threat.

The Southern Annamites Montane Rain Forests (IM0152) ecoregion represents a large extent of the wet evergreen forests. The conservation status of this ecoregion is Vulnerable, as the ecoregion has undergone major forest conversion. As the ecoregion is 46,620 km^2, it spans Laos and Vietnam, the spatial extent is not considered to be small.

The habitat type within the EAAA are widespread throughout Laos and Vietnam and are not considered to be unique or contain species assemblages that would be conservation significant. The EAAA therefore would not be critical habitat under Criterion 4.

Criterion 5

IFC PS6 describes this Criterion trigger to be one of the following:

- Physical features of a landscape that might be associated with particular evolutionary processes (for example isolated areas, areas of high endemism, spatial heterogeneity, environmental gradients, edaphic interfaces, biological corridors or sites of demonstrated importance to climate change adaptation); and/or

- Subpopulations of species that are phylogenetically or morphogenetically distinct and may be of special conservation concern given their distinct evolutionary history. The latter includes evolutionarily significant units and evolutionarily distinct and globally endangered species.

Although the Project is located within the Southern Annamites Montane Rain Forests (IM0152) ecoregion, the species assessments did not identify any species subpopulations known to be phylogenetically or morphogenetically distinct that rely primarily on the project site and EAAA. However, as discussed previously, the wider landscape contains a number of IBA's specifically designated for endemic species, but with the exception of the heavily degraded Dakchung Plateau IBA, these areas of high endemism lie mostly beyond the EAAA boundary. The exceptions are the edge of the Upper Se Kaman KBA/IBA to the south and the transmission line does cross part of the Phou Ahyon KBA. This latter site is the southern extremity of the Kon Tum Plateau Endemic Bird Area (EBA). It is also part of the south Annamites tiger conservation landscape.

As a result it is considered possible that the Project Area and EAAA would be considered important in the conservation of Key Evolutionary Processes, and thus trigger, critical habitat under Criterion 5.

4.1.6.4 Key Gaps Identified

In assessing the adequacy of the existing EIA the requirements of sustainable finance as expressed in the IFC PS6, ADB SPS and Equator IV principles relating to the adequacy of the baseline information and impact assessment, the extent of protection provided for biodiversity, the assessment of critical habitat and alignment with the requirements relating to designated and protected areas are relevant. The various performance standards also reference the need to address invasive non-native species, and impacts on priority ecosystem services. The elements relating to those involved in primary production are not relevant to this project. The need for supply chains to avoid contributing to deforestation and other biodiversity loss is also referenced in the various standards but again is relevant primarily to the use of primary production products.

Baseline Information and impact assessment: The unknown spatial coverage of the EIA and limited field work are insufficient to allow assessment of impacts across the whole Project area. Further desk study, habitat identification along the route and targeted field survey in areas with high biodiversity potential are required.

Extent of protection provided for biodiversity: There are no mitigations stated for the assessed impacts. As the baseline does not identify all the biodiversity features associated with the route additional baseline studies, impact assessment and use of the mitigation hierarchy will be required.

Critical Habitat: No critical habitat assessment identifying the areas of modified, natural and potentially critical habitat has been undertaken. For the limited scope of the original EIA this may be reasonable, as the majority of the areas surveyed were highly modified. The total area does cover areas with the potential to trigger critical habitat that require further study and assessment.

Designated and Protected Sites: The EIA does not provide assessment of sites designated or protected for biodiversity reasons. A detailed assessment of protected and designated sites in relation to international finance requirements is needed.

Invasive non-native species: No information on this is provided and any biodiversity surveys commissioned should include identification of invasive species, and carry through any findings into the assessment and mitigation.

Impacts on priority ecosystem services: No analysis was undertaken, although within the search area of the original EIA it is unlikely significant issues existed. The location of the wind turbines and the transmission line does include areas of new land take in rural areas and natural habitat and an assessment of the significance of ecosystem services will be required, although this is likely to crossover into the social topic.

4.1.6.5 Proposed Scope of Work and Methodology for Phase 2

Based on the initial gap analysis, the following is recommended to close gaps identified in the original EIA:

Habitat characterisation and classification of site (Desktop Survey)

ERM will utilise existing vegetation maps, land use maps, satellite imagery and aerial photography to map the extent and condition of major habitat types; and map extent of Modified and/or Natural Habitat in the project study area. In order to map areas of habitat, ERM will use freely available LandSat imagery.

Rapid Ecological Assessment (REA)

Commission specialists to undertake REA surveys throughout the Project area to both typical and high conservation value areas to ground truth the aerial assessment and identify the main habitats and likely species present. The precise location to conduct the surveys will be agreed with the subcontractor. Arising from the REA and the critical habitat screening it is likely additional specialist surveys for particular fauna and flora will need to be commissioned. The REA will help identify priority areas for such surveys.

At the time of this Gap Analysis submission, the REA has been conducted between December 2020 and January 2021. The results of the REA has identified priority areas for specialist surveys in the north of the project area and the transmission line, and have also identified some locally protected forests. Survey requirements and methods are currently being discussed.

Bird Surveys

Commission specialist to undertake bird surveys for areas agreed with the subcontractor. These will consist of vantage point surveys during the migratory period (November-April) to identify bird movements (species, numbers, flight height, direction) across the proposed wind turbine locations and transmission line. Given the very large scale of the project a sampling approach will be adopted that undertakes VP assessments for each of the main clusters. Transect and point count surveys will also be undertaken to identify species present.

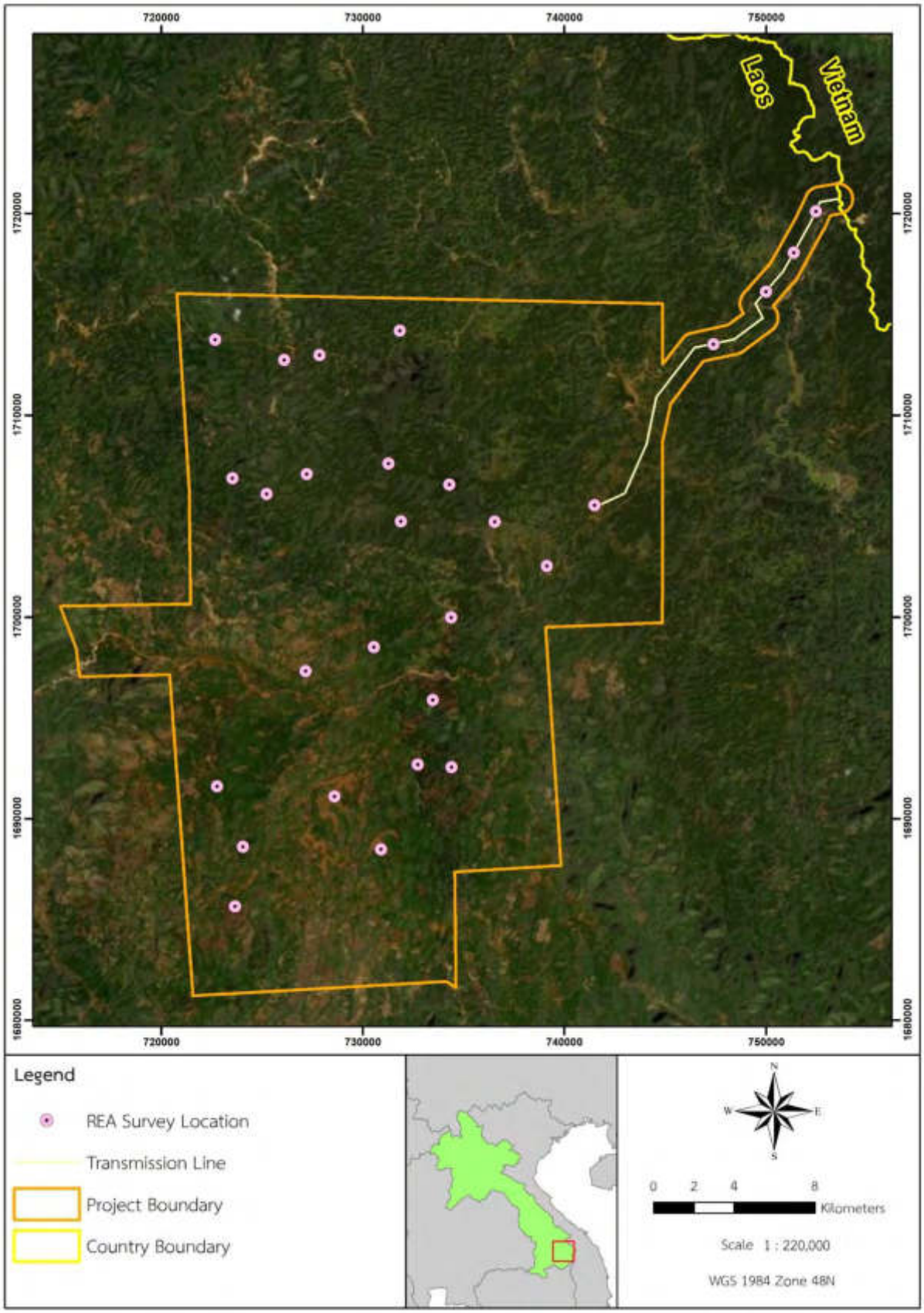
At the time of this Gap Analysis submission, two trips (out of the total 6 trips) has been conducted, one in December 2020 and another in January 2021.

Bat Surveys

Commission specialist to undertake bat surveys for areas agreed with the subcontractor. These will consist of bat detectors for acoustic sampling and mist netting of bats. The latter will be in accordance with IUCN bat SSG guidance and takes into account the COVID-19 free status of Lao.

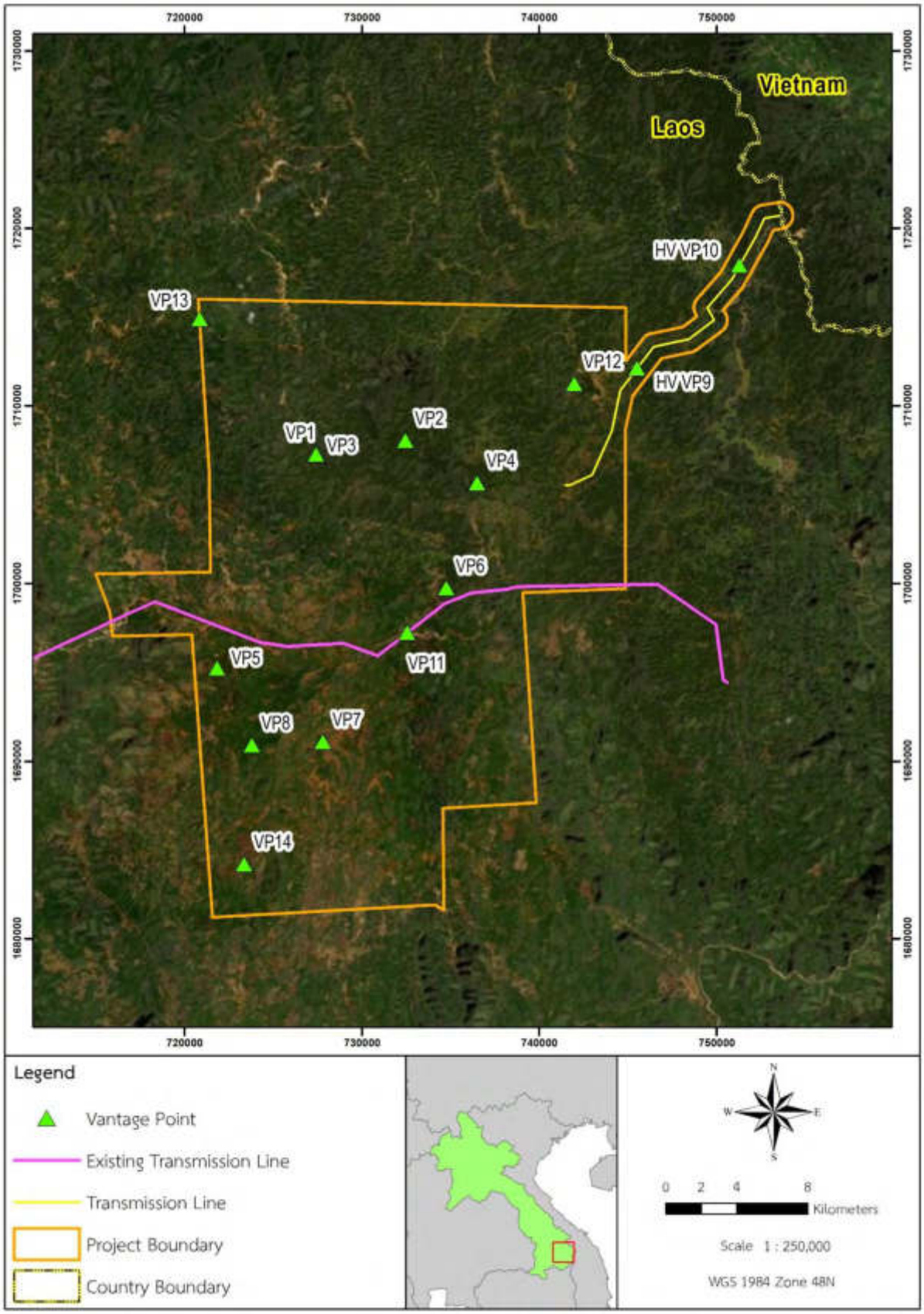
At the time of this Gap Analysis submission, one trip (out of the total 4 trips) has been conducted in February 2021.

Figure 4.8: Indicative REA Survey Locations



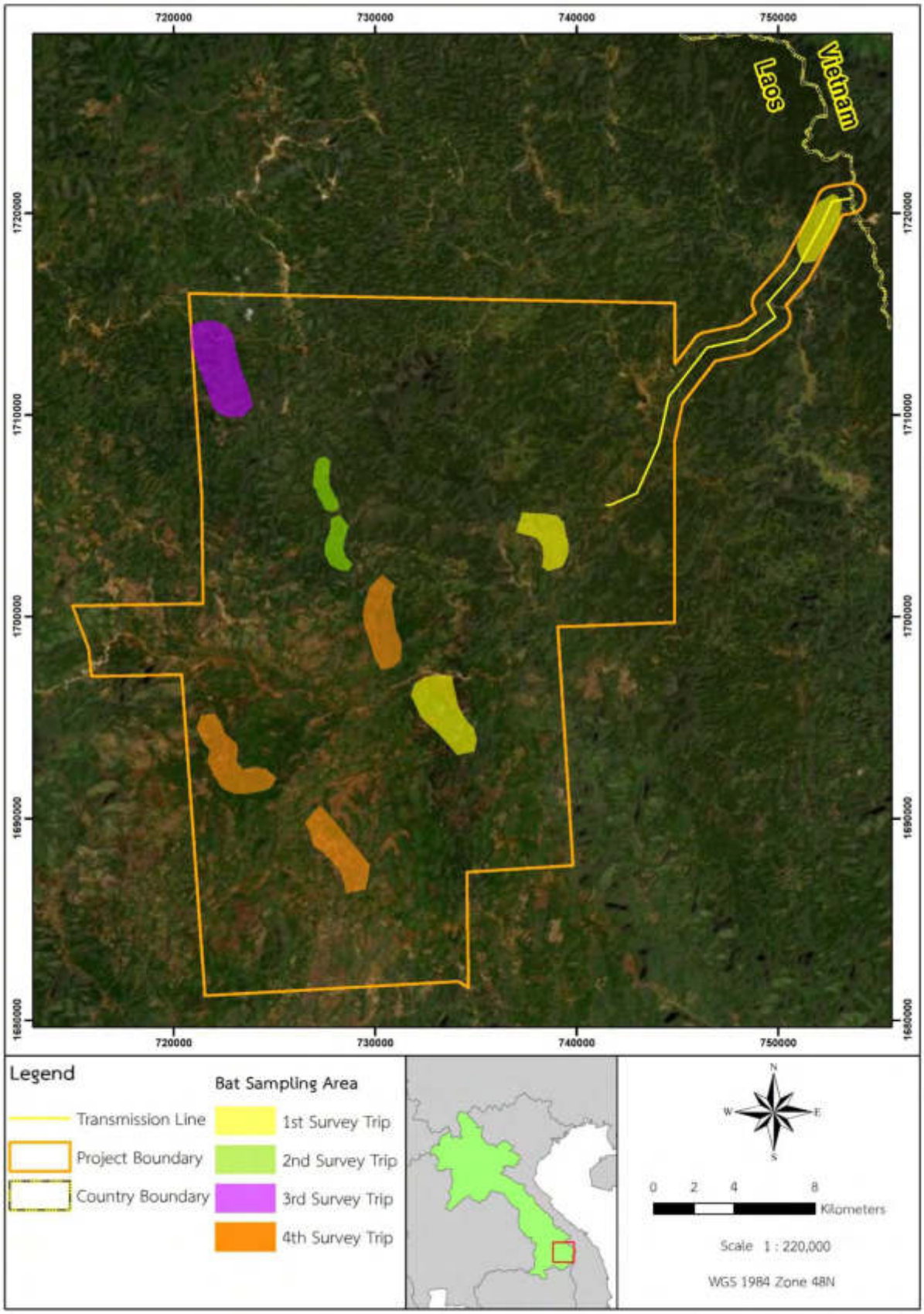
Source: ERM, 2020.

Figure 4.9: Indicative Bird Vantage Point Survey Locations



Source: ERM, 2020.

Figure 4.10: Indicative Bat Survey Locations



Source: ERM, 2020.

Based on the information from the baseline studies, Phase 2 will include undertaking an impact assessment to cover the following;

- Critical habitat assessment;
- Relationship with protected and/or designated sites;
- High value biodiversity receptors;
- Invasive species;
- Cross reference ecosystem services;
- Cumulative impacts;
- Demonstrate application of the mitigation hierarchy;
- Detail mitigation requirements and identify any residual environmental liabilities in relation to natural or critical habitat.

4.1.6.6 Survey Plan

Phase 2 is expected to include an analysis of survey results from surveys indicated in ***Section 4.1.6.5***, followed by ESIA that addresses sustainable finance requirements, providing a suitably robust baseline able to inform impact assessment against these requirements, particularly those that relate to modified, natural and critical habitat assessment and any requirements for no net loss or net gain.

Table 4.4: Survey Duration

Survey	Survey Duration	Full Survey Plan
Rapid Ecological Assessment	Within 1 months, between December 2020 and January 2021.	***Appendix E***
Bird Vantage Point Surveys	Within 6 months, between December 2020 and May 2021.	***Appendix F***
Bat Surveys	Total of 4 survey trips, 1 survey trip per month. Trip 1) 1 – 16 February Trip 2) 21 February – 8 March Trip 3) 14 – 29 March Trip 4) June, TBC	***Appendix G***

4.1.7 PS 7: Indigenous People

The local EIA suggests that there are mainly three ethnic groups, namely Triang Katu and Yae in the Project area that will be affected by development of Project. It includes some information on the ethnic communities but additional information will be required to determine whether they are considered indigenous. It is understood that Triang is identified as indigenous people according to technical note on indigenous People's Issue.[1] However, this needs to be further assessed to confim applicability of Free Prior and Informed Consent (FPIC).

4.1.8 PS 8: Cultural Heritage

The local EIA suggests that there are no resources of archaeological importance within the Project area based on the field data collected through consultation with the elderly, ethnic group leaders, or village administrative authorities in the villages. However, it indicates that there are holy, sacred and prohibited places within thevillages such as cemeteries and town spirits. The local EIA identifies four wind turbine towers (WTG13, WTG35, WTG36, and WTG84) which are located in the cemetery area of the villages. It is unclear if measures have been discussed to avoid such areas or if communities have been

[1] https://www.ifad.org/documents/38714170/40224860/laos_ctn.pdf/24089e12-d0e8-43db-9fb8-978b48526499

consulted of such possible impacts. The local EIA recognizes the unique intangible cultural heritage of each ethnic group and includes a discussion on the potential impacts e.g., disturbances from the Project activities on local cultures, customs, tradition, festivals beliefs, and conflicts between local people and workers; which may occur due to differences in culture and behaviour. The EIA includes mitigation measures for potential impacts on intangible cultural heritage such as, avoiding heavy work on important religious days, performing rituals before undertaking construction work according to local beliefs, raising awareness on local customs, traditions and practices for the workers, and promoting participation in traditional and cultural activities of the villages.

The local EIA does not include the possibility of chance finds during the construction phase.

4.1.9 Additional Requirements

4.1.9.1 Human Rights under Equator Principle IV

The potential human rights risks and impacts associated with the Project have not been assessed as part of the EIA. The EP IV, specifically Principle 2, requires an assessment of the potential human rights impacts as part of the ESIA or other assessment documentation.

To close the identified gap, a human rights impact assessment (HRIA), aligned with the UN Guiding Principles on Business and Human Rights (UNGP) is required. This will involve:

- **Preparation of an additional baseline data/survey** detailing the local context, including the applicable regulatory framework and an overview of human rights risks and challenges. This will involve the collection of primary and secondary data;
- **Engagement with key stakeholders**, including rights holders potentially impacted by the Project. This will include representatives from potentially affected communities as well as workers or worker organisations. This will involve engagement with potentially vulnerable groups. A representative sample will be engaged.
- **Assessment of the potential impacts and risks to rights holders** (e.g. nearby community members, direct employees, workers within the supply chain). This includes instances where the project may unwittingly contribute to human rights violations. The assessment should consider impacts and risks related to the project's supply chain; and
- **Selection of management measures** to mitigate the predicted impacts and risks, and identification of monitoring indicators to track performance over time.

Based on the information available, supply chain management is a key risk. Appropriate management measures will be required to mitigate the risk, based on the outcomes of the HRIA. This will involve development of a procurement procedure for be followed during construction and operation.

4.1.9.2 Transboundary Impact Assessment

The EIA does not include a cumulative impact assessment of the project, nor transboundary impacts between Laos and Vietnam.

5. SUMMMMARY AND RECOMMENDATIONS

This Section provides the summary of the key findings as well as the risk rating and the recommended actions to close each gap.

Table 5.1: Summary of Gap Assessment

Gap No.	IFC PS Para Ref. No's.	Non-Conformance/ Risk Significance	Description	Recommended Actions
PS 1 Social and Environmental Assessment and Management Systems				
1.1	5	Major	ESMS IEAD has not developed an ESMS for the Project yet. A project specific ESMS is required per IFC PS to help ensure the Project complies with government requirements, project commitments, and good international industry practice. However, since the Project is in the early stages, it may be in the process of being set up.	A structured and comprehensive ESMS policy, including an HSE Policy, land procurement policy, contractor selection and performance evaluation procedure, construction related SOPs on safety and environmental aspects, on-site and off-site emergency preparedness and response plan, community health and safety plan, HR Policy and procedures, etc. need to be developed and implemented.
1.2	8	Moderate	Identification of Risks and Impacts The Project's area of influence can be more clearly defined, indicating the impacts that are expected from the Project activities and how they justify the delineation of the area of influence. Currently status of all ancilliary facilities are not known or included in the Project footprint.	Clearly delineate the Project's area of influence, map and provide additional details of the Project's ancillary/associated project facilities (including the transmission line and access road). Include the ancillary/associated project facilities in the overall environmental and social impact assessment of the Project.
1.3	7	Major	Alternative Analysis The local EIA does not include details of proposed alternatives and justification for the selected alternative. IEAD is currently assessing three alternatives, and demonstrating how social and environmental concerns were undertaken to finalize the Project footprint will be key.	■ Include discussion on alternative analysis demonstrating social and environmental considerations.
1.3	8	Major	Cumulative Impacts Cumulative impact assessment is not included in the EIA. According to PS 1, para 8, the area of influence encompasses "cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and	■ Condcut a cumulative impact assessment as part of the E&S studies

Gap No.	IFC PS Para Ref. No's.	Non-Conformance/ Risk Significance	Description	Recommended Actions
			impacts identification process is conducted." A cumulative impact is not assessed at this stage.	
1.4	13	Moderate	Environmental and Social Management Program The ESMMP has been developed whichoutlines the mitigation measures, roles and responsibilities, monitoring methods, etc. However, mitigation measures will need to be detailed out in management plans. For instance, the ESMMP indicates that hazardous waste should be stored and handled separately with proper burying methods and locations; however a waste management plan on how that will be managed is not included. The SMMP was only available in Lao language and was not reviewed for this analysis.	■ Update the current ESMMP to meet the applicable lenders' standards ■ Develop specific management plan such as - Hazardous Waste Management Plan - Community Health, Safety and Security Management Plan (including considerations on gender based violenace and trafficking in persons induced from labor influx). - Contractor Management Plan
1.5	8	Moderate	Socio-economic Baseline undertaken for the local EIA doesnot include: ■ Gender disaggregated socio-economic data; ■ Socio-economic data on vulnerable individuals or groups directly affected by the Project, including informal settlers; ■ Poverty and vulnerability assessment; and ■ Corporate and Project policies and strategies for gender mainstreaming.	■ Additional data collection through FGDs and KIIs to fill the missing data gaps. ■ Conduct a Supplemental Poverty, Gender and Social Analysis
1.5	25-28	Major	Stakeholder Engagement, Stakeholder Analysis and Engagement Planning Stakeholder engagement activities i.e. public consultations have been undertaken, however there is no Stakeholder Engagement Plan.	■ Develop a Stakeholder Engagement Plan ■ Include vulnerable individuals and groups; timetable/periodicity of engagement activities; resources; and responsibilities;
1.6	35	Moderate	Grievance Mechanism A complaint handling mechanism is included. However, it is understood that this is for emergency response. A GRM has to be outlined in the EIA and implemented prior to any Project activities.	It is recommended that the Project develop a Stakeholder Engagement Plan to identify key stakeholders, and engagement policies with the stakeholders at the earliest, and establish a GRM to effectively and transparently manage and respond to community's grievances. As a best practice, setting up a Public Information Centre (PIC) to disseminate timely and accurate information on the Project including a grievance may be considered for the Project.

Gap No.	IFC PS Para Ref. No's.	Non-Conformance/ Risk Significance	Description	Recommended Actions
1.9	22	Aligned	Monitoring and Review The Project has developed an environmental and Social and Monitoring Plan (ESMMP) which covers roles, monitoring plan and activities during construction and operation phase.	Aligned
PS 2 Labour and Working Conditions				
2.1	8 - 9	Major	Human Resources, Policies and Procedures Human Resources Policy developed by the Project was not available for review to understand existing guiding principle, policy/principle/ code of conduct for probation, salaries, termination, retirement, retrenchment, leave, medical facilities, PF, gratuity, bonus, overtime, minimum wages, insurance and other provisions for both direct employees and contract workers. However, the EIA does indicate the relevant laws which specifies some of the above.	■ Develop an HR Policy, wherein defining different category of workforce (staff, workers, contractors etc.) including non-discrimination and equal opportunity, working conditions and terms of employment, prohibition against child labour/forced labour, overtime policy, sexual harassment, grievance procedure, termination, misconduct etc. as per applicable national laws and IFC PS 2. ■ Provide documented information that is clear and understandable that entails their rights under the national laws and their rights related to hours of work, wages, overtime, compensation, benefits, etc. ■ ERM understands that Lao Labor Law is largely in line with Performance Standard 2 on all key aspects. Lao Labor Law requires the Project to set-up labor units, prepare labor regulations for approval by the relevant government authority. It also includes monthly inspections by the Provincial Labor and Social Welfare Department. However, a detailed gap analysis should be considered to identify gaps.
2.2	20	Moderate	Worker Grievance Mechanism It is unclear whether a formal grievance mechanism is in place for employees of the project. It is not known if there have been any grievances and how they are currently reported.	■ As a good practice, a common grievance policy should be developed with a set procedure for any internal complaints pertaining to the workforce and employees in a timely manner; ■ The particulars of the grievance procedure should be communicated adequately to all the employees/staff/workers; and ■ The procedure should also have scope for receiving/addressing anonymous complaints.
2.3	21 - 22	Major	Child Labour and Fored Labour	■ The policy against child labour should be conveyed to all the staffs;

Gap No.	IFC PS Para Ref. No's.	Non-Conformance/ Risk Significance	Description	Recommended Actions
		Major	There are no specific policies with regards to child labour and forced labour, which states the non-tolerance to employment of child labour.	■ The contractor agreements also need to have a clause stating prohibition of child labour – that any individual less than the age of 18 years will not be employed by the contractor for work in the project.
2.5	24 - 26		Workers Engaged by third parties A contractor management system to oversee the activities undertaken by contractors' workers at any of the sites should be included in the EIA. Compliance with this requirement is not described specifically in the EIA documents	■ The company is required to formulate robust contractor management plan to set out the process for managing contractors, including contractor selection, mobilisation and demobilisation, payments and invoicing, and monitoring to ensure compliance with the Project's expectations with regards to labour and working practices.
2.6	5	Minor	Occupational Health, Safety and Security The ESIA includes the assessment of health and safety impacts of Project to workers and surrounding communities, together with proposed mitigation measures to some extent. The ESMMP includes: ■ Health and safety management plan which outlines personal safety, equipment and machinery safety, and safety monitoring. ■ Monitoring and evaluation of health and safety to ensure that the contractor/sub-contractors adhere to health and safety requirements ■ Emergency Response Plan (construction phase)	■ The Project has to ensure adequate monitoring of implementation of contractor management plans to verify that contractors and sub-contractors engaged during the construction phase comply with IFC requirements with regards to occupational health and safety, labour conditions, environmental performance and community engagement. This should at a minimum include personal safety, equipment and machinery safety, safety inspection, fire prevention, and emergency plan amongst others. ■ For example, as a best practice EHS training needs to be identified and training to be provided to by competent person. Training on the use of PPEs to be given to the workers. It is to be ensured that PPEs are worn without fail. Training on first aid also needs to be provided to the workers. Records of all training including tool box talks to be maintained. ■ Prepare a contractor management plan
PS 3 Resource Efficiency and Pollution Prevention				
3.1	4	Moderate	Air Quality ■ Air quality baseline data that was collected has not covered all parameters that is required by the WBG EHS General Guidelines ■ Local EIA study does not cover all potential sources of impact on air quality	■ Consider updating the SP 2: Air pollution and quality management to consider the use of electric vehicles and equipment to reduce air emissions. ■ Update SP 3: Noise and Vibration Management to include measures as detailed in the IFC EHS Guideline 1.7 Noise and other GIIP.

Gap No.	IFC PS Para Ref. No's.	Non-Conformance/ Risk Significance	Description	Recommended Actions
			Ambient Noise ■ No noise impact assessment was conducted for construction phase ■ Noise monitoring were conducted for 24 hours, whereas IFC standards require 48 hours Shadow Flickering ■ Shadow flickering impact assessment indicates there were no receptors potentially impacted by the Project at a significant level. Water Quality ■ The local EIA Study has conducted water quality impact assessment through a descriptive manner without quantitative analysis. ■ The local EIA report is silent on the groundwater impact from the Project activity and surface runoff and infiltration from the Project site.	■ Provide mitigation measures for shadow flickering measures to further reduce or compensate the shadow flickering impact towards the receptors ■ Provide additional information, such as the quantity and type of wastewater expected from the Project site in order to determine the level of impact significance. ■ Undertake additional surface water samplines and conduct laboratory analysis
1.1	7	Major	Climate Change Assessment and Climate Change Resilience Local EIA does not include any study related Climate Change impact assessment and Climate Change Resilience.	■ Conduct Climate Change impact assessment and Climate Change Resilience.
PS 4 Community Health, Safety and Security				
4.1	5	Major	Community health, safety, and security The EIA discusses the communities exposures to risk of natural disaster and unexploded ordnance (UXOs), potential impacts of traffic on communities, the use of water resoruces, and potential impacts of waste management to communities exposure to dieases. The ESSMP includes UXO survey and clearance plan, waste control plan and traffic management plan. However, the EIA does not assess the impacts of worker influx, the effects of construction activities (noise, dust, wastewater, etc) on community health and safety.	■ Develop a Community Health and Safety Management Plan which includes attention on labour influx such as communicable diseases, particularly COVID-19. ■ Develop a workers code of conduct to avoid potential risks of trafficking and security to the local communit, especially on women and vulnerable groups. ■ Develop wastewater management plan ■ Update traffic management plans to include considerations of transportation of waste and hazardous materials

Gap No.	IFC PS Para Ref. No's.	Non-Conformance/ Risk Significance	Description	Recommended Actions
4.1	11	Minor	Emergency Preparedness and Response The EIA documents include a framework emergency preparedness and response plan. This is acceptable, because a detailed emergency plan can only be developed once the institutional arrangements, project organization and EPC contractor are in place and the detailed design is well advanced. However a framework can be developed early on in the project.	■ Develop a detailed emergency response plan/framework.
4.5	8	Major	Ecosystem Services The EIA remains lacked in details on ecosystem services and does not include ecosystem service screening and prioritization as per IFC PS6 Strategies to mitigate the loss of ecosystem services should be included in the EIA.	■ Collect additional information on ecosystem services. ■ Conduct ecosystem services screening and prioritization in compliance with IFC PS6 and the WRI guidance. ■ Develop mitigation measures in compliance with IFC PS6.
4.2	12	Major	Security Personnel Details about security personnel are not included in the available documentation and will likely be developed by the project once the project organization is set-up and in place.	■ Include details on security personnel. ■ Establish a code of conduct.
PS 5 Land Acquisition and Involuntary Resettlement				
5.1	12	Major	Land requirement and census survey ■ No physical displacement is envisioned under the current project design. ■ The extent of economic displacement and the census information of the households affected by economic displacement are not detailed out in the local EIA ■ Customary land ownerhip and land legacy issues will need to be further assessed. ■ Limited discussion on vulnerabilities, particularly among Project Affected Persons (PAPs)	■ Conduct census survey, asset inventory, and replacement cost valuation in compliamce with IFC PS5 requirements. ■ Conduct vulnerability analysis (including gender, poverty, disability and other forms of vulnerabilities)
5.2	9	Major	Resettlement and Livelihood Restoration Plan Currently a resettlement action plan/ and or a land acquisition (livelihood restoration plan) is not developed for the project.	■ Develop the following plans as per IFC PS 5

Gap No.	IFC PS Para Ref. No's.	Non-Conformance/ Risk Significance	Description	Recommended Actions
				■ Develop a land acquisition plan inclusive of a livelihood restoration plan (LRP) in case of economic displacement. ■ Develop a resettlement action plan (RAP) if physical displacement is confirmed
PS 6 Biodiversity Conservation and Sustainable Natural Resource Management				
6.2	16-19	Major	A formal Critical Habitat assessment has not been prepared, despite evidence that the Project is likely located within Critical Habitat.	A Critical Habitat assessment should be prepared, and if it is determined that the Project will affect Critical Habitat, a Biodiversity Action Plan should be prepared. The Biodiversity Action Plan should set out the strategy for achieving net gain of the biodiversity values for which the Critical Habitat has been identified.
6.5	20	Minor	The Local EIA has provided mitigation measures to reduce impacts to forest resources, wildlife, and aquatic biological resources. Measures for compensation through reforestation has also been provided. According to the REA survey, the Project is located within locally protected forest. The Project is also located within KBAs, for both the Wind Farm and the northern end of the Transmission Line. The Project does not overlap with projected areas, but is located nearby, there are no measures that address the nearby protected areas.	The strategy to preserve the values for which the locally protected forest and protected areas were originally protected and any residual impacts on their function should be included in the ESMP and EIA, respectively.
PS 7 Indigenous Peoples				
7.1	10	Major	<u>Participation and Consent</u> It is unclear whether indigenous people are present in the Project footprint. Further assessment to identify indigenous presence is needed.	■ Collect additional data on cultural heritage resources ■ Establish if Indigenous People are affected by the Project. ■ If the Project establishes that there are indigenous people, Free Prior and Informed Consent (FPIC) process will need to be followed.
PS 8 Cultural Heritage				
8.1	6	Moderate	The local EIA identifies that four wind turbine towers are located in the cemetery area of the villages. It is unclear what avoidance measures were undertaken.	■ Develop cultural heritage management plan ■ Avoid cultural heritage sites to the extent possible ■ Coordinate with local authorities and communities to identify appropriate management measures for such impacts

Gap No.	IFC PS Para Ref. No's.	Non-Conformance/ Risk Significance	Description	Recommended Actions
				■ Develop a cultural heritage management plan.
8.2	8	Moderate	Chance Finds Procedure Chance Finds Procedure is critical in cases where cultural heritage resources are identified during the construction phase. The EIA does not include and a cultural heritage management plan.	■ Develop a detailed chance finds procedure as a part of the ESMS
9. Additional Requirements				
9.1	EP4, Principle 2	Major	Human Rights The potential human rights risks and impacts associated with the Project have not been assessed as part of the EIA.	■ Conduct a human rights impacts assessment (HRIA)
9.2	N/A	Major	Transboundary Impact Assessment The EIA does not currentlya transboundary impact assessment	■ Conduct transboundary impact assessment

Note:

[A] Colour Coding

	Major	Information available indicates the Project does not fulfil the requirement. Material regulatory permitting non-compliances and other risk-based issues that may: ■ Would require more than US$ 500,000 to rectify; ■ May result in significant business interruption or delay in Project development; ■ May result in criminal proceeding or a major environmental incident; ■ May result in community or Non-Government Organisation ("NGO") protest; or ■ Could result in risk of multiple serious injuries or fatalities.
	Moderate	Regulatory permitting non-compliance, which may result in non-material rectification cost or fine, and is unlikely to result in the short term in business discontinuity in current regulatory enforcement context.
	Minor	Information available indicates the Project partially fulfils the requirement and/or is partially aligned with intended outcome of the requirement. Non-compliance to Applicable Standards, which may result in minor cost or only requires management time to address the issue.
	Aligned	Information available indicates the Project fulfils the requirement and is aligned with the intended outcome of the requirement.

6. CONCLUSION

The proposed Wind Power Project is a major contribution to the generation of renewable energy and minimizing GHG emission. Despite this, the Project does pose some environmental and social risks that are not yet accounted in the local EIA and that which deviates from some guidance on the international standards. While the details of the gaps are discussed in the preceding Sections, the most challenging gaps with international standards for the Project to comply with include the following:

- IFC PS 1 – The EIA does not include alternative analysis, Environmental and Social Manageement System (ESMS) and cumulative impact assesment which are critical to ensuring environmental and social safeguards during Project implementation. In addition, a stakeholder engagement plan, and cumulative impact assessment is not included in the EIA.
- IFC PS 5 – EIA does not clearly identify impacts on private land, land use and does not include a resettlement or livelihood restoration plan. It is understood that this will be developed following the finalization of the alternatives currently being considered.
- IFC PS 6 – the EIA acknowledges that the Project will impact both natural and critical habitat, but a Critical Habitat Assessment has not been prepared, despite evidence that the Project is likely located within Critical Habitat. Several surveys including VP surveys, and Bat Surveys will require seasonal surveys requiring extended period of time for survey completion. A REA survey is also required to identify whether additional specialized surveys (such as mammals, fish, herpetofauna, etc.) are required.
- IFC PS 7 – It is not clear from the EIA if the ethnic communities within the Project are considered as Indigenous communities. FPIC is a “lightning rod” issue that will get a lot of international scrutiny. The Project will need to confirm and document the indigenous screening process.

There are several other gaps with international standards as suggested in Table 5.1, but these can be readily addressed. These gaps are not surprising as the Project EIA documentation was not specifically prepared to comply with the International Standards. We do note, however, that some key management measures, such as a Project-specific Environmental and Social Management System, and a detailed Environmental and Social Management Plan, will need to be prepared.

The next phase would be to fill these gaps through supplementary environmental, social and health studies to conform to the Lender’s requirements. Refer to ***Chapter 7*** for the detailed ToR for supplementary studies for gap closure.

7. SCOPE OF WORK FOR PHASE 2

This section provides a scope of work for the next phase to update the key E&S documents to fulfill the gaps by conforming to the lenders requirements as following. Each task is detailed out in the subsequent sections.

- Task 1: Update Project Description and Alternatives
- Task 2: Collect Supplementary Social, Physical and Environmental Data
- Task 3: Supplementary Environmental Studies and Plans
- Task 4: Impact Assessment for Supplemenetary E&S Studies
- Task 5: Management Plans for Supplementary E&S Studies
- Task 6: Cumulative Impact Assessment
- Task 7: Transboundary Impact Assessment
- Task 8: Environmental and Social Management System (ESMS)
- Task 9: Non-Technical Summary (NTS)

7.1 Task 1: Supplementary Project Alternative Analysis

Conduct alternative analysis for the Project, taking into considerations the Project alternative feasibility and potential environmental and social impacts.

7.1.1 Scope of Work

- Review existing data about the proposed alternatives (e.g., alternative technology, alternative location for project site, optimization of turbine design)
- Assess potential physical and economic impacts for each alternative
- Assess the area of protected area and/or natural habitats (e.g., forest) to be impacted by each alternative
- Develop E&S metrics to evaluate alternatives and compare alternatives
- Provide detailed justifications for the selected alternative

7.1.2 Deliverable

- Additional Alternative Analysis section in compliance with Applicable Lenders' Standards in the Supplementary E&S Studies.

7.2 Task 2: Collect Supplementary Social, Physical and Environmental Data

7.2.1 Task 2.1: Social Baseline Survey

Collect additional baseline data to form part of the Supplementary E&S Studies (e.g., poverty, gender, cultural resources, ethnic groups, ecosystem services, community resources, land tenure and ownership including legacy issues, community development initiatives etc.)

7.2.1.1 Scope of Work

Additional data collection and analysis will include the following:

- Review the existing socio-economic data and reprocessing the available socio-economic data to meet the Lenders requirements including poverty and vulnerability analysis etc.
- Collect additional socio-economic baseline data to meet lenders' requirement which includes but not limited to the following:
  - Gender disaggregated socio-economic data;
  - Socio-economic data on vulnerable individuals or groups directly affected by the Project, including informal settlers;
  - Data on ethnic communities, and dependency on natural resources, customary practices and cultural practices;
  - Data on ethnic communities, customary land ownership, customary social structures etc.;
  - Data on community resources and ecosystem services;
  - Data on land ownership, land tenure, customary land ownership and land tenure issues;
  - Data on community health; and
- Prepare a detailed socio-economic profile of affected people (including distinction between directly and indirectly affected including consideration of gender aspects);
- Identification of social impacts and risks, and the key constraints faced by people directly and indirectly impacted by the Project

- Data on corporate level gender analysis to identify proactive measures on gender mainstreaming at the corporate level etc.

7.2.1.2 Deliverables

- Additional baseline data (primary and secondary) in compliance with Applicable Lenders' Standards in the Supplementary E&S Studies.
- Additional Cumulative Impact Assessment (refer to Task 9).
- Supplementary ESMP (refer to Task 11).

7.2.2 Task 2.2: Physical Baseline Survey

In order to appreciate the changes of Project description and its associated potential impacts, additional set of physical baseline sampling and survey will be needed to understand the current baseline condition at the respective revised receptors. It is understood that additional noise and landuse survey is being conducted and will form part of updated EIA 2020.

7.2.2.1 Scope of Work

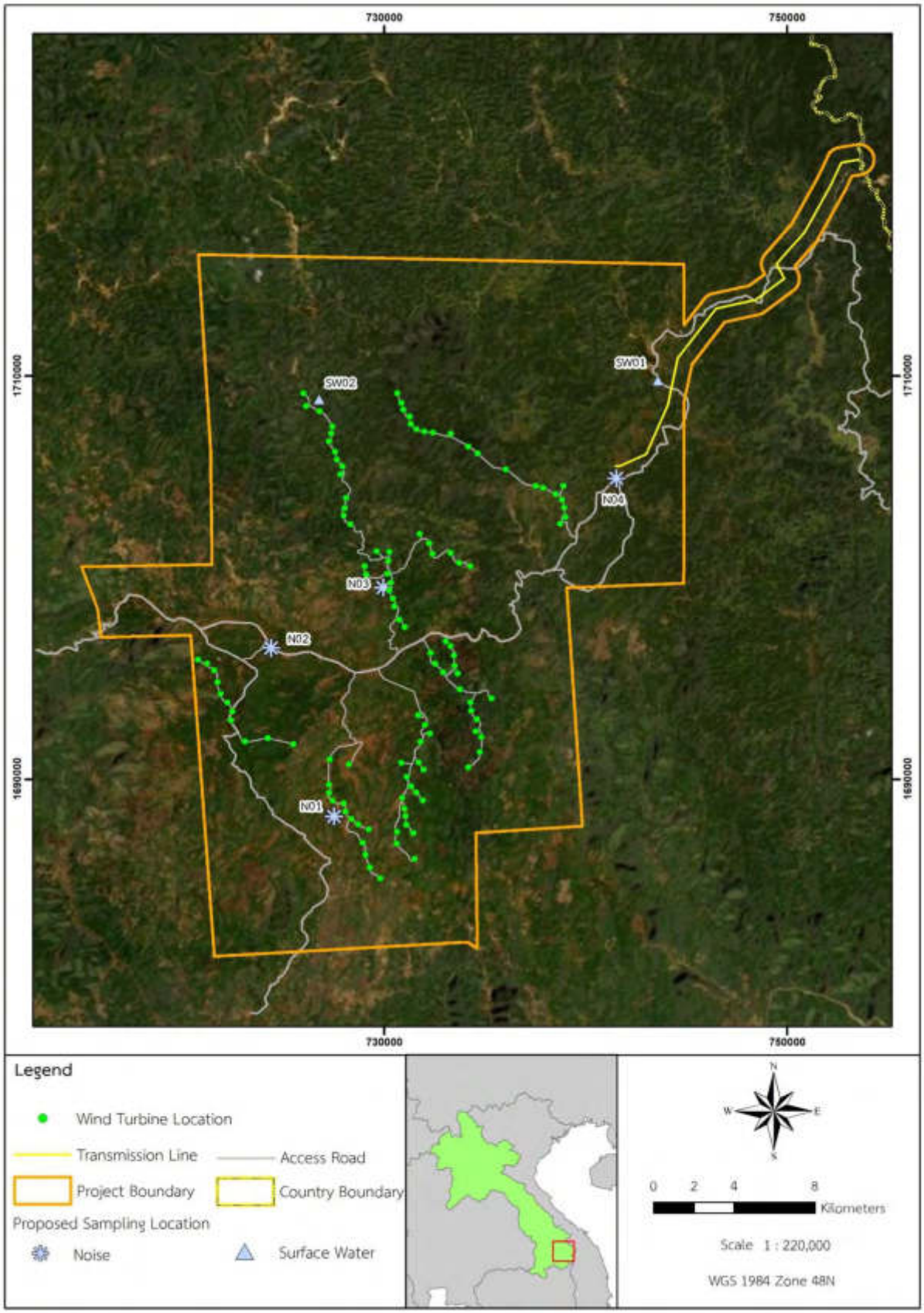
- Based on the data gaps identified with the current information on the existing environment in the Project Study Area, physical baseline sampling is proposed to be conducted as detailed in ***Table 7.1*** with key locations as shown in ***Figure 7.1***. The purpose of this survey plan is to provide a suitably robust baseline that is able to inform the impact assessment against the appropriate requirements.
- The baseline sampling and survey is required to be conducted once during the ESIA upgrade study.

Table 7.1: Summary of Physical Baseline Sampling Details for ESIA

Physical Aspect	Location	Proposed Parameters and Methodology	Remark
Ambient Noise	■ Four (4) additional ambient noise monitoring at the same four (4) locations	**Parameter:** ■ One Hour LAeq (dBA) **Methodology:** ■ Calibration before and after measurement ■ Monitoring undertaken in accordance with ISO 1996 -1:2003 at Noise monitoring should be carried out using Type 1 or Type 2 sound level meter as per IFC standards ■ To be conducted over 3 days or consecutively 48 hours	Additional surveys are recommended to complete the monitoring with sufficient duration to comply with IFC standards.
Surface Water Quality	■ Two (2) additional surface water sampling at two (2) new locations	**Observations:** ■ Odour, Colour, and Turbidity **In-situ measurements:** ■ pH, ORP (Oxidation Reduction Potential), DO (Dissolved Oxygen), Conductivity, Salinity, TDS (Total Dissolved Solids), Water Temperature, and Water depth **Laboratory analysis:** ■ Calcium, Magnesium, Sodium, Potassium, total hardness CaCO3, alkalinity as CaCO3, Sulphate, Chloride, Total Suspended Solids, Total Coliform Bacteria, Oil and Grease,	Additional surveys are recommended as there may be potential river/creeks along the transmission line and wind turbines. This will however be confirmed during the

Physical Aspect	Location	Proposed Parameters and Methodology	Remark
		Total Nitrogen, Total Phosphorus, Ortho-Phosphorus, Ammonia, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Mercury, Cadmium, Arsenic , Iron, Aluminium, Manganese, Lead, Zinc, Copper, Nickel, Nitrate, and Nitrite **Other related measurements:** ■ Ambient temperature	Supplementary E&S Phase.

Figure 7.1: Proposed Physical Baseline Sampling Location



Source: Innogreen Engineering Company, 2016 (modified by ERM).

7.2.2.2 Deliverables

- Ambient Noise Monitoring Results
- Surface Water Quality Survey Results

7.2.3 Task 2.3: Noise and Vibration and Shadow Flickering

Review the noise and vibration assessment in the government approved EIA, including proposed mitigation measures and monitoring pan and determine whether these meet GIIP and WBG EHS Guidelines.

7.2.3.1 Scope of Work

Building on the review under Phase 1 of the noise assessments provided in the domestic EIA documents prepared for the project and conduct the following:

- Determine whether the methodologies used to calculate the noise impacts are appropriate and based on GIIP.
- Review applicable national and local environmental laws, regulations, and requirements both during construction and operation and provide a regulatory review to clarify noise limits / good practice levels applicable to the project (based on national laws, Municipal planning, and applicable and relevant good international practice recommendations and guidelines (including, but not limited to, the WBG EHS Guidelines).
- Determine whether the reported noise impacts are accurate, including noise levels/impacts at roadside. The determination should be supported by developing and running a noise propagation model without and with simulation of proposed mitigations, according to good international industry practice. Prepare noise maps of areas outside infrastructure boundaries based on the forecasted traffic during the concession for the various noise threshold references. Conduct an analysis of the areas above threshold limits and determine an approximate count of buildings impacted and their typology in case an insulation program is required.
- Revise the Noise and Vibration, and Shadow Flickering assessment according the updated Project Layout.
- Determine whether the proposed mitigation measures are sufficient for complying with applicable national regulations, WBG EHS Guidelines and applicable good international industry practices, including recommendations by WHO on railways noise.
- Propose new and/or additional mitigation measures, as necessary

7.2.3.2 Deliverables

- The supplemental study should incorporate results of the analyses including the revised assessment, and proposed new and/or additional mitigation measures, as necessary.

7.2.4 Task 2.4: Biodiversity Baseline Survey

Complement the available biodiversity baseline data and assessment available in the regulatory EIA and other available secondary sources to prepare a suitable, fit-for-purpose biodiversity impact assessment and corresponding plans.

7.2.4.1 Scope of Work

- Conduct the field surveys as per the Biodiversity Survey Approach provided and approved at the issue of Phase 1.

- Analyse survey results from Rapid Ecological Assessment (REA), Bird Surveys, Bat Surveys, and detailed surveys.
- Prepare an impact assessment and the relevant action/management plan in accordance with the Lenders' Applicable Standards .Prepare an ecosystem services review compliant with Lenders' Applicable Standards (e.g. IFC PS6) by using information from the biodiversity baseline and data and information collected in addressing gaps 1 and 2.

7.2.4.2 Deliverables

- REA survey results
- Bird survey results
- Bat survey results
- Detailed survey results

7.3 Task 3: Impact Assessment for Supplementary E&S Studies

As the Project description has encountered multiple changes that may significantly alter the result of physical, social and environmental impact assessment (these aspects include, but are not limited to, air quality, ambient noise, water quality, groundwater, shadow flickering, soil, social impacts, environmental impacts). Impact assessment thus will need to be updated to incporate all foreseeable impacts, and clearly indicate residual impacts.

7.3.1 Task 3.1: Impact Assessment for Physical Resources

- Reassessing relevant impacts under the most updated Project design is required. Some of the key Project changes includes:
  - Number of wind turbines;
  - Location of wind turbines;
  - Specification of wind turbines (e.g. turbine size, turbine height); and
  - Design of project associated facilities (e.g. access road, transmission line route, and substation).
- Assigning of sensitive receptors shall be determined based on the closest household to the Project component (does not require to be a group of settlement but individual households are sufficient to be accounted as a sensitive receptor), and assessment of impact shall be in reference to these sensitive receptors. Remodelling (i.e. noise and shadow flickering) shall be conducted again based on updated Project design to understand the revised impact significance.
- Furthermore, based on the revised assessment, appropriate mitigation measures and monitoring programs shall be proposed to minimise the impact to an acceptable level (and as low as reasonably practicable) and observe the performance of the mitigation measures, respectively.
- As indicated herein above, the following impact assessment and additional mitigation measures to form part of the ESMP shall be conducted:
  - Air Quality during construction shall consider dust dispersion from vehicles travelling long range for transporting materials. Further consideration is required for additional sensitive receptors (i.e. settlements) along the transportation route. The additional mitigation measures will be required as part of the ESMP;
  - Re-modelling Noise and Shadow Flicker to reflect the final project design and turbine location and specifications;

- Obtain additional information on wastewater, waste and run-off water management during construction and updated the mitigation measures and monitoring programme in the ESMP; and
- Conduct the Climate Change Impact Assessment, especially during construction and conduct an additional study on Climate Change Resilience of the Project.

- Moreover, the Project shall also adopt and comply with the IFC guidelines and standards as applicable and relevant to the Project (i.e. general and sector specific)

7.3.1.1 Deliverables

- Physical Impact Assessment for supplementary E&S Studies

7.3.2 Task 3.2: Biodiversity Impact Assessment

As the Project description has encountered multiple changes that may significantly alter the result of biodiversity impact assessment.

7.3.2.1 Scope of Work

- Prepare an impact assessment and recommend reasonable management and monitoring measures to mitigate or eliminate the potential negative effects and to enhance positive benefits. Examples of the sub-topics for the biodiversity impact assessment include, but are not limited to:
  - Permanent and temporary loss of habitat
  - Temporary disturbance or displacement of fauna
  - Temporary and permanent barrier creation, fragmentation and edge effects
  - Temporary degradation of habitat
  - Mortality – Vehicle strike, hunting and poaching
  - Ecosystem Services (as per Task 4.3)

7.3.3 Task 3.3: Ecosystem Services Screening and Assessment

Based on the results of the desktop assessment (Task 2.2), an Ecosystem Services Screening (ESS) and Assessment (ESA) shall be conducted according to the 2019 IFC PS6 Guidance.

The IFC performance standards require projects to assess and preserve the benefits from ecosystem services. The IFC also requires that the environmental and social risks and impacts identification process considers a Project's dependence on ecosystem services. A fundamental component is to apply the mitigation hierarchy to determine measures to limit impacts on ecosystem services.

7.3.3.1 Scope of Work

- Screen existing information to identify ecosystem services values being used by the Project or are being relied upon by local people. It should be noted that if ERM identifies data gaps, field assessments may be recommended to collect contemporary data for the assessment.
- The ESS and ESA shall comply with the World Resources Institute (WRI) Guidelines: Weaving Ecosystem Service into Impact Assessment to guide the approach used to assess ecosystem services in relation to the project. The ecosystem services review will be undertaken following a five-stage approach (WRI 2014)

7.3.3.2 Deliverables

- Screened ecosystem service values associated with the project area used by the Project or depended upon by local people

- Scoping of ecosystem service values and prioritization
- ESA and mitigation measures

7.3.4 Task 3.4: Social Impact Assessment

Based on the additional social data, assess additional impacts to be included in the Supplementary E&S Studies.

7.3.4.1 Scope of Work

- Identify additional social impacts from the additional data collected through FGDs and KII;
- Assessement of how such impacts can be avoided; and
- Propose mitigation measures to address such impacts.

7.3.4.2 Deliverables

- Social Impact Assessment for Supplementary E&S Studies

7.3.5 Task 3.5: Critical Habitat Assessment

Based on the results of the desktop assessment (Task 2.2), a Critical Habitat Assessment (CHA) shall be conducted according to the thresholds for Critical Habitat Criterion 1-5 (as outlined in the 2019 IFC PS6 Guidance

7.3.5.1 Scope of Work

- Collate species that potentially exist or were detected within the Project area from existing studies, relevant data from the Integrated Biodiversity Assessment Tool (IBAT), WWF EcoRegion and other relevant online databases.
- Collate species that were identified during the REA or further detailed surveys.
- Define an Ecologically Appropriate Area of Analysis (EAAA) to assist in defining critical habitat values as required by IFC PS6. The EAAA will be delineated based on a defined ecological management unit associated with the Project. This would constitute intact terrestrial and aquatic landscapes contiguous with the Project area.
- Based on the EAAA and species list, the relevant thresholds contained within the IFC PS6 Guidance Note will be used to determine whether critical habitat would be triggered by the species assessed.

7.3.5.2 Deliverables

- Defined EAAA for the Project
- Results of the CHA

7.3.6 Task 3.6: Climate Change Assessment

- Quantify Scope 1 and 2 Greenhouse Gas Emissions
- Assess the project's physical resilience to climate related adverse weather events (or verify that these have been considered in engineering design)

7.3.6.1 Scope of Work

The supplemental study will consist of the following:

- Calculation of greenhouse gas (GHG) emissions/reduction which will (i) estimate greenhouse gas (GHG) emissions and/or abatement by the project, and (ii) if applicable, recommend mitigation measures for GHG emissions from the operation of the project and cost of implementing such measures.
- Climate risk assessment which will require the (i) review site conditions, and secondary and/or historical meteorological data and determine potential climate related risks to the project and its components, (ii) review the engineering design and determine whether adaptation measures to climate risks were incorporated, and (iii) identify adaptation measures in the design, construction and operation of the project facilities, as necessary, including the cost of construction/implementation of such measures
- Identification of potential E&S effects due to project underperformance, triggered by climate change (climate drivers and related hazards). The analysis should be carried out with respect to Global Circulation Model (GCM) Scenario Result for 2025, 2050 and 2100 and variability of climate parameters and extreme weather events projected for the project location.

7.3.6.2 Deliverables

- GHG Emission Inventory and Climate Risk Assessment Report

7.4 Task 4: Management Pland for Supplementary E&S Studies

Based on the impacts above, develop management plans for the pontential impacts assessed above. This will include 1) Preparing additional management plans to address new impacts not currently identified 2) Updating the existing management plans.

7.4.1 Task 4.1: Biodiversity Action Plan (BAP)

According to IFC Performance Standard (PS) 6, “18. In such cases where a client is able to meet the requirements defined in paragraph 17, the project’s mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains15 of those biodiversity values for which the critical habitat was designated.” Therefore, if it is determined that the Project will affect Critical Habitat, as per the results of the CHA, a BAP should be prepared.

7.4.1.1 Scope of Work

- Conduct a CHA, as per Task 4.3.
- Determine if the Project will affect Critical Habitat, in accordance with the IFC PS6 Guidance Note.
- Prepare a BAP for the Project, ensure the following elements are included:
  - Composite of actions and a rationale for how the project’s mitigation strategy will achieve net gain (or no net loss).
  - The approach for how the mitigation hierarchy will be followed.
  - The roles and responsibilities for internal staff and external partners.

7.4.1.2 Deliverables

- Biodiversity Action Plan

7.4.2 Task 4.2: Stakeholder Engagement Plan (SEP)

The Consultant is expected to develop a Stakeholder Engagement Plan inclusive of a grievance redressal mechanism. Implementation of the SEP will be the responsibility of the Project including addressing and managing all grievances from the stakeholders.

7.4.2.1 Scope of Work

- Re-visit the stakeholder lists, conduct stakeholder mapping and indicate the most appropriate methods to engage with each stakeholder groups, understand the interest and influence of each stakeholder groups on the Project, including frequency and messaging for each consultation
- Ensure that all stakeholder engagement plan proposes safety measures for consultations in the context of COVID-19

7.4.2.2 Deliverables

- Stakeholder Engagement Plan

7.4.3 Task 4.3: Grievance Redress Mechanism

Currently, a grievance mechanism has been developed as part of the local EIA, however it is limited in details and is hence required to be updated to meet Lenders' Applicable Standards. The Grievance Redress Mechanism (GRM) should cover all phases of the Project. While the Consultant shall be responsible for revisiting and finalizing rhe GRM with the Client, the Client shall be responsible for managing and addressing the grievances.

7.4.3.1 Scope of Work

- Review of existing grievance outline in the Draft EIA report
- Propose a GRM (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints from both local communities, workers, and subcontractors, about environmental and social performance.
- Propose ways to communicate GRM to workers and the affected communities.
- Provide a mechanism on how grievance/complaints can be recorded and document

7.4.3.2 Deliverables

- Grievance Redress Mechanism

7.4.4 Task 4.4: Land Acquisition, Resettlement and Livelihood Restoration Planning and Implementation

The Consultant shall be responsible for preparing the Resettlement Action Plan as per the Lenders requirements. This will include consultations with the affected households, conducting asset inventory and socio-economic surveys for each household. All permits and clearances that may be required to enable such consultations will be facilititated by the Project. The Project shall also be responsible for providing georeferenced land parcels and land ownership details. The Project will also be responsible for coordinating with the resettlement committees and getting any approval that may be required through such committees.

7.4.4.1 Scope of Work

- Benchmark the government-led process against Lenders' Applicable Standards
- Conduct census surveys for RAP (asset inventory and socio-economic surveys) to include all Project impacted entities including informal settlers/users, vulnerability analysis amongst others
- Identification of impact on livelihood and alternative livelihood options
- Consultation with project affected households to ensure informed consultation and participation
- Communication of a grievance mechanism prior to survey commencement
- Disclosure of draft RAP prior to finalizationation

7.4.4.2 Deliverables

- Resettlement Action Plan or a Livelihood Restoration Plan as appropriate.

7.4.5 Task 4.5: Supplemental Social Management Plans

Additional field surveys indicated in Task 2 (Section 7.2) collected during the second phase will infor the following plans. To avoid, stakeholder fatigue, the Consultant shall agree on all plans with the Project to collect sufficient information to develop such plans as indicated below.

7.4.5.1 Scope of Work

- Prepare supplementary social plans based on the socio-economic baseline, social analysis and stakeholder engagement
- Complement the data available in the local EIA and other available secondary sources to prepare social plans that are participatory, socially and gender sensitive and inclusive, which include (but not limited to) the followings:
  - **Ethnic Minority and Vulnerable People Development Plan**
    - To identify ethnic groups, marginalized groups and associated vulnerabilites present within the Project location
    - Propose avoidance and mitigation measures for any such potential impacts
    - Propose measures such that ethnic minority and vulnerable people can equally benefit from the Project
  - **Community Development Plan/Benefit Sharing Plan**

    The Project has developed a community development plan to ensure that Project benefits are maximized for the directly and indirectly affected Project households. The Consultant shall revise and assist in plan finalization.
    - Review the Benefit Sharing Plan developed by the Project to identify gaps
    - Strengthenprogram interventions to maximize Project benefits including:
      - Monetary benefit sharing: sharing part of the revenue (through taxes and royalties) generated by the Project operation with the local communities such as revenue sharing, preferential electricity rate, community development fund, and payment for environmental and ecosystem services etc.
      - Non-monetary benefit sharing mechanism such as improved infrastructures, support for health and education programs, vocational training programs and employment.
    - Identify implementation modalities to complement with existing government programs to avoid duplication
    - Establish monitoring mechanism to monitor project impacts.
  - **Gender Action Plan (GAP)**
    - Develop GAP based on based on gender-disaggregated data
    - Identify vulnerabilities and propose measures to reduce any Project induced impacts disproportionately on women (e.g gender based violence, impact from land acquisition etc).
    - Propose measures for equal participation of women and men in all Project activities
    - Provide equitable access to project and program resources such as skill trainings, job opportunities

- Improved practical benefits for women in the Project area such as increased job opportunity and income for women, and more livelihood options
- Ensure safety of children and women, specially facing the increased vulnerability of children and women as a result of migrant labour influx into the communities.
- Ensure livelihood restoration programs to mitigate disproportionate Project impacts on women (e.gdecrease in availability of non-timber forest resources which is one of the major sources of livelihood for women)

- **Cultural Heritage Management Plan**
  - Regular consultations with the local communities to notify them of construction work;
  - Maintenance and updating a central list of tangible cultural heritage around the Project areas for avoidance of heavy transport (to mitigate potential vibration damage); and
  - Ensuring that all ancillary Project facilities, including labour camps, are set up away from cultural heritage sites.
  - Cultural Heritage Management Plan should include the Chance Finds Procedure which includes the following required actions:
    - Establishment of protection area around the find where no further work can be undertaken;
    - Clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds;
    - Record keeping and expert verification procedures;
    - Chain of custody instructions for movable finds including coordination with relevant GoL agencies;
  - An outline of the roles, responsibilities and response times required from Project staff, and any relevant heritage government authority, as well as any agreed consultation procedures

7.4.5.2 Deliverables

- Ethnic Minority and Vulnerable People Development Plan
- Community Development Plan/Benefit Sharing Plan
- Gender Action Plan (GAP)
- Cultural Heritage Management Plan

7.4.6 Task 4.6: Labour and Working Conditions

- Assess labour and working conditions risks linked to third party workers (contractors and subcontractors) and the supply chain (procured goods and materials) against the Lenders' Applicable Standards
- Develop policies and procedures to mitigate such risks
- Cascade requirements to contractors and subcontractors (labour and working conditions, forced labour, migrant workers, worker accommodation standards, code of conduct, etc.)

7.4.6.1 Scope of Work

The supplemental study will consist of the following:

- Review extent to which labour issues are addressed in the ESMP and check if project related labour issues will be implemented and monitored against labour laws and Lenders Applicable Standards

relate to labour and working conditions. If ESMP does not cover labour management and monitoring of compliance with labour laws and Lenders' Applicable Standards, assist to prepare the following:

- Assessment of labour and working conditions risks for workers engaged by third parties" (i.e. workers working for contractors, subcontractors, service providers) and supply chain (i.e. suppliers who, on an ongoing basis, provide goods or materials essential for the core business processes of the project " including offsite facilities operated by the Contractor or contracted third party to manufacture components of the project) particularly for migrant labour if such is anticipated by the Contractor
- Develop policies and procedures to be implemented by contractors (labour and working conditions, forced labour, worker accommodation standards, migrant workers, code of conduct, SEAH and anti-GBV policies and training for construction contractor, grievance mechanism for workers etc.)
- COVID-19 and other infectious diseases preparedness and response plan and measure to be prepared particularly for migrant workers, and worker's accommodation.
- Gender: Assessment of gender risks, such as the occurrence of gender-based violence during construction, and opportunities, such as employment creation during both construction and operation of the project and the mitigation measures and gender-related opportunities will be reflected in the ESMP.

7.4.6.2 Deliverables

- Contractor Management Plan[1] (Note: each Contractor will be required to prepare detailed specific plan based on the guidance provided in the Contractor Management Plan)

7.4.7 Task 4.7: Occupational Health and Safety

Review the occupational health and safety assessment, including emergency preparedness and response and corresponding mitigation measures in the local ESIA and assessment whether these meet GIIP and WBG EHS Guidelines, complete in Phase 2 the relevant supplemental studies and plans in accordance with the IFC Applicable Standards. OHS should also consider risks related to COVID-19.

7.4.7.1 Scope of Work

- Review applicable national and local environmental laws, regulations, requirements during both construction and operation, and good international industry practices on occupational health and safety, including emergency preparedness and response, determine the project's compliance with such requirements and standards, and propose measures in case of gaps.
- The OHS Management Plan should be based on a Hazard Identification and Risk Assessment and apply the hierarchical principles of the safety pyramid, which are listed below in descending order of effectiveness:
- Elimination/Substitution – identify opportunities to eliminate the safety risk by preventing exposure to the hazard before it occurs, or to substitute a less hazardous material or process to reduce the risk;
- Design Controls – involve changing the structure of the work area to reduce exposure using safety devices or barriers, such as placing a fence around a dangerous locations;
- Administrative and Work Practice Controls – implement procedures that require workers to do things to reduce their exposure to a risk, including placement of warning signs and alarms;

[1] See https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_escontractormanagement

- Personal Protective Equipment (PPE) – ensure all employees wear proper protective clothing and equipment, such as safety goggles, gloves, and fall protection;
- Inclusion of emergency preparedness and action plan for COVID-19 to be provided as part of IFC PS2/PS4 requirement; and
- (Note: every Contractor will be expected to develop and implement a site-specific health and safety management plan based on the OHS Plan prepared for the project).

7.4.7.2 Deliverables

- OHS Management Plan
- Emergency Response Plan

7.4.8 Task 4.8: Community Health &Safety Plans

The Project is likely to present risks to the health and safety of communities. These may arise from:

1. Importation of diseases to potentially vulnerable local populations.
2. Increase in traffic and potential impacts of increased traffic and transportation of Project related equipment/machinery/materials on communities, and increase in accidents etc.
3. Increased risk of community exploitation through:
   a. Disruption to local market prices and availability of goods and services;
   b. Increased potential for gender-based violence and inequalities within households or at work camps;
   c. Increased sexual harassment and exploitation of women, girls and boys, or persons who self-identify as the third gender; and
   d. Potential increased likelihood of trafficking of persons to other areas.

7.4.8.2 Scope of Work

- Update the traffic management plans to include transportation of waste and hazardous waste/materials;
- Prepare a workers code of conduct to avoid potential community exploitation risks as above;
- Prepare a community health and safety management plan; and
- Prepare a waste management plan to avoid any waste and water induced diseases.

7.4.8.3 Deliverables

- Updated traffic management plan;
- Workers code of conduct;
- Community health and safety management plan; and
- Waste management plan which is inclusive of wastewater management.

7.5 Task 5: Cumulative Impact Assessment

Review the future development plan and development plan of other facilities and conduct the CIA in accordance with the Lenders' Applicable Standards.

7.5.1 Scope of Work

The supplemental study will:

- Review planned and unplanned but predictable developments caused by the project that may occur later or at a different location.
- Determine and assess potential cumulative impacts to areas and communities potentially by these developments, such as changes in prices of properties, changes in access to areas surrounding the project site, potential livelihood impacts, among others, and changes to the availability of natural resources and environmental quality.
- Ensure that the CIA focuses on Valued Environmental and Social Component (VEC) identified based on technical criteria and considering consultation with stakeholders.

7.5.2 Deliverables

- Cumulative Impact Assessment

7.6 Task 6: Transboundary Impact Assessment

7.6.1 Scope of Work

- Prepare a Transboundary Impact Assessment (TIA) as relevant

7.6.2 Deliverables

- Transboundary Impact Assessment

7.7 Task 7: Environmental and Social Management System (ESMS)

Develop an ESMS for construction and operation aligned with the applicable national laws and regulations and Lenders' Applicable Requirements.

7.7.1 Scope of Work

- Develop a structured and comprehensive ESMS policy, including an HSE Policy, land procurement policy, contractor selection and performance evaluation procedure, construction related SOPs on safety and environmental aspects, on-site and off-site emergency preparedness and response plan, community health and safety plan, HR Policy and procedures, etc.
- Develop construction ESMS Manual and Indicative/Framework Operation ESMS Manual. The ESMS Manuals should cover the mitigation measures, action plans, procedures and monitoring and reporting plans in the local EIA and developed to meet the IFC Applicable Standards.

7.7.2 Deliverables

- Environmental and Social Management System (ESMS) for construction and operation.

7.8 Task 8: Non-Technical Summary (NTS)

In consultation with the Company and the Lenders', a concise, over-arching, illustrated, standalone NTS that summarizes the EIA, supplemental studies, all management plans and other relevant documents describing the key E&S aspects and how the project will manage them in compliance with the Lenders' Applicable Standards will be prepared. The NTS will be in clear language comprehensible to the general public. The NTS will be in English and Laos. An indicative content of the NTS is showed as follows:

1. Executive Summary
2. Introduction and Overview of the Project

3. Policy, Legal and Administrative Framework
4. Project Description, Development of Alternatives and Project Justification
5. Environmental and Social Baseline
6. Impact and Risk Assessment and Mitigation
7. Environmental and Social Management Plan (including Monitoring Plan) (ESMP)
8. Cumulative Impact Assessment
9. Stakeholder Consultation and Disclosure
10. Conclusion and Recommendations
11. Appendices

APPENDIX A THREATENED SPECIES

S/N	Class	Scientific Name	Common Name	IUCN Status
1	Actinopterygii	*Pangasius sanitwongsei*	Giant Pangasius	CR
2	Actinopterygii	*Catlocarpio siamensis*	Giant Carp	CR
3	Actinopterygii	*Sewellia breviventralis*	Butterfly Loach	CR
4	Aves	*Calidris pygmaea*	Spoon-billed Sandpiper	CR
5	Aves	*Gyps bengalensis*	White-rumped Vulture	CR
6	Aves	*Sarcogyps calvus*	Red-headed Vulture	CR
7	Aves	*Emberiza aureola*	Yellow-breasted Bunting	CR
8	Aves	*Gyps tenuirostris*	Slender-billed Vulture	CR
9	Mammalia	*Manis javanica*	Sunda Pangolin	CR
10	Mammalia	*Pseudoryx nghetinhensis*	Saola	CR
11	Mammalia	*Pygathrix nemaeus*	Red-shanked Douc Langur	CR
12	Mammalia	*Pygathrix cinerea*	Grey-shanked Douc Langur	CR
13	Mammalia	*Muntiacus vuquangensis*	Large-antlered Muntjac	CR
14	Mammalia	*Panthera pardus ssp. delacouri*	Indochinese Leopard	CR
15	Reptilia	*Crocodylus siamensis*	Siamese Crocodile	CR
16	Reptilia	*Indotestudo elongata*	Elongated Tortoise	CR
17	Reptilia	*Cuora bourreti*	Bourret's Box Turtle	CR
18	Actinopterygii	*Laubuka caeruleostigmata*	Flying Minnow	EN
19	Actinopterygii	*Probarbus labeamajor*	Thicklipped Barb	EN
20	Actinopterygii	*Pangasianodon hypophthalmus*	Striped Catfish	EN
21	Actinopterygii	*Poropuntius bolovenensis*		EN
22	Actinopterygii	*Poropuntius lobocheiloides*		EN
23	Actinopterygii	*Poropuntius solitus*		EN
24	Actinopterygii	*Schistura bolavenensis*		EN
25	Actinopterygii	*Poropuntius consternans*		EN
26	Actinopterygii	*Poropuntius deauratus*	Yellow Tail Brook Barb	EN
27	Actinopterygii	*Argyrosomus japonicus*	Dusky Meagre	EN
28	Agaricomycetes	*Calostoma insigne*		EN
29	Amphibia	*Leptobrachella applebyi*	Appleby's Leaf-litter Toad	EN
30	Amphibia	*Leptobrachium xanthops*		EN
31	Amphibia	*Theloderma nebulosum*	Misty Moss Frog	EN
32	Amphibia	*Leptobrachella firthi*		EN
33	Aves	*Rheinardia ocellata*	Crested Argus	EN
34	Aves	*Pavo muticus*	Green Peafowl	EN
35	Aves	*Asarcornis scutulata*	White-winged Duck	EN
36	Aves	*Heliopais personatus*	Masked Finfoot	EN
37	Aves	*Sterna acuticauda*	Black-bellied Tern	EN
38	Aves	*Leptoptilos dubius*	Greater Adjutant	EN
39	Aves	*Lonchura oryzivora*	Java Sparrow	EN
40	Chondrichthyes	*Hemitrygon laosensis*	Mekong Freshwater Stingray	EN

S/N	Class	Scientific Name	Common Name	IUCN Status
41	Liliopsida	*Zingiber microcheilum*		EN
42	Mammalia	*Bos javanicus*	Banteng	EN
43	Mammalia	*Chrotogale owstoni*	Owston's Civet	EN
44	Mammalia	*Cuon alpinus*	Dhole	EN
45	Mammalia	*Elephas maximus*	Asian Elephant	EN
46	Mammalia	*Lutra sumatrana*	Hairy-nosed Otter	EN
47	Mammalia	*Nycticebus pygmaeus*	Pygmy Slow Loris	EN
48	Mammalia	*Panthera tigris*	Tiger	EN
49	Mammalia	*Nycticebus bengalensis*	Bengal Slow Loris	EN
50	Mammalia	*Trachypithecus germaini*	Indochinese Silvered Langur	EN
51	Mammalia	*Nesolagus timminsi*	Annamite Striped Rabbit	EN
52	Mammalia	*Viverra megaspila*	Large-spotted Civet	EN
53	Mammalia	*Nomascus annamensis*	Northern Yellow-cheeked Crested Gibbon	EN
54	Reptilia	*Geoemyda spengleri*	Black-breasted Leaf Turtle	EN
55	Reptilia	*Cuora mouhotii*	Keeled Box Turtle	EN
56	Reptilia	*Protobothrops sieversorum*	Three Horned-scaled Pitviper	EN

APPENDIX B ENDEMIC/RESTRICTED RANGE SPECIES

S/N	Class Name	Scientific Name	Common Name	IUCN Status
1	Actinopterygii	*Poropuntius bolovenensis*		EN
2	Actinopterygii	*Poropuntius consternans*		EN
3	Actinopterygii	*Poropuntius lobocheiloides*		EN
4	Actinopterygii	*Poropuntius solitus*		EN
5	Actinopterygii	*Schistura bolavenensis*		EN
6	Amphibia	*Gracixalus supercornutus*		NT or LR/NT
7	Amphibia	*Leptobrachella applebyi*	Appleby's Leaf-litter Toad	EN
8	Amphibia	*Leptobrachella crocea*	Orange-bellied leaflitter toad	DD
9	Amphibia	*Leptobrachella firthi*		EN
10	Amphibia	*Leptobrachium xanthops*		EN
11	Amphibia	*Theloderma nebulosum*	Misty Moss Frog	EN
12	Aves	*Actinodura sodangorum*	Black-crowned Barwing	NT or LR/NT
13	Aves	*Cutia legalleni*	Vietnamese Cutia	NT or LR/NT
14	Aves	*Fregata minor*	Great Frigatebird	LC or LR/LC
15	Aves	*Fulvetta danisi*	Indochinese Fulvetta	LC or LR/LC
16	Aves	*Garrulax konkakinhensis*	Chestnut-eared Laughingthrush	VU
17	Aves	*Garrulax milleti*	Black-hooded Laughingthrush	LC or LR/LC
18	Aves	*Psilopogon auricularis*	Necklaced Barbet	LC or LR/LC
19	Aves	*Sitta nagaensis*	Chestnut-vented Nuthatch	LC or LR/LC
20	Aves	*Sitta solangiae*	Yellow-billed Nuthatch	NT or LR/NT
21	Gastropoda	*Hubendickia polita*		NT or LR/NT
22	Gastropoda	*Jullienia costata*		VU
23	Gastropoda	*Pachydrobia incerta*		NT or LR/NT
24	Liliopsida	*Zingiber microcheilum*		EN
25	Magnoliopsida	*Quercus austrocochinchinensis*		VU
26	Mammalia	*Crocidura zaitsevi*	Mikhail Zaitsev's Shrew	DD
27	Mammalia	*Mus fragilicauda*	Sheath-tailed Mouse	LC or LR/LC
28	Mammalia	*Pseudoryx nghetinhensis*	Saola	CR
29	Reptilia	*Bungarus slowinskii*	Red River Krait	VU
30	Reptilia	*Manouria impressa*	Impressed Tortoise	VU
31	Reptilia	*Protobothrops sieversorum*	Three Horned-scaled Pitviper	EN

APPENDIX C MIGRATORY SPECIES

S/N	Class Name	Scientific Name	Common Name	IUCN Status
1	Actinopterygii	*Catlocarpio siamensis*	Giant Carp	CR
2	Actinopterygii	*Pangasianodon hypophthalmus*	Striped Catfish	EN
3	Actinopterygii	*Pangasius sanitwongsei*	Giant Pangasius	CR
4	Actinopterygii	*Poropuntius bolovenensis*		EN
5	Actinopterygii	*Poropuntius deauratus*	Yellow Tail Brook Barb	EN
6	Actinopterygii	*Probarbus labeamajor*	Thicklipped Barb	EN
7	Aves	*Abroscopus superciliaris*	Yellow-bellied Warbler	LC OR LR/LC
8	Aves	*Accipiter badius*	Shikra	LC OR LR/LC
9	Aves	*Accipiter gularis*	Japanese Sparrowhawk	LC OR LR/LC
10	Aves	*Accipiter nisus*	Eurasian Sparrowhawk	LC OR LR/LC
11	Aves	*Accipiter virgatus*	Besra	LC OR LR/LC
12	Aves	*Acrocephalus bistrigiceps*	Black-browed Reed-warbler	LC OR LR/LC
13	Aves	*Acrocephalus orientalis*	Oriental Reed-warbler	LC OR LR/LC
14	Aves	*Agropsar sturninus*	Purple-backed Starling	LC OR LR/LC
15	Aves	*Anas crecca*	Common Teal	LC OR LR/LC
16	Aves	*Anas poecilorhyncha*	Indian Spot-billed Duck	LC OR LR/LC
17	Aves	*Anthipes monileger*	White-gorgeted Flycatcher	LC OR LR/LC
18	Aves	*Anthus hodgsoni*	Olive-backed Pipit	LC OR LR/LC
19	Aves	*Anthus richardi*	Richard's Pipit	LC OR LR/LC
20	Aves	*Apus pacificus*	Pacific Swift	LC OR LR/LC
21	Aves	*Artamus fuscus*	Ashy Woodswallow	LC OR LR/LC
22	Aves	*Arundinax aedon*	Thick-billed Warbler	LC OR LR/LC
23	Aves	*Aviceda leuphotes*	Black Baza	LC OR LR/LC
24	Aves	*Brachypodius atriceps*	Black-headed Bulbul	LC OR LR/LC
25	Aves	*Bubulcus ibis*	Cattle Egret	LC OR LR/LC
26	Aves	*Burhinus indicus*	Indian Thick-knee	LC OR LR/LC
27	Aves	*Butastur indicus*	Grey-faced Buzzard	LC OR LR/LC
28	Aves	*Buteo japonicus*	Japanese Buzzard	LC OR LR/LC
29	Aves	*Cacomantis merulinus*	Plaintive Cuckoo	LC OR LR/LC
30	Aves	*Cacomantis sonneratii*	Banded Bay Cuckoo	LC OR LR/LC
31	Aves	*Calliope calliope*	Siberian Rubythroat	LC OR LR/LC
32	Aves	*Caprimulgus jotaka*	Grey Nightjar	LC OR LR/LC
33	Aves	*Carpodacus erythrinus*	Common Rosefinch	LC OR LR/LC
34	Aves	*Cecropis daurica*	Red-rumped Swallow	LC OR LR/LC
35	Aves	*Ceyx erithaca*	Oriental Dwarf-kingfisher	LC OR LR/LC
36	Aves	*Chrysococcyx xanthorhynchus*	Violet Cuckoo	LC OR LR/LC
37	Aves	*Circus melanoleucos*	Pied Harrier	LC OR LR/LC
38	Aves	*Clamator coromandus*	Chestnut-winged Cuckoo	LC OR LR/LC
39	Aves	*Clanga clanga*	Greater Spotted Eagle	VU
40	Aves	*Cuculus canorus*	Common Cuckoo	LC OR LR/LC

S/N	Class Name	Scientific Name	Common Name	IUCN Status
41	Aves	*Cuculus micropterus*	Indian Cuckoo	LC OR LR/LC
42	Aves	*Cuculus saturatus*	Oriental Cuckoo	LC OR LR/LC
43	Aves	*Cyanoptila cyanomelana*	Blue-and-white Flycatcher	LC OR LR/LC
44	Aves	*Delichon dasypus*	Asian House Martin	LC OR LR/LC
45	Aves	*Delichon lagopodum*	Eastern House Martin	LC OR LR/LC
46	Aves	*Dendrocopos hyperythrus*	Rufous-bellied Woodpecker	LC OR LR/LC
47	Aves	*Dendronanthus indicus*	Forest Wagtail	LC OR LR/LC
48	Aves	*Dicrurus annectens*	Crow-billed Drongo	LC OR LR/LC
49	Aves	*Dicrurus hottentottus*	Hair-crested Drongo	LC OR LR/LC
50	Aves	*Dicrurus leucophaeus*	Ashy Drongo	LC OR LR/LC
51	Aves	*Dicrurus macrocercus*	Black Drongo	LC OR LR/LC
52	Aves	*Egretta garzetta*	Little Egret	LC OR LR/LC
53	Aves	*Emberiza aureola*	Yellow-breasted Bunting	CR
54	Aves	*Emberiza fucata*	Chestnut-eared Bunting	LC OR LR/LC
55	Aves	*Emberiza rutila*	Chestnut Bunting	LC OR LR/LC
56	Aves	*Eudynamys scolopaceus*	Western Koel	LC OR LR/LC
57	Aves	*Eumyias thalassinus*	Verditer Flycatcher	LC OR LR/LC
58	Aves	*Eurystomus orientalis*	Oriental Dollarbird	LC OR LR/LC
59	Aves	*Falco severus*	Oriental Hobby	LC OR LR/LC
60	Aves	*Falco tinnunculus*	Common Kestrel	LC OR LR/LC
61	Aves	*Ficedula albicilla*	Red-throated Flycatcher	LC OR LR/LC
62	Aves	*Ficedula mugimaki*	Mugimaki Flycatcher	LC OR LR/LC
63	Aves	*Ficedula strophiata*	Rufous-gorgeted Flycatcher	LC OR LR/LC
64	Aves	*Gallicrex cinerea*	Watercock	LC OR LR/LC
65	Aves	*Gallinago gallinago*	Common Snipe	LC OR LR/LC
66	Aves	*Gallinago stenura*	Pintail Snipe	LC OR LR/LC
67	Aves	*Geokichla citrina*	Orange-headed Thrush	LC OR LR/LC
68	Aves	*Geokichla sibirica*	Siberian Thrush	LC OR LR/LC
69	Aves	*Glaucidium brodiei*	Collared Owlet	LC OR LR/LC
70	Aves	*Glaucidium cuculoides*	Asian Barred Owlet	LC OR LR/LC
71	Aves	*Gorsachius melanolophus*	Malay Night-heron	LC OR LR/LC
72	Aves	*Halcyon coromanda*	Ruddy Kingfisher	LC OR LR/LC
73	Aves	*Hemixos flavala*	Ashy Bulbul	LC OR LR/LC
74	Aves	*Hierococcyx hyperythrus*	Northern Hawk-cuckoo	LC OR LR/LC
75	Aves	*Hierococcyx nisicolor*	Whistling Hawk-cuckoo	LC OR LR/LC
76	Aves	*Hierococcyx sparverioides*	Large Hawk-cuckoo	LC OR LR/LC
77	Aves	*Hierococcyx vagans*	Moustached Hawk-cuckoo	NT OR LR/NT
78	Aves	*Hirundapus caudacutus*	White-throated Needletail	LC OR LR/LC
79	Aves	*Hirundapus cochinchinensis*	Silver-backed Needletail	LC OR LR/LC
80	Aves	*Hirundo rustica*	Barn Swallow	LC OR LR/LC

S/N	Class Name	Scientific Name	Common Name	IUCN Status
81	Aves	*Hirundo smithii*	Wire-tailed Swallow	LC OR LR/LC
82	Aves	*Hydrophasianus chirurgus*	Pheasant-tailed Jacana	LC OR LR/LC
83	Aves	*Hypothymis azurea*	Black-naped Monarch	LC OR LR/LC
84	Aves	*Hypsipetes leucocephalus*	Black Bulbul	LC OR LR/LC
85	Aves	*Ixobrychus cinnamomeus*	Cinnamon Bittern	LC OR LR/LC
86	Aves	*Ixobrychus sinensis*	Yellow Bittern	LC OR LR/LC
87	Aves	*Ixos mcclellandii*	Mountain Bulbul	LC OR LR/LC
88	Aves	*Lalage melaschistos*	Black-winged Cuckooshrike	LC OR LR/LC
89	Aves	*Lanius collurioides*	Burmese Shrike	LC OR LR/LC
90	Aves	*Lanius cristatus*	Brown Shrike	LC OR LR/LC
91	Aves	*Lanius schach*	Long-tailed Shrike	LC OR LR/LC
92	Aves	*Larvivora cyane*	Siberian Blue Robin	LC OR LR/LC
93	Aves	*Leptoptilos dubius*	Greater Adjutant	EN
94	Aves	*Locustella lanceolata*	Lanceolated Warbler	LC OR LR/LC
95	Aves	*Locustella mandelli*	Russet Grasshopper-warbler	LC OR LR/LC
96	Aves	*Locustella tacsanowskia*	Chinese Grasshopper-warbler	LC OR LR/LC
97	Aves	*Loriculus vernalis*	Vernal Hanging-parrot	LC OR LR/LC
98	Aves	*Machlolophus spilonotus*	Yellow-cheeked Tit	LC OR LR/LC
99	Aves	*Macropygia unchall*	Barred Cuckoo-dove	LC OR LR/LC
100	Aves	*Megaceryle lugubris*	Crested Kingfisher	LC OR LR/LC
101	Aves	*Merops leschenaulti*	Chestnut-headed Bee-eater	LC OR LR/LC
102	Aves	*Merops orientalis*	Asian Green Bee-eater	LC OR LR/LC
103	Aves	*Merops philippinus*	Blue-tailed Bee-eater	LC OR LR/LC
104	Aves	*Mirafra javanica*	Horsfield's Bushlark	LC OR LR/LC
105	Aves	*Monticola gularis*	White-throated Rock-thrush	LC OR LR/LC
106	Aves	*Monticola solitarius*	Blue Rock-thrush	LC OR LR/LC
107	Aves	*Motacilla alba*	White Wagtail	LC OR LR/LC
108	Aves	*Motacilla cinerea*	Grey Wagtail	LC OR LR/LC
109	Aves	*Motacilla tschutschensis*	Eastern Yellow Wagtail	LC OR LR/LC
110	Aves	*Muscicapa dauurica*	Asian Brown Flycatcher	LC OR LR/LC
111	Aves	*Muscicapa ferruginea*	Ferruginous Flycatcher	LC OR LR/LC
112	Aves	*Muscicapa sibirica*	Dark-sided Flycatcher	LC OR LR/LC
113	Aves	*Myophonus caeruleus*	Blue Whistling-thrush	LC OR LR/LC
114	Aves	*Nettapus coromandelianus*	Cotton Pygmy-goose	LC OR LR/LC
115	Aves	*Oriolus chinensis*	Black-naped Oriole	LC OR LR/LC
116	Aves	*Oriolus tenuirostris*	Slender-billed Oriole	LC OR LR/LC
117	Aves	*Oriolus traillii*	Maroon Oriole	LC OR LR/LC
118	Aves	*Otus lettia*	Collared Scops-owl	LC OR LR/LC
119	Aves	*Otus spilocephalus*	Mountain Scops-owl	LC OR LR/LC
120	Aves	*Otus sunia*	Oriental Scops-owl	LC OR LR/LC

S/N	Class Name	Scientific Name	Common Name	IUCN Status
121	Aves	*Pericrocotus cantonensis*	Brown-rumped Minivet	LC OR LR/LC
122	Aves	*Pericrocotus divaricatus*	Ashy Minivet	LC OR LR/LC
123	Aves	*Pericrocotus roseus*	Rosy Minivet	LC OR LR/LC
124	Aves	*Pericrocotus solaris*	Grey-chinned Minivet	LC OR LR/LC
125	Aves	*Pernis ptilorhynchus*	Oriental Honey-buzzard	LC OR LR/LC
126	Aves	*Phyllergates cucullatus*	Mountain Tailorbird	LC OR LR/LC
127	Aves	*Phylloscopus castaniceps*	Chestnut-crowned Warbler	LC OR LR/LC
128	Aves	*Phylloscopus coronatus*	Eastern Crowned Warbler	LC OR LR/LC
129	Aves	*Phylloscopus fuscatus*	Dusky Warbler	LC OR LR/LC
130	Aves	*Phylloscopus inornatus*	Yellow-browed Warbler	LC OR LR/LC
131	Aves	*Phylloscopus intermedius*	White-spectacled Warbler	LC OR LR/LC
132	Aves	*Phylloscopus maculipennis*	Ashy-throated Warbler	LC OR LR/LC
133	Aves	*Phylloscopus ogilviegranti*	Kloss's Leaf-warbler	LC OR LR/LC
134	Aves	*Phylloscopus plumbeitarsus*	Two-barred Warbler	LC OR LR/LC
135	Aves	*Phylloscopus poliogenys*	Grey-cheeked Warbler	LC OR LR/LC
136	Aves	*Phylloscopus reguloides*	Blyth's Leaf-warbler	LC OR LR/LC
137	Aves	*Phylloscopus ricketti*	Sulphur-breasted Warbler	LC OR LR/LC
138	Aves	*Phylloscopus schwarzi*	Radde's Warbler	LC OR LR/LC
139	Aves	*Phylloscopus soror*	AlstrÃ¶m's Warbler	LC OR LR/LC
140	Aves	*Phylloscopus tenellipes*	Pale-legged Leaf-warbler	LC OR LR/LC
141	Aves	*Pitta moluccensis*	Blue-winged Pitta	LC OR LR/LC
142	Aves	*Pnoepyga pusilla*	Pygmy Cupwing	LC OR LR/LC
143	Aves	*Prinia hodgsonii*	Grey-breasted Prinia	LC OR LR/LC
144	Aves	*Prinia polychroa*	Brown Prinia	LC OR LR/LC
145	Aves	*Prinia superciliaris*	Hill Prinia	LC OR LR/LC
146	Aves	*Psittacula finschii*	Grey-headed Parakeet	NT OR LR/NT
147	Aves	*Pteruthius aeralatus*	White-browed Shrike-babbler	LC OR LR/LC
148	Aves	*Pycnonotus flavescens*	Flavescent Bulbul	LC OR LR/LC
149	Aves	*Rallina eurizonoides*	Slaty-legged Crake	LC OR LR/LC
150	Aves	*Rhipidura albicollis*	White-throated Fantail	LC OR LR/LC
151	Aves	*Riparia chinensis*	Asian Plain Martin	LC OR LR/LC
152	Aves	*Saxicola caprata*	Pied Bushchat	LC OR LR/LC
153	Aves	*Saxicola torquatus*	Common Stonechat	LC OR LR/LC
154	Aves	*Scolopax rusticola*	Eurasian Woodcock	LC OR LR/LC
155	Aves	*Siva cyanouroptera*	Blue-winged Minla	LC OR LR/LC
156	Aves	*Spilopelia chinensis*	Eastern Spotted Dove	LC OR LR/LC
157	Aves	*Streptopelia orientalis*	Oriental Turtle-dove	LC OR LR/LC
158	Aves	*Streptopelia tranquebarica*	Red Turtle-dove	LC OR LR/LC
159	Aves	*Sturnia sinensis*	White-shouldered Starling	LC OR LR/LC
160	Aves	*Surniculus dicruroides*	Fork-tailed Drongo-cuckoo	LC OR LR/LC

S/N	Class Name	Scientific Name	Common Name	IUCN Status
161	Aves	*Sylviparus modestus*	Yellow-browed Tit	LC OR LR/LC
162	Aves	*Tadorna ferruginea*	Ruddy Shelduck	LC OR LR/LC
163	Aves	*Tarsiger cyanurus*	Orange-flanked Bush-robin	LC OR LR/LC
164	Aves	*Tephrodornis virgatus*	Large Woodshrike	LC OR LR/LC
165	Aves	*Terpsiphone affinis*	Oriental Paradise-flycatcher	LC OR LR/LC
166	Aves	*Terpsiphone incei*	Chinese Paradise-flycatcher	LC OR LR/LC
167	Aves	*Tesia cyaniventer*	Grey-bellied Tesia	LC OR LR/LC
168	Aves	*Treron apicauda*	Pin-tailed Green-pigeon	LC OR LR/LC
169	Aves	*Treron curvirostra*	Thick-billed Green-pigeon	LC OR LR/LC
170	Aves	*Treron seimundi*	Yellow-vented Green-pigeon	LC OR LR/LC
171	Aves	*Treron sieboldii*	White-bellied Green-pigeon	LC OR LR/LC
172	Aves	*Treron sphenurus*	Wedge-tailed Green-pigeon	LC OR LR/LC
173	Aves	*Tringa glareola*	Wood Sandpiper	LC OR LR/LC
174	Aves	*Tringa ochropus*	Green Sandpiper	LC OR LR/LC
175	Aves	*Turdus cardis*	Japanese Thrush	LC OR LR/LC
176	Aves	*Turdus obscurus*	Eyebrowed Thrush	LC OR LR/LC
177	Aves	*Turnix tanki*	Yellow-legged Buttonquail	LC OR LR/LC
178	Aves	*Upupa epops*	Common Hoopoe	LC OR LR/LC
179	Aves	*Urocissa erythroryncha*	Red-billed Blue Magpie	LC OR LR/LC
180	Aves	*Urosphena squameiceps*	Asian Stubtail	LC OR LR/LC
181	Aves	*Vanellus cinereus*	Grey-headed Lapwing	LC OR LR/LC
182	Aves	*Yuhina gularis*	Stripe-throated Yuhina	LC OR LR/LC
183	Aves	*Zapornia fusca*	Ruddy-breasted Crake	LC OR LR/LC
184	Aves	*Zoothera aurea*	White's Thrush	LC OR LR/LC
185	Aves	*Zoothera dauma*	Scaly Thrush	LC OR LR/LC
186	Chondrichthyes	*Hemitrygon laosensis*	Mekong Freshwater Stingray	EN
187	Insecta	*Agriocnemis pygmaea*	Wandering Midget	LC OR LR/LC
188	Insecta	*Ischnura aurora*	Gossamer Damselfly	LC OR LR/LC
189	Insecta	*Ischnura senegalensis*	Tropical Bluetail	LC OR LR/LC
190	Insecta	*Macrodiplax cora*	Coraâ€™s Pennant	LC OR LR/LC
191	Insecta	*Pantala flavescens*	Wandering Glider	LC OR LR/LC
192	Insecta	*Tholymis tillarga*	Old World Twister	LC OR LR/LC
193	Insecta	*Tramea basilaris*	Keyhole Glider	LC OR LR/LC
194	Insecta	*Tramea transmarina*	Red Glider Dragonfly	LC OR LR/LC

APPENDIX D CRITICAL HABITAT SCREENING

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Asarcornis scutulata	White-winged Duck	EN	decreasing	y		1,2
Bos javanicus	Banteng	EN	decreasing	n	Range doesn't overlap with project	
Calostoma insigne		EN	decreasing	y	Unlikely to qualify given range extent	
Catlocarpio siamensis	Giant Carp	CR	decreasing	n	Range doesn't overlap with project	
Chrotogale owstoni	Owston's Civet	EN	decreasing	n	Unlikely to qualify given range extent	
Crocodylus siamensis	Siamese Crocodile	CR	decreasing	n	Unlikely due to habitat	
Cuon alpinus	Dhole	EN	decreasing	n	Range doesn't overlap with project	
Cuora bourreti	Bourret's Box Turtle	CR	decreasing	n	Range doesn't overlap with project	
Cuora mouhotii	Keeled Box Turtle	EN	decreasing	n	Range doesn't overlap with project	
Elephas maximus	Asian Elephant	EN	decreasing	y		1
Emberiza aureola	Yellow-breasted Bunting	CR	decreasing	n	Unlikely to qualify given range extent	
Geoemyda spengleri	Black-breasted Leaf Turtle	EN	decreasing	n	Unlikely to qualify given range extent	
Gyps bengalensis	White-rumped Vulture	CR	decreasing	n	Believed extinct in project area	
Gyps tenuirostris	Slender-billed Vulture	CR	decreasing	n	Believed extinct in project area	
Heliopais personatus	Masked Finfoot	EN	decreasing	n	unlikely given habitat requirements	
Hemitrygon laosensis	Mekong Freshwater Stingray	EN	decreasing	n	Range doesn't overlap with project	
Indotestudo elongata	Elongated Tortoise	CR	decreasing	n	Unlikely to qualify given range extent	
Laubuka caeruleostigmata	Flying Minnow	EN	decreasing	n	Range doesn't overlap with project	
Leptobrachella applebyi	Appleby's Leaf-litter Toad	EN	decreasing	n	Range doesn't overlap with project	
Leptobrachella firthi		EN	decreasing	n	Range doesn't overlap with project	
Leptobrachium xanthops		EN	decreasing	n	Range doesn't overlap with project	
Leptoptilos dubius	Greater Adjutant	EN	decreasing	n	Range doesn't overlap with project	
Lonchura oryzivora	Java Sparrow	EN	decreasing	n	Range doesn't overlap with project	
Manis javanica	Sunda Pangolin	CR	decreasing	n	Unlikely to qualify given range extent	
Manis pentadactyla	Chinese Pangolin	CR	decreasing	n	Range doesn't overlap with project	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Muntiacus vuquangensis	Large-antlered Muntjac	CR	decreasing	y		1,2
Nesolagus timminsi	Annamite Striped Rabbit	EN	decreasing	y		1,2
Nomascus annamensis	Northern Yellow-cheeked Crested Gibbon	EN	decreasing	y		2
Nycticebus bengalensis	Bengal Slow Loris	EN	decreasing	n	Unlikely to qualify given range extent	
Nycticebus pygmaeus	Pygmy Slow Loris	EN	decreasing	n	Unlikely to qualify given range extent	
Pangasianodon hypophthalmus	Striped Catfish	EN	decreasing	n	Unlikely to qualify given range extent	
Pangasius sanitwongsei	Giant Pangasius	CR	decreasing	n	Unlikely to qualify given range extent	
Panthera pardus ssp. delacouri	Indochinese Leopard	CR	decreasing	n	Unlikely to qualify given range extent	
Panthera tigris	Tiger	EN	decreasing	n	Unlikely to qualify given range extent	
Pavo muticus	Green Peafowl	EN	decreasing	y		2
Poropuntius bolovenensis		EN	decreasing	n	Range doesn't overlap with project	
Poropuntius consternans		EN	decreasing	n	Range doesn't overlap with project	
Poropuntius deauratus	Yellow Tail Brook Barb	EN	decreasing	y		2
Poropuntius lobocheiloides		EN	decreasing	n	Range doesn't overlap with project	
Poropuntius solitus		EN	decreasing	n	Range doesn't overlap with project	
Probarbus labeamajor	Thicklipped Barb	EN	decreasing	n	Range doesn't overlap with project	
Protobothrops sieversorum	Three Horned-scaled Pitviper	EN	unknown	y		2
Pseudoryx nghetinhensis	Saola	CR	decreasing	n	Range doesn't overlap with project	
Pygathrix cinerea	Grey-shanked Douc Langur	CR	decreasing	n	Range doesn't overlap with project	
Pygathrix nemaeus	Red-shanked Douc Langur	CR	decreasing	y		1,2
Rheinardia ocellata	Crested Argus	EN	decreasing	n	Range doesn't overlap with project	
Sarcogyps calvus	Red-headed Vulture	CR	decreasing	n	Range doesn't overlap with project	
Schistura bolavenensis		EN	unknown	n	Range doesn't overlap with project	

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Sewellia breviventralis	Butterfly Loach	CR	decreasing	n	Range doesn't overlap with project	
Sterna acuticauda	Black-bellied Tern	EN	decreasing	n	Range doesn't overlap with project	
Theloderma nebulosum	Misty Moss Frog	EN	decreasing	n	Range doesn't overlap with project	
Trachypithecus germaini	Indochinese Silvered Langur	EN	decreasing	n	Unlikely to qualify given range extent	
Viverra megaspila	Large-spotted Civet	EN	decreasing	y		1,2
Zingiber microcheilum		EN	unknown	n	Range doesn't overlap with project	
Bos gaurus	Gaur	VU	decreasing	n	Unlikely to qualify given range extent	
Helarctos malayanus	Sun Bear	VU	decreasing	n	Unlikely to qualify given range extent	
Macaca arctoides	Stump-tailed Macaque	VU	decreasing	n	Unlikely to qualify given range extent	
Macaca fascicularis	Nicobar Crab-eating Macaque	VU	decreasing	n	Unlikely to qualify given range extent	
Neofelis nebulosa	Clouded Leopard	VU	decreasing	n	Unlikely to qualify given range extent	
Ursus thibetanus	Asiatic Black Bear	VU	decreasing	n	Unlikely to qualify given range extent	
Macaca leonina	Northern Pig-tailed Macaque	VU	decreasing	n	Unlikely to qualify given range extent	
Arctictis binturong	Binturong	VU	decreasing	n	Unlikely to qualify given range extent	
Rusa unicolor	Sambar	VU	decreasing	n	Unlikely to qualify given range extent	
Naja siamensis	Black And White Spitting Cobra	VU	decreasing	n	Unlikely to qualify given range extent	
Ophiophagus hannah	King Cobra	VU	decreasing	n	Unlikely to qualify given range extent	
Jullienia costata		VU	unknown	n	Wetland species that could occur in freshwater streams in project area. Include.	
Quercus austrocochinchinensis		VU	unknown	n	Project area outside known range	
Bungarus slowinskii	Red River Krait	VU	unknown	y		2
Python bivittatus	Burmese Python	VU	decreasing	n	Unlikely to qualify given range extent	
Mulleripicus pulverulentus	Great Slaty Woodpecker	VU	decreasing	n	Unlikely to qualify given range extent	

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Buceros bicornis	Great Hornbill	VU	decreasing	n	Unlikely to qualify given range extent	
Rhyticeros undulatus	Wreathed Hornbill	VU	decreasing	n	Unlikely to qualify given range extent	
Carpococcyx renauldi	Coral-billed Ground-cuckoo	VU	decreasing	n	Unlikely to qualify given range extent	
Columba punicea	Pale-capped Pigeon	VU	decreasing	n	Unlikely to hold 10% of global population	
Clanga clanga	Greater Spotted Eagle	VU	decreasing	n	Unlikely to qualify given range extent	
Garrulax konkakinhensis	Chestnut-eared Laughingthrush	VU	stable	n	Include on precautionary basis given restricted range	
Arctonyx collaris	Greater Hog Badger	VU	decreasing	n	Unlikely to qualify given range extent	
Physignathus cocincinus	Chinese Water Dragon	VU	decreasing	n	Unlikely to qualify given range extent	
Capricornis sumatraensis	Mainland Serow	VU	decreasing	n	Unlikely to qualify given range extent	
Gracixalus supercornutus		NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Ingerophrynus galeatus	Bony-headed Toad	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ingerophrynus macrotis		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Duttaphrynus melanostictus	Black-spectacled Toad	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Megophrys intermedia	Annam Spadefoot Toad	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Leptobrachium banae		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Leptobrachium chapaense	Chapa Spadefoot Toad	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Leptobrachium pullum		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Leptobrachella pelodytoides		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Leptobrachella tuberosa		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Megophrys microstoma	Asian Mountain Toad	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Megophrys koui	Zhushihe Mountain Toad	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Megophrys major	White-lipped Horned Toad	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Kalophrynus interlineatus		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Kaloula pulchra	Malaysian Narrowmouth Toad	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Microhyla berdmorei	Pegu Rice Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Microhyla butleri	Tubercled Pygmy Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Microhyla heymonsi	Black-sided Narrow-mouthed Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Microhyla pulchra	Beautiful Pygmy Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Micryletta inornata	Deli Paddy Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Amolops spinapectoralis		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Fejervarya limnocharis	Asian Grass Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hoplobatrachus rugulosus	East Asian Bullfrog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Limnonectes kuhlii	Large-headed Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Limnonectes limborgi		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Occidozyga lima	Pointed-tongued Floating Frog	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Occidozyga martensii	Marten’s Oriental Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Occidozyga vittata	Striped Oriental Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hylarana attigua		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Odorrana banaorum		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Babina chapaensis	Chapa Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Odorrana chloronota	Chloronate Huia Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hylarana erythraea	Common Green Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Sylvirana guentheri	Gunther's Amoy Frog	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rana johnsi	John's Frog	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hylarana lateralis	Kokarit Frog	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hylarana macrodactyla	Three-striped Grass Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Odorrana morafkai	Morafkai Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Sylvirana nigrovittata		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hylarana taipehensis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Chiromantis nongkhorensis		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Feihyla vittata	Striped Asian Treefrog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Raorchestes parvulus	Karin Bubble-nest Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Zhangixalus feae	Thao Whipping Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Polypedates leucomystax	White-lipped Tree Frog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Kurixalus baliogaster		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Rhacophorus exechopygus	Spinybottom Tree Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Rhacophorus orlovi	Orlov's Treefrog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Kurixalus verrucosus		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Theloderma asperum	Hill Garden Bug-eyed Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Theloderma gordoni		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ichthyophis kohtaoensis	Koa Tao Island Caecilian	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Microhyla marmorata		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Odorrana absita		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Odorrana khalam		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Odorrana orba		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Microhyla fissipes		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Limnonectes poilani		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Rhacophorus kio	Black-webbed Treefrog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Rhacophorus rhodopus	Red-webbed Treefrog	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Leptobrachium mouhoti		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Amolops compotrix		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Rhacophorus robertingeri	Robert Inger's Tree Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Rhacophorus annamensis	Annam Flying Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Theloderma vietnamense		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Limnonectes dabanus	Annam Wart Frog	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Leptobrachella crocea	Orange-bellied leaf-litter toad	DD	unknown	n	Unlikely to qualify given range extent	
Herennia multipuncta	Spotted Coin Spider	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Nephilengys malabarensis	Asian Hermit Spider	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Nephila antipodiana	Batik Golden Orb Weaver	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Nephila pilipes	Giant Golden Orb Weaver	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Picus rabieri	Red-collared Woodpecker	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Alcedo hercules	Blyth's Kingfisher	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Hierococcyx vagans	Moustached Hawk-cuckoo	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Psittacula finschii	Grey-headed Parakeet	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Psittacula roseata	Blossom-headed Parakeet	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Psittacula alexandri	Red-breasted Parakeet	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Icthyophaga humilis	Lesser Fish-eagle	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Lophotriorchis kienerii	Rufous-bellied Eagle	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Polihierax insignis	White-rumped Pygmy-falcon	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	

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Sitta solangiae	Yellow-billed Nuthatch	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Actinodura sodangorum	Black-crowned Barwing	NT OR LR/NT	stable	n	Unlikely to qualify given range extent	
Ploceus hypoxanthus	Asian Golden Weaver	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Treron phayrei	Ashy-headed Green-pigeon	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Anorrhinus austeni	Austen's Brown Hornbill	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Cutia legalleni	Vietnamese Cutia	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Urocissa xanthomelana	White-winged Magpie	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Rimator danjoui	Indochinese Wren-babbler	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Francolinus pintadeanus	Chinese Francolin	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Synoicus chinensis	Asian Blue Quail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Arborophila rufogularis	Rufous-throated Partridge	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Arborophila brunneopectus	Bar-backed Partridge	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Gallus gallus	Red Junglefowl	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Lophura nycthemera	Silver Pheasant	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Lophura diardi	Siamese Fireback	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Tadorna ferruginea	Ruddy Shelduck	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Nettapus coromandelianus	Cotton Pygmy-goose	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Turnix sylvaticus	Common Buttonquail	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Turnix tanki	Yellow-legged Buttonquail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Turnix suscitator	Barred Buttonquail	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	

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Picumnus innominatus	Speckled Piculet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Sasia ochracea	White-browed Piculet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Picoides canicapillus	Grey-capped Woodpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Dendrocopos atratus	Stripe-breasted Woodpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Dendrocopos hyperythrus	Rufous-bellied Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Micropternus brachyurus	Rufous Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Dryocopus javensis	White-bellied Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Picus chlorolophus	Lesser Yellownape	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Chrysophlegma flavinucha	Greater Yellownape	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Picus vittatus	Laced Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Picus erythropygius	Black-headed Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Gecinulus grantia	Pale-headed Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Blythipicus pyrrhotis	Bay Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Meiglyptes jugularis	Black-and-buff Woodpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hemicircus canente	Heart-spotted Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Psilopogon lagrandieri	Red-vented Barbet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Psilopogon lineatus	Lineated Barbet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Psilopogon faiostrictus	Green-eared Barbet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Psilopogon incognitus	Moustached Barbet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Psilopogon haemacephalus	Coppersmith Barbet	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Anthracoceros albirostris	Oriental Pied Hornbill	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Upupa epops	Common Hoopoe	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Harpactes oreskios	Orange-breasted Trogon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Harpactes erythrocephalus	Red-headed Trogon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Eurystomus orientalis	Oriental Dollarbird	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Halcyon coromanda	Ruddy Kingfisher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Megaceryle lugubris	Crested Kingfisher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Nyctyornis athertoni	Blue-bearded Bee-eater	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Merops philippinus	Blue-tailed Bee-eater	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Merops leschenaulti	Chestnut-headed Bee-eater	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Clamator coromandus	Chestnut-winged Cuckoo	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cuculus micropterus	Indian Cuckoo	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Cuculus canorus	Common Cuckoo	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Cacomantis sonneratii	Banded Bay Cuckoo	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cacomantis merulinus	Plaintive Cuckoo	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Chrysococcyx xanthorhynchus	Violet Cuckoo	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Eudynamys scolopaceus	Western Koel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phaenicophaeus tristis	Green-billed Malkoha	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Centropus sinensis	Greater Coucal	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Centropus bengalensis	Lesser Coucal	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Loriculus vernalis	Vernal Hanging-parrot	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hirundapus caudacutus	White-throated Needletail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hirundapus cochinchinensis	Silver-backed Needletail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cypsiurus balasiensis	Asian Palm-swift	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Apus pacificus	Pacific Swift	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Apus nipalensis	House Swift	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Hemiprocne coronata	Crested Treeswift	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Tyto alba	Common Barn-owl	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tyto longimembris	Eastern Grass-owl	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Otus spilocephalus	Mountain Scops-owl	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Bubo nipalensis	Spot-bellied Eagle-owl	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ketupa zeylonensis	Brown Fish-owl	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ketupa flavipes	Tawny Fish-owl	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ketupa ketupu	Buffy Fish-owl	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Strix leptogrammica	Brown Wood-owl	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Glaucidium brodiei	Collared Owlet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Glaucidium cuculoides	Asian Barred Owlet	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Athene brama	Spotted Owlet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Batrachostomus hodgsoni	Hodgson's Frogmouth	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Lyncornis macrotis	Great Eared-nightjar	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Streptopelia orientalis	Oriental Turtle-dove	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Streptopelia tranquebarica	Red Turtle-dove	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Macropygia unchall	Barred Cuckoo-dove	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Treron bicinctus	Orange-breasted Green-pigeon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Treron curvirostra	Thick-billed Green-pigeon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Treron phoenicopterus	Yellow-footed Green-pigeon	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Treron apicauda	Pin-tailed Green-pigeon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Treron seimundi	Yellow-vented Green-pigeon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Treron sphenurus	Wedge-tailed Green-pigeon	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Treron sieboldii	White-bellied Green-pigeon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Rallina eurizonoides	Slaty-legged Crake	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Lewinia striata	Slaty-breasted Rail	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Zapornia fusca	Ruddy-breasted Crake	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Gallicrex cinerea	Watercock	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Scolopax rusticola	Eurasian Woodcock	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Gallinago stenura	Pintail Snipe	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Gallinago gallinago	Common Snipe	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Tringa ochropus	Green Sandpiper	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Tringa glareola	Wood Sandpiper	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hydrophasianus chirurgus	Pheasant-tailed Jacana	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Vanellus cinereus	Grey-headed Lapwing	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Vanellus indicus	Red-wattled Lapwing	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aviceda leuphotes	Black Baza	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pernis ptilorhynchus	Oriental Honey-buzzard	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Elanus caeruleus	Black-winged Kite	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Spilornis cheela	Crested Serpent-eagle	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Circus melanoleucos	Pied Harrier	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Accipiter trivirgatus	Crested Goshawk	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Accipiter badius	Shikra	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Accipiter gularis	Japanese Sparrowhawk	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Accipiter virgatus	Besra	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Accipiter nisus	Eurasian Sparrowhawk	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Butastur liventer	Rufous-winged Buzzard	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Butastur indicus	Grey-faced Buzzard	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ictinaetus malaiensis	Black Eagle	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Microhierax caerulescens	Collared Falconet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Falco tinnunculus	Common Kestrel	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Falco severus	Oriental Hobby	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Microcarbo niger	Little Cormorant	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Bubulcus ibis	Cattle Egret	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Gorsachius melanolophus	Malay Night-heron	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ixobrychus sinensis	Yellow Bittern	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ixobrychus cinnamomeus	Cinnamon Bittern	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hydrornis phayrei	Eared Pitta	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hydrornis soror	Blue-rumped Pitta	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hydrornis oatesi	Rusty-naped Pitta	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hydrornis cyaneus	Blue Pitta	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hydrornis elliotii	Bar-bellied Pitta	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pitta moluccensis	Blue-winged Pitta	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Corydon sumatranus	Dusky Broadbill	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Psarisomus dalhousiae	Long-tailed Broadbill	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Lanius cristatus	Brown Shrike	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Lanius collurioides	Burmese Shrike	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lanius schach	Long-tailed Shrike	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Urocissa erythroryncha	Red-billed Blue Magpie	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cissa hypoleuca	Indochinese Green Magpie	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Dendrocitta vagabunda	Rufous Treepie	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Crypsirina temia	Racquet-tailed Treepie	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Temnurus temnurus	Ratchet-tailed Treepie	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Artamus fuscus	Ashy Woodswallow	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Oriolus chinensis	Black-naped Oriole	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Oriolus tenuirostris	Slender-billed Oriole	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Oriolus xanthornus	Black-hooded Oriole	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Oriolus traillii	Maroon Oriole	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Coracina javensis	Large Cuckooshrike	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lalage polioptera	Indochinese Cuckooshrike	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lalage melaschistos	Black-winged Cuckooshrike	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pericrocotus roseus	Rosy Minivet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pericrocotus cantonensis	Brown-rumped Minivet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pericrocotus divaricatus	Ashy Minivet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pericrocotus cinnamomeus	Small Minivet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pericrocotus flammeus	Scarlet Minivet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hemipus picatus	Bar-winged Flycatcher-shrike	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Rhipidura aureola	White-browed Fantail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Dicrurus macrocercus	Black Drongo	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dicrurus leucophaeus	Ashy Drongo	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dicrurus annectens	Crow-billed Drongo	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dicrurus aeneus	Bronzed Drongo	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dicrurus remifer	Lesser Racquet-tailed Drongo	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aegithina tiphia	Common Iora	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aegithina lafresnayei	Great Iora	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Monticola gularis	White-throated Rock-thrush	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Monticola solitarius	Blue Rock-thrush	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Myophonus caeruleus	Blue Whistling-thrush	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Geokichla citrina	Orange-headed Thrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Geokichla sibirica	Siberian Thrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Zoothera marginata	Dark-sided Thrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Turdus cardis	Japanese Thrush	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Turdus obscurus	Eyebrowed Thrush	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Brachypteryx leucophris	Lesser Shortwing	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Muscicapa sibirica	Dark-sided Flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Muscicapa dauurica	Asian Brown Flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Muscicapa ferruginea	Ferruginous Flycatcher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ficedula mugimaki	Mugimaki Flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ficedula strophiata	Rufous-gorgeted Flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Anthipes monileger	White-gorgeted Flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ficedula westermanni	Little Pied Flycatcher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Eumyias thalassinus	Verditer Flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Niltava grandis	Large Niltava	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Niltava macgrigoriae	Small Niltava	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Niltava davidi	Fujian Niltava	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cyornis hainanus	Hainan Blue-flycatcher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Cyornis unicolor	Pale Blue-flycatcher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ficedula hodgsoni	Pygmy Blue-flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Culicicapa ceylonensis	Grey-headed Canary-flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Calliope calliope	Siberian Rubythroat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Larvivora cyane	Siberian Blue Robin	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Enicurus schistaceus	Slaty-backed Forktail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Enicurus leschenaulti	White-crowned Forktail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cochoa viridis	Green Cochoa	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Saxicola torquatus	Common Stonechat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Saxicola caprata	Pied Bushchat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Saxicola ferreus	Grey Bushchat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Sturnia malabarica	Chestnut-tailed Starling	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Agropsar sturninus	Purple-backed Starling	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Sturnia sinensis	White-shouldered Starling	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Gracupica nigricollis	Black-collared Starling	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Acridotheres tristis	Common Myna	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Acridotheres cristatellus	Crested Myna	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ampeliceps coronatus	Golden-crested Myna	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Sitta nagaensis	Chestnut-vented Nuthatch	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Sitta frontalis	Velvet-fronted Nuthatch	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Machlolophus spilonotus	Yellow-cheeked Tit	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Sylviparus modestus	Yellow-browed Tit	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Melanochlora sultanea	Sultan Tit	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hirundo rustica	Barn Swallow	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hirundo smithii	Wire-tailed Swallow	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Delichon dasypus	Asian House Martin	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Pycnonotus jocosus	Red-whiskered Bulbul	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pycnonotus aurigaster	Sooty-headed Bulbul	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pycnonotus blanfordi	Streak-eared Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Iole propinqua	Grey-eyed Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ixos mcclellandii	Mountain Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Prinia polychroa	Brown Prinia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Prinia rufescens	Rufescent Prinia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Prinia hodgsonii	Grey-breasted Prinia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Tesia cyaniventer	Grey-bellied Tesia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Urosphena squameiceps	Asian Stubtail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Locustella tacsanowskia	Chinese Grasshopper-warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Locustella lanceolata	Lanceolated Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Acrocephalus bistrigiceps	Black-browed Reed-warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Arundinax aedon	Thick-billed Warbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Phyllergates cucullatus	Mountain Tailorbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Orthotomus sutorius	Common Tailorbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Orthotomus atrogularis	Dark-necked Tailorbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus fuscatus	Dusky Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus schwarzi	Radde's Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus maculipennis	Ashy-throated Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus inornatus	Yellow-browed Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus tenellipes	Pale-legged Leaf-warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus coronatus	Eastern Crowned Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus ricketti	Sulphur-breasted Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus intermedius	White-spectacled Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus poliogenys	Grey-cheeked Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus castaniceps	Chestnut-crowned Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Abroscopus albogularis	Rufous-faced Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Garrulax monileger	Lesser Necklaced Laughingthrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Garrulax milleti	Black-hooded Laughingthrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Garrulax vassali	White-cheeked Laughingthrush	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Trochalopteron milnei	Red-tailed Laughingthrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Malacocincla abbotti	Abbott's Babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pellorneum albiventre	Spot-throated Babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pellorneum ruficeps	Puff-throated Babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Malacopteron cinereum	Scaly-crowned Babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Erythrogenys hypoleucos	Large Scimitar-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pomatorhinus schisticeps	White-browed Scimitar-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pomatorhinus ochraceiceps	Red-billed Scimitar-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Turdinus brevicaudatus	Streaked Wren-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Napothera epilepidota	Eyebrowed Wren-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pnoepyga pusilla	Pygmy Cupwing	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Cyanoderma ruficeps	Rufous-capped Babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Stachyris nigriceps	Grey-throated Babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Mixornis kelleyi	Grey-faced Tit-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Timalia pileata	Chestnut-capped Babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Chrysomma sinense	Yellow-eyed Babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pteruthius aenobarbus	Chestnut-fronted Shrike-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Siva cyanouroptera	Blue-winged Minla	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Minla ignotincta	Red-tailed Minla	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Schoeniparus rufogularis	Rufous-throated Fulvetta	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Schoeniparus dubius	Rusty-capped Fulvetta	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Alcippe poioicephala	Brown-cheeked Fulvetta	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Alcippe morrisonia	Grey-cheeked Fulvetta	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Leioptila annectens	Rufous-backed Sibia	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Heterophasia picaoides	Long-tailed Sibia	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Yuhina gularis	Stripe-throated Yuhina	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Yuhina nigrimenta	Black-chinned Yuhina	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Erpornis zantholeuca	White-bellied Erpornis	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Suthora nipalensis	Black-throated Parrotbill	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dicaeum chrysorrheum	Yellow-vented Flowerpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Dicaeum cruentatum	Scarlet-backed Flowerpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Chalcoparia singalensis	Ruby-cheeked Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Arachnothera hypogrammica	Purple-naped Spiderhunter	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cinnyris asiaticus	Purple Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Aethopyga gouldiae	Gould's Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Aethopyga nipalensis	Green-tailed Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Aethopyga saturata	Black-throated Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Arachnothera magna	Streaked Spiderhunter	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Passer montanus	Eurasian Tree Sparrow	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Dendronanthus indicus	Forest Wagtail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Motacilla alba	White Wagtail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Motacilla cinerea	Grey Wagtail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Anthus rufulus	Paddyfield Pipit	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Anthus hodgsoni	Olive-backed Pipit	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ploceus manyar	Streaked Weaver	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ploceus philippinus	Baya Weaver	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lonchura striata	White-rumped Munia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Lonchura punctulata	Scaly-breasted Munia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Carpodacus erythrinus	Common Rosefinch	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Emberiza fucata	Chestnut-eared Bunting	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Emberiza rutila	Chestnut Bunting	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Chalcophaps indica	Grey-capped Emerald Dove	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ducula aenea	Green Imperial-pigeon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ninox scutulata	Brown Boobook	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Caprimulgus jotaka	Grey Nightjar	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Caprimulgus macrurus	Large-tailed Nightjar	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Merops orientalis	Asian Green Bee-eater	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Coracias affinis	Indochinese Roller	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Psilopogon auricularis	Necklaced Barbet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Psilopogon cyanotis	Blue-eared Barbet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Dendrocopos analis	Freckle-breasted Woodpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Picus guerini	Black-naped Woodpecker	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Chrysocolaptes guttacristatus	Greater Flameback	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Lacedo pulchella	Banded Kingfisher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Dinopium javanense	Common Flameback	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Phodilus badius	Oriental Bay-owl	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ducula badia	Mountain Imperial-pigeon	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Batrachostomus javensis	Horsfield's Frogmouth	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hierococcyx sparverioides	Large Hawk-cuckoo	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Otus sunia	Oriental Scops-owl	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lonchura atricapilla	Chestnut Munia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Anas crecca	Common Teal	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Abroscopus superciliaris	Yellow-bellied Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Arborophila chloropus	Green-legged Partridge	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Trichastoma tickelli	Buff-breasted Babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Nisaetus cirrhatus	Changeable Hawk-eagle	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Buteo japonicus	Japanese Buzzard	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Phylloscopus soror	AlstrÃ¶m's Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Acrocephalus orientalis	Oriental Reed-warbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hierococcyx hyperythrus	Northern Hawk-cuckoo	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hierococcyx nisicolor	Whistling Hawk-cuckoo	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ficedula albicilla	Red-throated Flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Locustella mandelli	Russet Grasshopper-warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus ogilviegranti	Kloss's Leaf-warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus reguloides	Blyth's Leaf-warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Mirafra erythrocephala	Indochinese Bushlark	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Chloropsis aurifrons	Golden-fronted Leafbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Gampsorhynchus torquatus	Collared Babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Fulvetta danisi	Indochinese Fulvetta	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Alcippe grotei	Black-browed Fulvetta	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Heterophasia desgodinsi	Black-headed Sibia	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Yuhina torqueola	Indochinese Yuhina	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Garrulax leucolophus	White-crested Laughingthrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Mixornis gularis	Pin-striped Tit-babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Schoeniparus castaneceps	Rufous-winged Fulvetta	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Alcippe peracensis	Mountain Fulvetta	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Psittiparus gularis	Grey-headed Parrotbill	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Psilopogon annamensis	Annam Barbet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Parus major	Great Tit	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Surniculus dicruroides	Fork-tailed Drongo-cuckoo	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Polyplectron bicalcaratum	Grey Peacock-pheasant	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Anas poecilorhyncha	Indian Spot-billed Duck	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Burhinus indicus	Indian Thick-knee	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Spilopelia chinensis	Eastern Spotted Dove	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Aerodramus fuciphagus	Edible-nest Swiftlet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Cuculus saturatus	Oriental Cuckoo	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ceyx erithaca	Oriental Dwarf-kingfisher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Otus lettia	Collared Scops-owl	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Egretta garzetta	Little Egret	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Serilophus lunatus	Silver-breasted Broadbill	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Eurylaimus harterti	Banded Broadbill	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pteruthius aeralatus	White-browed Shrike-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pericrocotus solaris	Grey-chinned Minivet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tephrodornis virgatus	Large Woodshrike	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tephrodornis pondicerianus	Common Woodshrike	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rhipidura albicollis	White-throated Fantail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Dicrurus hottentottus	Hair-crested Drongo	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dicrurus paradiseus	Greater Racquet-tailed Drongo	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hypothymis azurea	Black-naped Monarch	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Terpsiphone incei	Chinese Paradise-flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Terpsiphone affinis	Oriental Paradise-flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Garrulus leucotis	White-faced Jay	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pica pica	Eurasian Magpie	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cyanoptila cyanomelana	Blue-and-white Flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cyornis sumatrensis	Indochinese Blue-flycatcher	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Mirafra javanica	Horsfield's Bushlark	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Myiomela leucura	White-tailed Blue Robin	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ficedula hyperythra	Snowy-browed Flycatcher	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Irena puella	Asian Fairy-bluebird	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Chloropsis lazulina	Greyish-crowned Leafbird	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Chloropsis moluccensis	Blue-winged Leafbird	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Dicaeum minullum	Plain Flowerpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Dicaeum ignipectus	Fire-breasted Flowerpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Prinia superciliaris	Hill Prinia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Prinia flaviventris	Yellow-bellied Prinia	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Arachnothera longirostra	Little Spiderhunter	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Anthreptes malacensis	Brown-throated Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Leptocoma brasiliana	Maroon-bellied Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cinnyris jugularis	Olive-backed Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Aethopyga siparaja	Crimson Sunbird	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Aethopyga latouchii	Fork-tailed Sunbird	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Delichon lagopodum	Eastern House Martin	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Cecropis daurica	Red-rumped Swallow	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Riparia chinensis	Asian Plain Martin	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Alophoixus pallidus	Puff-throated Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Anthus richardi	Richard's Pipit	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Motacilla tschutschensis	Eastern Yellow Wagtail	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hemixos flavala	Ashy Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hypsipetes leucocephalus	Black Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rubigula flaviventris	Black-crested Bulbul	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pycnonotus finlaysoni	Stripe-throated Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pycnonotus flavescens	Flavescent Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Brachypodius atriceps	Black-headed Bulbul	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Phylloscopus plumbeitarsus	Two-barred Warbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Brachypteryx cruralis	Himalayan Shortwing	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Acridotheres leucocephalus	Vinous-breasted Myna	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Aegithalos annamensis	Grey-crowned Tit	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Acridotheres grandis	Great Myna	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Garrulax chinensis	Black-throated Laughingthrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Leiothrix argentauris	Silver-eared Mesia	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Gracula religiosa	Common Hill Myna	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Sitta neglecta	Burmese Nuthatch	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pomatorhinus phayrei	Brown-crowned Scimitar-babbler	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Copsychus saularis	Oriental Magpie-robin	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Kittacincla malabarica	White-rumped Shama	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Cyanoderma rufifrons	Rufous-fronted Babbler	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tarsiger cyanurus	Orange-flanked Bush-robin	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Dicaeum agile	Thick-billed Flowerpecker	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Zosterops palpebrosus	Indian White-eye	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Zosterops simplex	Swinhoe's White-eye	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Zoothera aurea	White's Thrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Zoothera dauma	Scaly Thrush	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Microhierax melanoleucos	Pied Falconet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Amynthas papulosus		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pachydrobia incerta		NT OR LR/NT	unknown	n	Unlikely to qualify given range extent	
Hubendickia polita		NT OR LR/NT	unknown	n	Unlikely to qualify given range extent	
Radix auricularia		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Melanoides tuberculata		LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Indoplanorbis exustus		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Tarebia granifera		LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Intha umbilicalis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Radix swinhoei		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pila polita		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Polypylis hemisphaerula		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Gyraulus convexiusculus		LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Brotia costula		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Lecythoconcha lecythis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Segmentina trochoidea		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Thiara rudis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Gyraulus siamensis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Filopaludina filosa		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pachydrobia munensis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pachydrobia prasongi		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Jullienia harmandi		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hydrorissoia trispirales		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Idiopoma doliaris		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Idiopoma javanica		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Idiopoma simonis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Cerithium coralium	Coral Cerith	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pila pesmei		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Idiopoma ingallsiana		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Lacunopsis levayi		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Halewisia expansa		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pomacea lineata		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Sulcospira dakrongensis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Sulcospira tourannensis		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Bithynia morleti		DD	unknown	n	Unlikely to qualify given range extent	
Sulcospira dautzenbergiana		DD	unknown	n	Unlikely to qualify given range extent	
Hubendickia velimirovichi		DD	unknown	n	Unlikely to qualify given range extent	
Viviparus boettgeri		DD	unknown	n	Unlikely to qualify given range extent	
Mekongia lamarcki		DD	unknown	n	Unlikely to qualify given range extent	
Mekongia rattei		DD	unknown	n	Unlikely to qualify given range extent	
Jullienia crooki		DD	unknown	n	Unlikely to qualify given range extent	
Lacunopsis sphaerica		DD	unknown	n	Unlikely to qualify given range extent	
Hydrorissoia elongata		DD	unknown	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Hubendickia cylindrica		DD	unknown	n	Unlikely to qualify given range extent	
Hydrorissoia elegans		DD	unknown	n	Unlikely to qualify given range extent	
Stenothyra mcmulleni		DD	unknown	n	Unlikely to qualify given range extent	
Ischnura senegalensis	Tropical Bluetail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pantala flavescens	Wandering Glider	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tholymis tillarga	Old World Twister	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Tramea basilaris	Keyhole Glider	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Troides aeacus	Golden Birdwing	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Lestes concinnus	Dusky Spreadwing	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Heliocypha biforata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Tetrathemis platyptera		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Gomphidictinus perakensis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Vestalis gracilis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Onychargia atrocyana		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ceriagrion azureum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Vestalaria smaragdina		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Tramea virginia		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Brachydiplax farinosa		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ceriagrion coromandelianum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Vestalis apicalis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Neurobasis chinensis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aciagrion hisopa		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Heliocypha perforata	Common Blue Jewel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ceriagrion auranticum	Orange-tailed Sprite	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Orthetrum sabina	Slender Skimmer	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Urothemis signata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pseudocopera ciliata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Zygonyx iris		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Davidius fruhstorferi		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Macromia flavocolorata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Paragomphus capricornis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rhyothemis variegata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Prodasineura autumnalis	Black Threadtail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Macromidia rapida		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ceriagrion olivaceum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Brachydiplax chalybea		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cratilla lineata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Anaciaeschna jaspidea		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Tramea transmarina	Red Glider Dragonfly	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Agriocnemis femina		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pseudagrion pruinosum		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Prodasineura croconota		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aciagrion occidentale		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aethriamanta brevipennis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Agriocnemis pygmaea	Wandering Midget	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Agrionoptera insignis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Epophthalmia vittata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Orthetrum luzonicum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Copera marginipes		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Anax guttatus	Lesser Green Emperor	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	

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Argiocnemis rubescens	Red-tipped Shadefly	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Nychogomphus duaricus		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Orthetrum japonicum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Brachythemis contaminata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Trithemis pallidinervis	Dancing Dropwing	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Diplacodes trivialis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ischnura aurora	Gossamer Damselfly	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ceriagrion fallax		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Orthetrum testaceum		LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Copera vittata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Libellago lineata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Trithemis aurora		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Orthetrum chrysis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Euphaea masoni		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Euphaea guerini		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Risiophlebia dohrni		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Camacinia gigantea		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Calicnemia eximia		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Orolestes octomaculatus		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Orolestes selysi		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ceriagrion cerinorubellum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dysphaea gloriosa		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rhyothemis phyllis	Yellow-striped Flutterer	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ceriagrion indochinense		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Leptogomphus divaricatus		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Indocnemis orang		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Tetrathemis irregularis	Rainforest Elf	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Macrodiplax cora	Cora's Pennant	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lestes praemorsus		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Neurothemis fluctuans		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Epophthalmia vittigera		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rhinagrion hainanense		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Anax panybeus		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ceriagrion praetermissum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aciagrion azureum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Gynacantha subinterrupta		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Heliaeschna uninervulata		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Aethriamanta gracilis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Agriocnemis nana		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Archibasis viola		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Mortonagrion falcatum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Idionyx thailandica		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Euphaea ochracea		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Onychothemis culminicola		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Burmagomphus divaricatus		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Gomphidia abbotti		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Orchithemis pulcherrima		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pseudothemis jorina		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Coeliccia scutellum		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Pseudagrion microcephalum ssp. microcephalum		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Troides helena	Common Birdwing	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Quilta oryzae	Asian Rice Conehead Grasshopper	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Saussurella cornuta	Common Pointed Pygmy Groundhopper	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hierodula tenuidentata	Giant Asian Mantis	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Pachliopta aristolochiae	Common Rose	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Losaria coon	Common Clubtail	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Onthophagus tricolor		DD	unknown	n	Unlikely to qualify given range extent	
Coeliccia montana		DD	unknown	n	Unlikely to qualify given range extent	
Macrogomphus borikhanensis		DD	unknown	n	Unlikely to qualify given range extent	
Leptogomphus baolocensis		DD	unknown	n	Unlikely to qualify given range extent	
Aristocypha fulgipennis		DD	decreasing	n	Unlikely to qualify given range extent	
Amphithemis kerri		DD	unknown	n	Unlikely to qualify given range extent	
Macromia septima		DD	unknown	n	Unlikely to qualify given range extent	
Protosticta robusta		DD	unknown	n	Unlikely to qualify given range extent	
Macrogomphus matsukii		DD	unknown	n	Unlikely to qualify given range extent	
Devadatta cyanocephala		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Planaeschna owadai		DD	unknown	n	Unlikely to qualify given range extent	
Juncus articulatus	Jointed Rush	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Juncus bufonius	Toad Rush	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Vallisneria spiralis	Tapegrass	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Alisma plantago-aquatica	Common Water-plantain	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Zannichellia palustris	Horned Pondweed	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Typha angustifolia	Lesser Bulrush	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Typha domingensis	Southern Cat-tail	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Potamogeton nodosus	Loddon Pondweed	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Najas graminea	Ricefield Waternymph	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Najas marina	Holly-leaved Naiad	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Najas minor	Slender Naiad	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ottelia alismoides	Duck-Lettuce	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Monochoria korsakowii		LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Hydrilla verticillata	Hydrilla	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Typha orientalis	Bullrush	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Isachne globosa	Swamp Millet	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Lemna perpusilla		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Sagittaria pygmaea		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Vallisneria natans		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Najas indica		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Sagittaria trifolia		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Potamogeton wrightii		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Potamogeton octandrus		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Monochoria hastata	Leaf Pondweed	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Cryptocoryne retrospiralis		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Monochoria vaginalis	Pickerel Weed	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Cryptocoryne ciliata	Water Trumpet	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophyton obtusifolium	Arrow Head	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Blyxa aubertii	Round Fruit Blyxa	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Juncus prismatocarpus		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Landoltia punctata	Dotted Duckweed	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Lasia spinosa		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hydrocharis dubia		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Blyxa octandra		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Nechamandra alternifolia		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Cyanotis axillaris		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Colocasia esculenta	Wild Taro	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Oryza rufipogon	Red Rice	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Oryza officinalis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Wolffia globosa		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Juncus wallichianus		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Juncus decipiens		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Monochoria cyanea		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ottelia cordata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Sparganium subglobosum	BurrÂ-reed	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Typhonium flagelliforme		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Alocasia odora		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Cryptocoryne crispatula		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aglaonema simplex		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Colocasia fallax		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Xyris wallichii		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Meistera chinensis		LC OR LR/LC	stable	n	Project area outside range	
Meistera elephantorum		LC OR LR/LC	stable	n	Project area outside range	
Wurfbainia microcarpa		LC OR LR/LC	stable	n	Project area outside range	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Amomum plicatum		LC OR LR/LC	stable	n	Project area outside range	
Wurfbainia schmidtii		LC OR LR/LC	stable	n	Project area outside range	
Wurfbainia tenella		LC OR LR/LC	stable	n	Project area outside range	
Oryza meyeriana		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Oryza nivara		LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Globba marantina		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Curcuma gracillima		LC OR LR/LC	stable	n	Project area outside range	
Digitaria nuda		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hornstedtia bella		LC OR LR/LC	stable	n	Project area outside range	
Ranalisma rostrata		DD	unknown	n	Unlikely to qualify given range extent	
Cryptocoryne annamica		DD	unknown	n	Unlikely to qualify given range extent	
Curcuma cotuana		DD	unknown	n	Unlikely to qualify given range extent	
Lindernia procumbens	Lindernie couchÃ©e	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Grangea maderaspatana		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Trapa natans	Water Caltrop	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Bacopa monnieri	Water Hyssop	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Alternanthera sessilis	Sessile Joyweed	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Nymphaea tetragona		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila sessiliflora		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Bonnaya antipoda		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Trapa incisa		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Centella asiatica	Centella	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Wedelia chinensis	Chinese Wedelia	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Oenanthe javanica	Water Dropwort	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Sesbania javanica		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Hygrophila salicifolia		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Drosera peltata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Vandellia micrantha		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hemisteptia lyrata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aeschynomene indica	Indian Jointvetch	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Nymphaea pubescens	Hairy Water Lily	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hygrophila pinnatifida	Miramar Weed	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila rugosa	Om kop	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Nymphaea nouchali	Blue Lotus	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hydrolea zeylanica		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Aeschynomene aspera	Sola Pith Plant	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila heterophylla		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Centrostachys aquatica		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Dopatrium junceum	Rushlike Dopatrium	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hygrophila polysperma	Dwarf Hygrophila	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Enydra fluctuans	Buffalo Spinach	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Nymphaea rubra		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila indica	Indian Marshweed	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Drosera burmanni		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hydrobryum griffithii		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Sesbania bispinosa	Sesbania Pea	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Barclaya longifolia	Orchid Lily	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Cladopus pierrei		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Quercus aliena		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hydrodiscus koyamae		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Hydrobryum japonicum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Eclipta angustata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Adenosma indianum		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Curanga amara		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila erecta		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila geoffrayi		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila laxa		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila micrantha		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila villifera		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Bonnaya multiflora		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Limnophila glabra		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Vandellia montana		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Prunus salicina	Asian Plum	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cinnamomum iners	Wild Cinnamon	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Quercus macrocalyx		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Cassia fistula		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Beilschmiedia roxburghiana		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Zanthoxylum nitidum		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Gironniera subaequalis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Aidia cochinchinensis		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Litsea monopetala		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Cladopus fallax		DD	unknown	n	Unlikely to qualify given range extent	
Cussetia diversifolia		DD	unknown	n	Unlikely to qualify given range extent	
Cussetia carinata		DD	unknown	n	Unlikely to qualify given range extent	
Hydrobryum tardhuangense		DD	unknown	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Limnophila polyantha		DD	unknown	n	Unlikely to qualify given range extent	
Pistacia weinmanniifolia		DD	decreasing	n	Unlikely to qualify given range extent	
Ficus abelii		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Mallotus paniculatus		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Catopuma temminckii	Asiatic Golden Cat	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Ia io	Great Evening Bat	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Kerivoula picta	Painted Woolly Bat	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Macaca assamensis	Assam Macaque	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Pardofelis marmorata	Marbled Cat	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Ratufa bicolor	Black Giant Squirrel	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Macaca assamensis ssp. assamensis	Assam Macaque	NT OR LR/NT	decreasing	n	Unlikely to qualify given range extent	
Atherurus macrourus	Asiatic Brush-tailed Porcupine	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Bandicota indica	Greater Bandicoot Rat	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Berylmys berdmorei	Berdmore’s Berylmys	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Callosciurus erythraeus	Pallas's Squirrel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Callosciurus finlaysonii	Variable Squirrel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Chiromyscus chiropus	Indochinese Chiromyscus	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Chiropodomys gliroides	Indomalayan Pencil-tailed Tree Mouse	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cynopterus brachyotis	Lesser Dog-faced Fruit Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Cynopterus sphinx	Greater Shortnosed Fruit Bat	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Dremomys rufigenis	Red-cheeked Squirrel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Eonycteris spelaea	Dawn Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Felis chaus	Jungle Cat	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Glischropus tylopus	Common Thick-thumbed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hesperoptenus blanfordi	Blanford's Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hesperoptenus tickelli	Tickell's Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hipposideros armiger	Great Himalayan Leaf-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hipposideros cineraceus	Least Leaf-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hipposideros diadema	Diadem Leaf-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hipposideros galeritus	Cantor's Leaf-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hipposideros larvatus	Horsfield's Leaf-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hipposideros pomona	Andersen's Leaf-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hylopetes alboniger	Particolored Flying Squirrel	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Hylopetes phayrei	Indochinese Flying Squirrel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hylopetes spadiceus	Red-cheeked Flying Squirrel	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hystrix brachyura	Malayan Porcupine	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Leopoldamys edwardsi	Edwards's Long-tailed Giant Rat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Leopoldamys sabanus	Long-tailed Giant Rat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Macaca mulatta	Rhesus Monkey	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Macroglossus sobrinus	Hill Long-tongued Fruit Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Maxomys moi	Indochinese Mountain Maxomys	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Maxomys surifer	Indomalayan Maxomys	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	

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Lyroderma lyra	Greater False Vampire	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Megaderma spasma	Lesser False Vampire	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Megaerops niphanae	Ratanaworabhan's Fruit Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Menetes berdmorei	Berdmore's Squirrel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Miniopterus magnater	Large Bent-winged Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Miniopterus pusillus	Small Long-fingered Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Murina aurata	Tibetan Tube-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Mus caroli	Ryukyu Mouse	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Mus musculus	House Mouse	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Mus pahari	Gairdner's Shrewmouse	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Myotis annectans	Hairy-faced Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Myotis horsfieldii	Horsfield's Myotis	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Myotis rosseti	Thick-thumbed Myotis	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Myotis siligorensis	Himalayan Whiskered Myotis	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Niviventer fulvescens	Chestnut White-bellied Rat	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Niviventer langbianis	Lang Bian White-bellied Rat	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Niviventer tenaster	Indochinese Mountain Niviventer	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Petaurista elegans	Spotted Giant Flying Squirrel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Petaurista philippensis	Indian Giant Flying Squirrel	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Pipistrellus abramus	Japanese Pipistrelle	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Hypsugo cadornae	Cadorna's Pipistrelle	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pipistrellus coromandra	Coromandel Pipistrelle	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pipistrellus javanicus	Javan Pipistrelle	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pipistrellus paterculus	Mount Popa Pipistrelle	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	

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Pipistrellus tenuis	Least Pipistrelle	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Prionailurus bengalensis	Leopard Cat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rattus argentiventer	Ricefield Rat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rattus exulans	Polynesian Rat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rattus losea	Losea Rat	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Rattus nitidus	Himalayan Field Rat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rattus rattus	House Rat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rattus andamanensis	Indochinese Forest Rat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rattus tanezumi	Oriental House Rat	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Rhinolophus acuminatus	Accuminate Horseshoe Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rhinolophus affinis	Intermediate Horseshoe Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rhinolophus luctus	Great Woolly Horsehoe Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rhinolophus malayanus	Malayan Horseshoe Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rhinolophus shameli	Shamel's Horseshoe Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rhinolophus thomasi	Thomas's Horseshoe Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rhizomys pruinosus	Hoary Bamboo Rat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rhizomys sumatrensis	Indomalayan Bamboo Rat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rousettus amplexicaudatus	Geoffroy's Rousette	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rousettus leschenaultii	Leschenault’s Rousette	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Scotomanes ornatus	Harlequin Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Scotophilus heathii	Greater Asiatic Yellow House Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Scotophilus kuhlii	Lesser Asiatic Yellow House Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tamiops maritimus	Maritime Striped Squirrel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

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Tamiops rodolphii	Cambodian Striped Squirrel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Taphozous melanopogon	Black-bearded Tomb Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Taphozous theobaldi	Theobold's Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Tylonycteris pachypus	Lesser Bamboo Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Tylonycteris robustula	Greater Bamboo Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hylomys suillus	Short-tailed Gymnure	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Crocidura fuliginosa	Southeast Asian Shrew	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Lepus peguensis	Burmese Hare	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Suncus murinus	House Shrew	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Euroscaptor klossi	Kloss's Mole	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dendrogale murina	Northern Smooth-tailed Treeshrew	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Tupaia belangeri	Northern Treeshrew	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Galeopterus variegatus	Sunda Flying Lemur	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Herpestes urva	Crab-eating Mongoose	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Melogale moschata	Small-toothed Ferret Badger	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Melogale personata	Large-toothed Ferret Badger	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Martes flavigula	Yellow-throated Marten	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Mustela kathiah	Yellow-bellied Weasel	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Arctogalidia trivirgata	Small-toothed Palm Civet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Paguma larvata	Masked Palm Civet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Paradoxurus hermaphroditus	Common Palm Civet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Prionodon pardicolor	Spotted Linsang	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Viverra zibetha	Large Indian Civet	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Viverricula indica	Small Indian Civet	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Sus scrofa	Wild Boar	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Kerivoula kachinensis	Kachin Woolly Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tragulus kanchil	Lesser Oriental Chevrotain	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Muntiacus vaginalis	Northern Red Muntjac	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Rhinolophus siamensis	Thai Horseshoe Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Kerivoula titania	Titania's Woolly Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Crocidura attenuata	Grey Shrew	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Herpestes javanicus	Javan Mongoose	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Glischropus bucephalus	Indochinese Thick-thumbed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rhinolophus stheno	Lesser Brown Horseshoe Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rhinolophus microglobosus	Indo-Chinese Lesser Brown Horseshoe Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Murina annamitica	Annam Tube-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Murina fionae	Fiona’s Tube-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Murina feae		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Myotis muricola	Nepalese Whiskered Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rhinolophus pusillus	Least Horseshoe Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Canis aureus	Golden Jackal	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Kerivoula hardwickii	Common Woolly Bat	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Murina cyclotis	Round-eared Tube-nosed Bat	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Muntiacus rooseveltorum	Roosevelts' Muntjac	DD	decreasing	n	Unlikely to qualify given range extent	
Muntiacus truongsonensis	Annamite Muntjac	DD	decreasing	n	Unlikely to qualify given range extent	
Crocidura zaitsevi	Mikhail Zaitsev's Shrew	DD	unknown	n	Unlikely to qualify given range extent	
Murina beelzebub	Beelzebub Tube-nosed Bat	DD	unknown	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Hypsugo dolichodon	Long-toothed Pipistrelle	DD	unknown	n	Unlikely to qualify given range extent	
Marsilea quadrifolia	Water Shamrock	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Salvinia natans	Floating Fern	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Marsilea minuta	Dwarf Water Clover	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Marsilea crenata		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Salvinia cucullata	Asian Watermoss	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Sphenomorphus tridigitus		NT OR LR/NT	unknown	n	Unlikely to qualify given range extent	
Varanus bengalensis	Common Indian Monitor	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Acanthosaura lepidogaster	Brown Pricklenape	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Draco maculatus	Spotted Flying Dragon	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hemidactylus brookii	Brooke's House Gecko	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hemidactylus frenatus	Common House Gecko	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ahaetulla prasina	Gunther's Whip Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Enhydris plumbea	Rice Paddy Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Oligodon cinereus	Black Cross-barred Kukri Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Oligodon cyclurus	North-east Indian Kukri Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Naja kaouthia	Monocled Cobra	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Ptyas carinata	Keeled Rat Snake	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Sinonatrix aequifasciata	Diamond-backed Water Snake	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Psammophis condanarus	Indo-chinese Sand Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Sibynophis collaris	Collared Black-headed Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ptychozoon lionotum	Smooth-backed Flying Gecko	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Varanus salvator	Common Water Monitor	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Takydromus sexlineatus	Asian Grass Lizard	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Trimeresurus albolabris	White-lipped Tree Viper	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Xenopeltis unicolor	Asian Sunbeam Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Takydromus hani	South-east Asian Green Grass Lizard	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ovophis monticola	Chinese Mountain Pit Viper	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Argyrophis diardii	Diard's Blindsnake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Malayopython reticulatus	Reticulated Python	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Lycodon davisonii	Blanford's Bridal Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Gonyosoma oxycephalum	Red-Tailed Racer	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Lycodon subcinctus	White-Banded Wolf Snake	LC OR LR/LC		n	Unlikely to qualify given range extent	
Rhabdophis chrysargos	Speckle-bellied Keelback	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Fimbrios klossi	Kloss's Rough Water Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hebius leucomystax	White-lipped Keelback	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pseudoxenodon macrops	Large-eyed False Cobra	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Oligodon taeniatus	Striped Kukri Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Bungarus multicinctus	Many-banded Krait	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Dendrelaphis subocularis	Mountain Bronzeback Tree Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Oligodon mouhoti	Cambodian Kukri Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pareas margaritophorus	White-spotted Slug Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Rhabdophis nigrocinctus	Black-banded Keelback	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Dendrelaphis ngansonensis	Nganson Bronzeback Tree Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Xenochrophis trianguligerus	Red-sided Keelback Water Snake	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Oligodon fasciolatus	Small-banded Kukri Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lycodon capucinus	Indian Wolf Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Cylindrophis ruffus	Common Pipe Snake	LC OR LR/LC	increasing	n	Unlikely to qualify given range extent	
Rhadinophis prasina	Green Trinket Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Rhabdophis subminiatus	Red-necked Keelback	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Xenochrophis flavipunctatus	Yellow-spotted Keelback Water Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Xenopeltis hainanensis	Hainan Sunbeam Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Sinonatrix percarinata	Chinese Keelback Water Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Pareas hamptoni	Hampton's Slug-eating Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Boiga guangxiensis	Guangxi Cat Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lycodon laoensis	Laos Wolf Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Ptyas multicinctus	Many-banded Green Snake	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Calamaria pavimentata	Brown Reed Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Calliophis maculiceps	Speckled Coral Snake	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Pareas carinatus	Keeled Slug-eating Snake	LC OR LR/LC	decreasing	n	Unlikely to qualify given range extent	
Bungarus candidus	Malayan Krait	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Eutropis multifasciata	Common Mabuya	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Gekko gecko	Tokay Gecko	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Lygosoma corpulentum	Fat Skink	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Lipinia vittigera	Banded Lipinia	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Acanthosaura nataliae		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Ptychozoon trinotaterra		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	

Scientific Name	Common Name	Red List Category	Population Trend	Screened in	Rationale	Criterion
Eutropis longicaudata	Longtail Mabuya	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Scincella melanosticta	Black Ground Skink	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Scincella rupicola		LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Plestiodon quadrilineatus	Hong Kong Skink	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Sphenomorphus buenloicus		LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tropidophorus cocincinensis	Cochinchinese Water Skink	LC OR LR/LC	stable	n	Unlikely to qualify given range extent	
Tropidophorus hainanus	Hainan Water Skink	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Lygosoma siamensis	Siamese Supple Skink	LC OR LR/LC	unknown	n	Unlikely to qualify given range extent	
Hebius annamensis	Annam Keelback	DD	unknown	n	Unlikely to qualify given range extent	
Oligodon saintgironsi	Saint Giron's Kukri Snake	DD	unknown	n	Unlikely to qualify given range extent	
Sphenomorphus stellatus	Perak Forest Skink	LC OR LR/LC	unknown	n	Project outside known range	

APPENDIX E RAPID ECOLOGICAL ASSESSMENT SURVEY APPROACH

BRIEF PROPOSAL: RAPID ECOLOGICAL ASSESSMENT FOR WIND FARM PROJECT, SEKONG PROVINCE, LAO PDR

1. Introduction

Wind farm is an inexpensive source of electric power, competitive with or in many places cheaper than a hydropower dam project as well as coal and gas plants. However, it requires quite large area of land concession which would generate impact on terrestrial ecosystem and flyways of migratory birds, bats and other species associated with sites during the project construction and operation. It is very much dependent on-site selection whether it is poor, moderate or rich biodiversity. Careful assessment on environment concern due to the project is strongly required as to ensure mitigation measures are in place at all stages of the project development.

The proposed Sekong Wind Farm Project is ca. 708km^2 with its capacity of 600 MW and a 500 Kv Transmission Line of 21.3 km. The TL of 500 kV will run from the project site to Vietnam crossing a biodiversity conservation corridor (BCC). This BCC has been funded by ADB and it is still ongoing. This proposal is to conduct a rapid ecological assessment of the proposed Wind Farm Project.

2. Study Team

The consulting team consists of 10 members (4 experts, 2 government staff and 4 villagers). The expert team with some similar strength and multiple disciplinaries, qualified degrees and relevant experiences (see the list of the survey team below and the experts' CVs in Annex 1). Dr. Phaivanh, the Team Leader with good knowledge in wildlife research and monitoring. He used to take lead as team leader for several projects of biodiversity assessment. Particularly, most recent project that he and his team including Dr. Thananh had conducted the biodiversity assessment of dry forests in central Laos for UNDP project which was very successful. For this biodiversity survey of wind power project, he will oversee all aspects of his project work for each team member responsibility as detailed instructions will be given from design to training, field practice and reporting.

No	Name of specialist	Degree	Expert	Key tasks and Remarks
Expert team				
1	Dr. Phaivanh Phiapalath	PhD in Envon. Biology	Wildlife and protected area	Team Leader, and Mammal/ bird/ecology
2	Dr. Thananh Khotpathoom	PhD in Forest Resource Management	Wildlife, Bird and forest habitat	Bird/habitat/ecology/mapping
3	Ms. Phansamai Phommexay	PhD Candidate in Biodiversity	Bat, forest and wildlife ecology	Bat/wildlife ecology
4	Mr. Duangphachanh Souvansai	M.Sc in Forest Management	Forest and wildlife ecology	Forest ecology
Field assistants from Government and local community				
	Provincial staff (1)			Sekong PAFO
	District staff (1)			Dak Cheung DAFO
	Villagers (4)			Relevant villages

3. Research Area

Sekong Province in southern Laos as mountainous area with high terrain at above 800 m a.s.l. which is considered part of Annamite Mountain Range - the southern section. The project area has 708km^2 and 500 kv Transmission Line for 21.3 km (see the Map in Annex 2).

4. Timeframe and time use

Rapid ecological assessment will be conducted for 3 months from December 2020 to February 2021, of which the fieldwork will take 14 days excluding the traveling days to and from the site. The time requires 2 hours per site or 3-4 sites per day which is dependent on field condition. The travel time from Vientiane to Dak Chueng District in Sekong Province for 2 days or 4 days including on the return trip, training and site preparation for 1 day.

5. Research Method

The research methodology is developed as to obtain the data set as following:

5.1 Literature Reviews

Review all relevant materials (publications and reports) on biodiversity/wildlife in the survey areas (Sekong Provinces). Species distribution in the project site based on IBAT of IUCN will be reviewed and listed.

5.2 Research Design and Approach

A rapid ecological assessment will be conducted to identify key elements of terrestrial ecosystem, understand the current status of ecosystem health – forest structure, compositions and upstream stream health (water quality). All is a qualitative assessment as expert judgement is used to identify what species are likely to occur on the site and to record any direct observations particularly evidences of globally threatened species.

The survey has to cover with by sampling in different conditions of forest such as upland, lower stream, grassland etc. Using GIS and Mapping to help define sampling sites so ca. 45 sites are proposed to cover most habitat representatives including grassland and water sources. The area for each survey site is estimated for ranging up to 500m around the GIS point. Any defined sites for this assessment have to record properly on data set requirement using data sheet with checklist of the assessment.

The output is a REA report with series of REA sheets based on each location that includes location data and photographs of the habitats. In addition to recording the key features of each site expert judgement is used to identify whether the site is low to high risk for the proposed seismic survey, and justification for that determination provided in each sheet. This assessment would identify and provide recommendations which sites and what taxon are needed for further specific surveys.

REA feeds into the mitigation hierarchy allowing the company to select those sites that have least impact on biodiversity or identifying those where additional mitigation will be required, thus allowing the company to assign costs and risks to different elements of the programme.

5.3 Field equipment

Binoculars (4 units), long lens camera (4 units), GPS (2 units) etc. Also, maps (2), fine pencils, stopwatch, data forms etc.

5.4 Safety

All team members will have a life insurance throughout the work. Travel safety is required by securing an insurance for the car and avoid travel at night. Any staff shall not touch with wildlife as to avoid some accidence of disease widespread from researcher to animal e.g Covid-19.

Data will be prepared in spreadsheets which will be easy for data analysis and all data to be organized in a systematic way using coding system.

6. Budget

The budget proposed for this consultancy is US$ 58,179 and details as below:

Item	Amount	Unit cost US$	Sub-total US$
Travel expanses			**6,200**
Travel cost (car-day) 2 cars@19days	38	150	5,700
Local transport	Lumsump	500	500
Food and per diems			**5,890**
Consultants (4), 4@19 days	76	50	3,800
Government staff (2) 2@17 days	34	35	1,190
Villagers (4) 4@15 days	60	15	900
Consultanting for fieldwork			**21,850**
Phaivanh Phiapalath, PhD (TL - Mammal/bird)/ecology	19	400	7,600.00
Thananh Khotpathoom, PhD (bird/habitat/ecology)	19	300	5,700.00
Phansamai, M.Sc (Bat specialist/ecology)	19	250	4,750.00
Duangphachanh Souvanxay, M.Sc (forest ecologist)	19	200	3,800.00
Consultanting for analysis and reporting			**18,250**
Phaivanh Phiapalath, PhD (TL - Mammal/bird)/ecology	20	400	8,000.00
Thananh Khotpathoom, PhD (bird/habitat/ecology)	15	300	4,500.00
Phansamai, M.Sc (Bat specialist/ecology)	15	250	3,750.00
Duangphachanh Souvanxay, M.Sc (forest ecologist)	10	200	2,000.00
Equipment			**700.00**
Batteries for bat accoustic survey, GPS, rangefinders, some stationaires and other			700
Sub-total			*52,890.00*
Contingency (10%)			5,289.00
Grand Total			**58,179.00**

7. Output Deliverables

Field visits will be conducted and all species detected by any means will be identified. The REA report will be prepared with relevant raw data, maps and photos for ERM.

Annexes

Annex 1.

Dr. Phaivanh Phiapalath, Team Leader/Mammal/bird/ecology

Curriculum Vitae | **PHAIVANH PHIAPALATh, PHD**			
1. NAME	Phaivanh Phiapalath	e-mail: p.phiapalath@gmail.com	Tel: 020 55620681
2. DATE OF BIRTH	Dec 2nd, 1972	**NATIONALITY**	Lao
3. PROFILE 	Phaivanh is a conservation biologist, holds PhD in environmental biology, with over 20 years of experience in wildlife surveys and protected area management planning, including collaborative management. He has been working on a wide range of conservation from wildlife surveys, ecological baseline survey to habitat and protected area management planning, management practice, site assessment for international designation and biodiversity monitoring, impact assessment of climate change vulnerability and adaptation through working with international organizations/NGOs. As IUCN SSC Member, visiting lecturer and advisor for post graduate students of FoF/NUoL and SUT, Thailand. He is a qualified national and regional expert on protected area management planning. With strong merit in building young Lao conservation professionals.		
At the same time he serves as independent consultant since 2011, working in the Lower Mekong Basin for MRCs (several project including Mekong Council Study), World Bank Project, ADB, UNDP, GMS/ICEM including in Cambodia, Thailand and Vietnam. Also, short assignments in the ASEAN country (Indonesia and Malaysia). Apart from biodiversity specialist/advisor he used to manage projects, programme as manager and team leader for a number of projects.			
Countries of Work Experience:	Lao PDR, Mekong country, China, Myanmar, Indonesia, Malaysia		
Language Skills:	Lao: Mother tongue English: Very Good;		
Educational and other Qualifications:	• PhD in Environmental biology, Suranaree University of Technology, Thailand in 2009. • M.Sc in Natural Resource Management, Asian Institute of Technology, Thailand, School of Natural Resource. • Diploma in Biology, National University of Laos (new name). **Other Trainings** • IVLP – Inter. Conservation Leader of US Program 2014, USA • Applied Climate change adaptation 2013, Smithsonian Madison, USA • IUCN Redlist: database and assessment 2010, Colombo in Sri Lanka • Primate ecology research and conservation 2007, Stony Brooks, USA • Natural World Heritage 2005, Hiroshima in Japan • Participatory Protected Area Management 1997, RECOFTC **Memberships and Affiliations** • IUCN/SSC Primate Specialist Group • Association for Tropical Biology and Conservation • Wildlife Conservation Association (Advisory Board) • Visiting Lecturer, Faculty of Forestry, National University of Laos and School of Biology, Suranaree University of Technology (SUT), Thailand		
Relevant Experience (From most recent):			

Period: From – To	Name of activity/ Project/ funding organisation, if applicable:	Job Title and Activities undertaken/Description of actual role performed:
Jan 2020 – Mar 2020	**Main task features:** r Assessment of HCVF in dry forest landscape, Central Laos **UNDP**	**National Coordinator/Primatologist** **Activities performed:** (i) conducted consultations and field assessment for defining HCVF sites with management planning in dry forest landscape of central Laos through stakeholder consultations and also conducted fieldwork assessment.
Nov 2019 – May 2020	**Main task features:** Prepare a management plan of Nam Poui NPA **ACB**	**National Protected Area Consultant** **Activities performed:** (i) prepared a management plan for NPA through stakeholder consultations at different levels and also conducted fieldwork on rapid biodiversity assessment for zoning.
May 2019 – July 2019	**Main task features:** Prepare draft spreadsheets for gibbon action plan of Lao PDR. **IUCN/SSC**	**National Coordinator/Primatologist** **Activities performed:** (i) prepared draft spreadsheets for gibbon action plan of Lao PDR through reviews and consultations with key gibbon experts.
Apr 2019 – Aug 2019	**Main task features:** Prepare ecological monitoring guidelines for Beung Kiat Ngong wetland “Ramsar site” **IUCN Laos**	**Biodiversity Monitoring Specialist/TL** **Activities performed:** (i) prepared draft and conducted consultations with field visits for developing ecological monitoring guidelines for Beung Kiat Ngong wetland “Ramsar site”, the concept of collaborative management. Also, to facilitate to conduct the monitoring practice.
June 2018 – Dec Feb 2019	**Main task features:** Conduct a terrestrial biodiversity assessment of wetlands in Lao PDR as part of testing tool for wetland inventory **LMNC/MRC**	**Terrestrial Specialist** **Activities performed:** (i) conducted a terrestrial biodiversity survey in 3 wetlands (Nong Nga, Beung Kiat Ngong and Nong Fah) as to develop the site profile and partly testing the wetland inventory tool being developed with MRC.
July 2018-May 2019	**Main task features:** Conducted CIA of Sekong River Basin. **IFC- SEKONG CUMULATIVE IMPACT ASSESSMENT (CIA)**	**Biodiversity Specialist/TL** **Activities performed:** (i) conducted a scoping mission to obtain globally terrestrial threatened species in the Sekong River Basin, Southern Laos; (ii) conduct key species and wildlife habitats of Sekong Basin for CIA; (iii) develop baseline of defined key species for CIA; (iv) to conduct CIA in the Sekong River Basin with mitigation measures.
Sep 2017	**Main task features:** participate in a study of FLEG-t process in Indonesia. **FLEG_T – EU/**	**Protected Area Advisor** **Activities performed:** (i) conducted consultations and visits to Indonesia to understand the FLEG-t process in Indonesia as to apply the cases for Laos and (ii) prepared some lessons learned the evaluation report.
Sep 2017-May 2018	**Main task features:** conduct biodiversity	**Protected Area and Wildlife Advisor/TL**

	assessment of dry forest. **UNDP- SAFE PROJECT**	**Activities performed:** (i) as team leader, conducted biodiversity assessment of dry forest in Savannakhet Province, Eld's Deer Sanctuary and (ii) to prepare the biodiversity assessment report, both mammal and bird sections were well covered by the team leader for field assessment.
Aug 2017-Mar 2018	**Main task features:** conduct biodiversity survey and stakeholder consultation for collaborative management planning. **LAO-AUSTRIAN REDD+ PROJECT FOR XE PIAN NPA MANAGEMENT**	**Protected Area and Wildlife Advisor/TL** **Activities performed:** (i) as team leader, conducted biodiversity survey (key species and habitats) of Xe Pian NPA to update current status of its biodiversity (ii) assisted the Xe Pian NPA management team, the Champasak and Attapeu province to develop Xe Pian Mgt plan (co-management) through stakeholder consultations from local community to khumban, district and provincial levels.
Mar 2017	**Main task features:** conduct an evaluation Babul National Park for Designation as ASEAN Heritage Site. **ACB, INDONESIA**	**Protected Area Expert** **Activities performed:** (i) conducted an evaluation of the Babul National Park for designation as ASEAN Heritage Site. (ii) facilitated in the workshop for discussion the findings and nomination process, (iii) prepared a report of the evaluation.
Feb 2016	**Main task features:** Facilitate a workshop on collaborative protected area management **ACB/MALAYSIA**	**Protected Area Expert** **Activities performed:** facilitated and presentation a workshop on collaborative protected area management for Gunung Mulu National Park/World Heritage Site, Miri State, Malaysia.
Nov 2016- Aug 2017	**Main task features:** conduct consultations and field site assessment of climate change, vulnerability and adaption planning in urban towns. **DHI/GREEN FUND**	**Wetland Ecology Specialist,** **Activities performed:** conducted consultations with key stakeholders through varies workshops and site visits to develop baseline on climate change, vulnerability and adaption in 4 main cities in Laos (Vientiane, Luang Prabang, Kaisone Phomvihan and Pakse), associated with environment and social concerns.
Oct 2015-July 2017	**Main task features:** planning and developing a series of guidelines on protected area management and wildlife conservation. **LAO ENVIRONMENT AND SOCIAL PROJECT (LENS2)/WB**	**Protected Area Advisor,** **Activities performed:** assisted the government team to prepare, plan and develop a series of guidelines on protected area management and wildlife conservation. This is part of strengthening the government to have a tool and mechanism for long-term protected area management.
Jun 2015-Feb 2016	**Main task features:** assessment of High Conservation Values, natural resource management and Ecosystem Services of dry forest in Savannakhet Province. **UNITED NATIONS**	**Forest Ecosystem Specialist** **Activities performed:** conducted the assessment of High Conservation Values and Ecosystem Service of dry forest from literature reviews, consultation with a range of stakeholders including villages, conducted baseline natural resource management, High Conservation Value Forest of Dry Forest. The findings feed to develop a project proposal of UNDP for GEF6 on dry forest conservation. Also, conducted baseline

	FOR DEVELOPMENT PROGRAMME (UNDP)	natural resource management of Savannakhet province.
May 2015-Dec 2016	**Main task features:** as bird and mammal specialist for Mekong Council Study **MEKONG RIVER COMMISSION (MRC)**	**Mammal Specialist** **Activities performed:** conducted the assessment from literature reviews, consultation with a range of stakeholders and share experience with Mekong Riparian countries, conduct site visits and do expert judgment to shortlist indicators, to complete history, current and trends assessment of defined indicator species.
Oct 2014-May 2015	**Main task features:** consultations, review, site verification, analysis and develop management planning of Nam Xam NPA. **LEAF PROJECT/SNV**	**Protected Area Management Advisor** **Activities performed:** conducted stakeholder consultations at provincial, district and village level as to analyse situations of Nam Xam NPA, socio-economic assessment and analysis of forest degradation and loss, then to develop management planning of Nam Xam NPA as the management goal, objective, key activities, timeframe and sustainable financing, were defined. Also, facilitated district and provincial workshop. Also, to the Nam Xam NPA to develop project proposal and fundraising communication.
Feb 2014-Apr 2015	**Main task features:** consultation and field inspection for recommendations the project on possible forest rehabilitation and management. **APF Net PROJECT**	**Ecosystem Specialist** **Activities performed:** conducted stakeholder consultations with provincial, district and villagers of three provinces (Oudomxay, Luang Namtha and Bokeo), presented and facilitated the stakeholder workshops to understand the current status, their interest and potential in forest rehabilitation.
Dec 2013-Sep 2014	**Main task features:** assist official (DFRM) and NN1 Environment Unit to facilitate in watershed consultation planning including bio-offset. **NAM NGIEP1**	**Protected Area and Wildlife Advisor** **Activities performed:** firstly, facilitated and joined field mission to conduct field surveys to confirm present and absence of endangered primate species in the proposed inundation area of NN1. Then, facilitated several small workshops with officials, to prepare a proposal for preparation the watershed management planning and field surveys for biodiversity offset. Participated in stakeholder workshops, joined field missions and also conducted short visit of the transmission lines crossing adjacent to Phou Khao Khouy NPA.
Oct 2013-Oct 2014	**Main task features:** preparation of a mega project implementation of World Bank (US$23 million) on strengthening the country's systems of protected areas management and wildlife conservation. Also, provide training, assisted and advised in developing subproject proposals. **PROTECTED AREAS**	**Protected Area Advisor** **Activities performed:** Coordinated with stakeholders at all levels including NGOs for consultations. Took lead as national technical advisor in conducting stakeholder consultations with government departments and non-government organisations on PAW project preparation. Facilitated and assisted government partners in national and provincial workshops on PAW project's indicators development till project preparation. Designed and took lead in preparing Project Implementation Plan (PIP) for GEF-WB, Project Implementation Manual (PIM) with World Bank team. As well as Monitoring and Evaluation Manual, involved in conducting METT of NEPL NPA, and Subproject Operation Manual were all prepared.

	AND WILDLIFE PROJECT/GEF-WB	Then, facilitated a series of workshops, provided training and guiding officials of from national and 8 provinces to develop their subproject proposals. At national level, especially for MONRE including DPC and DFRM as editing and supervising over the period of the assignment was carried out as to ensure of meeting qualified proposals for funding.
Apr 2013-Oct 2013	**Main task features:** developing a practical biodiversity monitoring system in protected area with the context of community-based approach as to ensure project sustainability where local communities can handle on the ground work. **Hin Namno, IP/ GIZ**	**Biodiversity Monitoring Advisor** **Activities performed:** Reviewed all relevant biodiversity monitoring related materials. Designed and consulted with provincial and district staff for developing appropriate community-based biodiversity monitoring system where its manual was required. Developed and tested biodiversity monitoring manual to be used in Hin Namno NPA. Prepared training materials and delivered training for Hin Namno NPA team, district staff and khet ranger team (local villagers). With more exercise and refining the biodiversity monitoring manual before final approval.
Nov – Dec 2012	**Main task features:** Obtaining preliminary ecological data in the proposed pepper development project **ECOLOGICAL BASELINE SURVEY IN MONDUKIRI, CAMBODIA, OLAM**	**Team Leader/Terrestrial Ecologist** **Activities performed:** Took lead in conducting survey of preliminary survey on terrestrial ecology. Examined and identified some key potential impacts, analysed and prepared the preliminary report of ecological data eastern buffer zone of Seima Biodiversity Conservation Area, Mondukiri Province, Cambodia. As preliminary report was prepared for the client.
Oct 2012-Feb 2013	**Main task features:** Obtaining best knowledge in ecological baseline data to ensure potential impact on biodiversity due to the proposed coffee development project. **ECOLOGICAL BASELINE SURVEY IN BOLOVEN, CHAMPASAK,**	**Team Leader/Terrestrial Ecologist** **Activities performed:** Took lead in conducting survey of ecological baseline focus on terrestrial ecology. Examined and identified potential impacts, analysed and prepared the ecological baseline report of at eastern buffer zone of Dong Hua Sao NPA, Champasak Province. As baseline data was established for long-term monitoring.
Oct 2012-Sep 2013	**Main task features:** Preparation of a mega-project of KfW - Germany (Euro 15 million) on biodiversity and protected area corridor in northern Laos (Nam Ha-Nam Kan NPA) and central country (HinNamno-Nongma) **KfW for ICBF Project**	**Protected Area Advisor** **Activities performed:** Coordinated for stakeholder consultation. Took lead in field consultations with government departments and non-government organizations for biodiversity conservation corridor project preparation. Facilitated and assisted government partners which national and provincial workshops were held on the project design, refined components, activities consolidation.
May-Jun 2012	**Main task features:** Obtaining best knowledge in wildlife and habitats for	**Team Leader/Wildlife Advisor** **Activities performed:** Conducted village interviews and wildlife survey in Phou Khaya, Sangthong, for

	watershed management planning. **Wildlife Inventory, Nam Ton Project/KfW**	watershed management planning. Also, identified key threat, potential for improving degraded habitats. Prepared a field report for GFA Nam Ton project.
Nov 2011-Mar 2012	**Main task features:** assess existing practice and potential of introduction of REDD+ projects in Lao PDR as to inform some potential consequent impact on biodiversity. **REDD + BIODIVERSITY PROJECT IMPACT ASSESSMENT/GIZ**	**Protected Area and Wildlife Advisor** **Activities performed:** Coordinated with stakeholders for consultations and conducted stakeholder consultations immediately with government departments and non-government organisations in Lao PDR. Consolidated and identified potential impact on biodiversity due to the introduction of REDD+ projects in Lao PDR using the existing and potential of funding. Prepared a report of Lao case with the project team leader.
Nov 2011-May 2012	**Main Project Features**: Strategic Environmental Assessment (SEA) of the GMS Power Development Master Plan to assess alternative GMS energy futures and their effects, and to guide future energy policy options, energy technology mixes and energy efficiency measures to meet demand with the minimum of unplanned and unwanted side effects. **ADB,**	**Biodiversity Specialist** **Activities Performed:** Took the lead in examining, analysing and monetizing environmental and climate change related impacts associated with power development project in GMS by 2030, with special attention to studies carried out by other development partners in GMS countries. Also, identified environmental benefits originating from regional GMS power system integration and the master plan especially biodiversity aspect, and with transmission line project. Proposed climate change mitigation and adaptation measures. Identified opportunities to implement these measures, taking into account differing national goals. Contributed in developing policy recommendations related to the mitigation and adaptation of adverse environmental and climate change impacts. At the same, along the project he contributed to and presented in national and regional workshops of the projects.
Sep 2011-Dec 2012	**Main Project Features**: Identify the best opportunities to mitigate environmental impacts associated with infrastructure construction projects of GMS corridor town development project. **ADB 7644 – GMS**	**Biodiversity Specialist** **Activities Performed***:* Coordinated with provincial authority in Savannakhet Province on project assessment. Consulted with key relevant provincial departments of the province and conducted the assessment of all potentially environmental impacts of the designed projects (road, sanitation, market, embankment, treatment plant) by firstly using rapid environmental assessment checklist to obtain adverse impacts assessment and advice for further assessments which then identified projects required for IEE and ESIA assessment. Conducted and prepared IEE per all projects with specific environmental management plan for each. Climate change, climate proof is included in the assessment. At the same time, he contributed to and facilitated in provincial workshop to present the work.
Jun 2011 - Dec 2011	**Main Project Features**: Basin-wide climate change impact and vulnerability assessment of the wetlands of the Lower	**Wetland Ecosystem Specialist** **Activities Performed:** Coordinate and consult with stakeholders as sourced information and data sets on wetlands including detailed information for case study sites were conducted. Carried out investigations on the

	Mekong Basin for adaptation planning. **BASIN-WIDE CLIMATE CHANGE IMPACTS AND VULNERABILITY ASSESSMENT FOR WETLANDS IN THE LOWER MEKONG/MRC**	vulnerability of wetland biodiversity. Prepared a baseline report showing status, trends and existing threats to wetland biodiversity. Assessed the vulnerability of each site to different climate change impacts. Interpreted climate change impacts on wetland ecology and biodiversity at the sub-basin and regional level. Finally, presented findings at regional workshop for Mekong River Commission and its riparian countries.
Aug 2009 - Jun 2011	**Main Project Features**: Protected Areas management planning and Wildlife conservation planning. **IUCN Lao Programme**	**Senior Programme Officer, Protected Area and Wildlife Advisor** **Activities Performed:** Conducted a number of wildlife survey projects e.g gibbon surveys in Nam Pouy, Dong Khanthung, Saola survey in Khoun Xe Nongma, Lao Langur and Gibbon survey in Phou Hinpoun NPA. Also, conducted biodiversity monitoring and training for Hin Namno Protected Area, held a series of training workshops with district and provincial stakeholders on developing co-management plan for Hin Namno Protected Area. Wetland survey in Beung Kiat Ngong Ramsar site for management planning with socio-economic data collection, economic values, biodiversity and climate change.
2001-2006	**IUCN, DANIDA, WB**	Protected Areas Management and Wildlife With the World Bank's project to develop and initiative poverty reduction fund in northern Laos. With DANIDA for Xe Pian NPA management in southern Laos. With IUCN Lao to strengthen technical assistance to the Government of Laos (GoL) on protected area management, including Third Party Monitoring of GoL for EIA/ESIA performance associated with development projects. Also, facilitated the central government team (ERI) to conduct site inspection of ADB9 in Houaphanh and Attapeu Province.
1995-2000	**Wildlife Conservation Society (WCS)**	Protected Areas Management and Wildlife Joined with the WCS team of biologists to conduct national wildlife inventory in a number of national protected areas such as Nakai-Nam Thuen, Nam Ha, Hin Namno etc.
Publication (relevant)	o Phiapalath, P. P., Khotpathoom, T., Inkhavilay, K., Lamxay, V., Xayyasith, S., and Thammavong, V. (2018a). Biodiversity Assessment of Dry Dipterocarp Forest in the Eld's Deer Sanctuary, Savannakhet province. Department of Forestry, Ministry of Agriculture and Forestry/UNDP - Sustainable Forest and Land Management in the DDF Ecosystems of Southern Lao PDR, Vientiane, Lao PDR. Under Review: 215 pages. o Phiapalath, P. P., Khotpathoom, T., Inkhavilay, K. Lamxay, V., Xayyasith, S.,	

	and Thammavong, V. (2018b). Biodiversity survey for wildlife-based ecotourism development in the Eld's Deer Sanctuary and its adjacent areas, Saavannakhet province. Department of Forestry, Ministry of Agriculture and Forestry/UNDP - Sustainable Forest and Land Management in the DDF Ecosystem of Southern Lao PDR, Vientiane, Lao PDR. o Phiapalath, P. (2018c). Village-based Biodiversity Assessment of Xe Pian National Protected Area, Lao-Austrian REDD+ Project for Xe Pian NPA, Champasak Province. o Phiapalath, P., Borries, C. and Suwanwaree, P. (2011). Seasonality of group size, feeding, and breeding in wildlife red-shanked douc langur (Lao PDR). AJP 73: 1134-44 o Phiapalath, P. (2013). Background Paper on Designing for Participatory Biodiversity Monitoring. Integrated Nature Conservation & Sustainable Resource Management in the Hin Namno Region. GIZ/IP Consultant o Phiapalath, P. (2013). Manual for Participatory Biodiversity Monitoring. Integrated Nature Conservation & Sustainable Resource Management in the HinNamno Region. GIZ/IP o Meynell P., Derbyshire, W., Halliburton, T., Meier, P., Sjørslev, J, Sawdon, J, Suljada, T,… and Phiapalath, P. (2013). Impact Assessment Report. Ensuring sustainability of GMS Regional Power Development. ICEM Asia, Hanoi. o Schmidt, L., Phiapalath, P. and McBreen, J. (2012). A Synthesis Report: REDD+ related risks, opportunities and safeguards for Biodiversity Consideration. A Survey of Issues and options in Lao PDR and Ecuador. GIZ/MBZ, Bonn in Germany. o Vongkhamheng, C., Phiapalath, P., Vongkhamheng, J. and Vongsa, O. (2012). *Draft* Report of Green Peafowl Census in Dong Khanthoung Provincial Protected Area, Champassak Province in Lao PDR. Lao Wildlife Conservation Association for CEPF – Birdlife International. o Phiapalath, P., Bodmixay, V., and Philavong, V. (2012). Report of wildlife surveys for the transmission line project of Ban Hatxan-Pleuku 500kV, Dong Ampham National Protected Area, Attapeu Province in Lao PDR. o Phiapalath, P. and Kuangvanh, K. (2012). Report of Wildlife Surveys in Phou Khaya Provincial Protected Area, Santhong District in Lao PDR. Lao Wildlife Conservation Association for KfW, Lao PDR. o Phiapalath, P. (2012). A status of primate conservation in Lao PDR. Proceeding: Association for Tropical Biology and Conservation. Asia and Pacific Chapter, Annual Meeting March 2012. Botanical Xishuangbanna Tropical Garden in China. o Phiapalath, P., Voladeth, S., Hicks, C., Sivongsay, N. and Nammanivong, M. (2012a). Case Study: Siphandone Wetland. Basin-wide climate change impact and vulnerability assessment for wetlands of the Lower Mekong Basin for Adaptation Planning. Prepared for the MRC by ICEM, Hanoi. o Phiapalath, P., Voladeth, S., Hicks, C., Sivongsay, N. and Nammanivong, M. (2012b). Case Study: Xe Champhone Wetland. Basin-wide climate change impact and vulnerability assessment for wetlands of the Lower Mekong Basin for Adaptation Planning. Prepared for the MRC by ICEM, Hanoi. o Phiapalath, P., Bousa, A. and Insua-Cao, P. (2012). The status and conservation of gibbons in Phou Hinpoun NPA, Khammouane Province, Lao PDR. International Union for Conservation of Nature (IUCN)/Fauna &Flora International (FFI). o Boonratana, R., Duckworth, J.W., Phiapalath, P., Reumaux, J.F., Sisomphane, S. (2011). The precarious status of the White-handed Gibbon *hylobateslar*in Lao PDR. APJ: 2: 13-20
	o Phiapalath, P. (2011). Report of Saola Survey in Khounxe Nongma Provincial Protected Area, Bualapha District in Khammouane Province, Lao PDR. Lao Wildlife Conservation Association, Vientiane, Lao PDR. o Phiapalath, P. (2010). Report of Lao langur [*Trachypithecuslaotum*] survey in Phou Hinpoun National Protected Area. Lao Wildlife Conservation Association, Vientiane. o Phiapalath, P. Suwanwaree, P. (2007). Preliminary census study of Red-shank douc langur and other primates in Hin Namno NPA, Lao PDR. Proceeding of Thai Wildlife Conference, Kasertsat University. *poster*

Declaration:

I confirm my intention to serve in the stated position and present availability to serve for the term of the proposed contract. I also understand that any wilful misstatement described above may lead to my disqualification, before or during my engagement.

Oct 15th, 2020

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Signature of the Nominated Team Leader/Member Date Signed

2. Dr. Thananh Khotpathoom, Bird Specialist

Name:	**Thananh KHOTPATHOOM (PhD.)**
Position for this Contract:	**Bird Specialist**
Nationality:	Lao
Contact information:	Mobile: +856-20-22636171 Email: **thananh@nuol.edu.la** **Institution:** Faculty of Forestry Science, National University of Laos (FFS, NUoL). **Office:** Tel: 865-21-770 097; Fax: 856-21-770 294
Countries of Work Experience:	Lao PDR
Language Skills:	- Lao: Mother tongue - English: Good - Vietnamese: Fluently - Thai: Excellent
Educational and other Qualifications:	***Educational qualification:*** o ***2014–2020***: ***PhD*** *in Forest Resource Management (Majored in Wildlife Ecology), Faculty of Natural Resource and Environment Management, Vietnam National University of Forestry, Vietnam. Research on modeling of Eld's Deer habitat use and distribution in the Eld's Deer Sanctuary, Xonnabouly.* o ***2007–2010***: ***M.Sc Degree*** *in Forest Biological Science, Faculty of Forestry, Kasetsart University, Thailand.* o ***1994–1999: B.Sc. Degree*** *in Forestry Faculty of Natural Resource and Environment Management, Vietnam National University of Forestry, Vietnam.* ***Training qualification:*** o **December 2016**: Training of Trainer Workshop on GIS "**Using Arc GIS for forest resources research** " Faculty of Forestry Science, National University of Laos, Lao PDR. o **March-April 2009**: Training on Wildlife and Habitat Assessment in Phu Khieo Wildlife Sanctuary, Thailand. *Faculty of Forestry, Kasetsart University, Thailand.*

Summary of Experience: *Highlight experience in the region and on similar projects.*

Thananh is a forest and wildlife ecologist and lecturer at the Faculty of Forestry Science, National University of Laos (FFS, NUoL) with over 20 years of lectures, field excursion and field practice experiences in forest ecology, and wildlife ecology and management. He used to take bird team leader for some biodiversity survey e.g UNDP – Dry Forest in central Laos. He has experiences in advising student

to carry out for field research for their thesis on wildlife behavior, ecology, community and habitat, including birds. Bird observation is part of academic program by working with graduate students on their research and practice with also bachelor students at Sangthong Forest Research Centre. He has also conducted wildlife and wildlife habitat survey within a number of protected areas in the country.

He has been working on teaching and developing manuals for B.Sc. programme at the faculty of forestry science, National University of Laos (FFS, NUoL) (Bachelor of Science in forestry, programme in Forest and Wildlife Conservation) included Wildlife Ecology, Wildlife Management, Wildlife Population, Wildlife Taxonomy and Wildlife Monitoring. He has also been worked on developing manual for short term training for Human Resources Development for Protected Area and Wildlife Management project at FFS, NUoL **(H-PAW Project)** and He has been working as trainer for **Forest Protection and Wildlife Management** programme. He is also a main trainer of this project on wildlife management section (Wildlife population monitoring for management and value of wildlife and sustainable utilization).

Relevant Experience (From most recent):

Period: From – To	**Name of activity/ Project/ funding organisation, if applicable:**	**Job Title and Activities undertaken/Description of actual role performed:**
Teaching and advise student		
2017-2018	**Biodiversity assessment** **UNDP**	**Consultant/Bird specialist** As bird specialist, took lead the bird team, conducted bird diversity assessment in dry forest, National Eld's Deer Sanctuary, Savannakhet Province. The work was conducted for both dry and wet season.
2011-2017	***B.Sc. and M.Sc. programme*** *Faculty of Forestry Science, National University of Laos (**FFS, NUOL**)*	***Lecturer:*** *Lecture on "**Wildlife Management**" for both B.Sc. and M.Sc. programme at the FFS, NUOL. Take lead and guide students for field practice on wildlife assessment and monitoring. The teaching including wildlife ecology, wildlife taxonomy and behaviors. Wildlife observations at field, including birds have been conducted at least 6 trips per years in Sangthong Research Centre. About 6 master students had and have been conducting research on birds including wetland birds which he had/has supervised.*
2015-2017	***M.Sc. student programme*** *Faculty of Forestry Science, National University of Laos (FFS, NUOL)*	***Advisor (To advise student conduct the thesis research and writing)*** *-Bird Species Diversity in Training and Model Forest of the Faculty of Forestry Science, Sangthong District, Vientiane Capital, Lao PDR. He had supervised them from thesis proposal preparation to field exercise, data analysis and thesis writing.*
2014-2016	***M.Sc. student programme*** *Faculty of Forestry Science, National University of Laos (FFS, NUOL)*	***Advisor (To advise student conduct the thesis research and writing)*** *- Habitat Utilization of Eld's deer in Xonnabouly District, Savannakhet Province, Lao PDR. He had supervised them from thesis proposal preparation to field exercise, data analysis and thesis writing.*
2012-14	***M.Sc. student programme*** *Faculty of Forestry Science, National University of Laos (FFS, NUOL)*	***Advisor (To advise student conduct the thesis research and writing)*** *- Distribution and Habitat of **Pycnonotus Hualon** in Limestone Karst: A Case Study of Mouangdoy Village, Thakhek District, Khammouane Province, Lao PDR. He had supervised them from thesis proposal preparation to field exercise, data analysis and thesis writing.*
2012-14	***M.Sc. student programme*** *Faculty of Forestry Science, National University of Laos (FFS, NUOL)*	***Advisor (To advise student conduct the thesis research and writing)*** *- Wetland Bird Community: A Case Study of Nongveng and Nongseng lake, Hatxayphong District, Vientiane Capital, Lao PDR. He had supervised them from thesis proposal preparation to field exercise, data analysis and thesis writing.*
Short Trainings		

2016-2017	Human Resources Development for Protected Area and Wildlife Management **(H-PAW Project)** *Faculty of Forestry Science, National University of Laos (FFS, NUOL)*	**Trainer** (To conduct the training for local government staff who worked on forest and wildlife mgt throughout country). **Topic:** *Forest Protection and Wildlife Management* **Activities performed:** - Wildlife Population Monitoring for Management - Wildlife Value and Sustainable Use
2013-2014	**WCS and NUOL**	**Trainer** (To conduct the training for Forest Protection's staffs or staff of organization and relative projects to forest resource and wildlife management). **Topic:** *Forest Protection and Wildlife Management* **Activities performed:** - Wildlife Population Monitoring for Management
January, 2010	Provincial Agricultural and Forest Office (**PAFO**), Protection Area Management Unit Savannakhet Province	**Trainer** (To conduct training for Forest Protection's staffs in Vilabouly District, Savannakhet Province). **Topic:** *Forest Protection Management and Planning* **Activities performed:** - Wildlife Monitoring and Management Planning-
Research and Fieldwork Experience		
2015-2017	FFS, NUoL	**Field research advisor:** **Topic:** *Bird Species Diversity in Training and Model Forest of the Faculty of Forestry Science, Sangthong District, Vientiane Capital, Lao PDR* **Activities performed:** ✓ Advise student to development research proposal ✓ Give advice for field research design and work plan ✓ Advise the field technical research for bird identification and other field technique (Habitat study, field data collections….)
2014-2016	FFS, NUoL	**Field research advisor:** **Topic:** *Habitat Utilization of Eld's deer in Xonnabouly District, Savannakhet Province, Lao PDR.* **Activities performed:** ✓ Advise student to development research proposal ✓ Give advice for field research design and work plan ✓ Advise the field technical research on dry dipterocarp habitat and other welfare factors and threaten factors of Eld's deer.
2012-14	FFS, NUoL	**Field research advisor:** **Topic:** *Distribution and Habitat of **Pycnonotus Hualon** in Limestone Karst: A Case Study of MouangDoi Village, Thakhek District, Khammouane Province, Lao PDR* **Activities performed:** ✓ Advise student to development research proposal ✓ Give advice for field research design and work plan ✓ Advise the field technical research on birds (i.e. behavior, ecology) and other wildlife community at limestone karst.

2012-14	FFS, NUoL	**Field research advisor:** **Topic:** *Wetland Bird Community: A Case Study of Nongveng and Nongseng lake, Hatxayphong District, Vientiane Capital, Lao PDR.* **Activities performed:** ✓ Advise student to development research proposal ✓ Review and give suggestion on research design ✓ Advise the field technical research on Wetland community
January-March, 2011	NUoL	**Researcher** **Topic:** Preliminary Wildlife and Habitat Study, Paklay District, Xayabouly Province **Activities performed:** ✓ to prepare and design field working, activities and work plan ✓ To conduct field working (Bird and wildlife habitats) ✓ take lead to write a technical report.
2009-2011	Forest Biology Department, Faculty of Forestry, Kasetsart University (M.Sc. Thesis research)	**Researcher** **Topic:** Home range and habitat Utilization of KhaNyou or Laotian Rock Rat (*Laonastesaenigmamus*) **Activities performed:** ✓ Home range estimate using radio tracking ✓ Habitat utilization in different season (Dry and rainy season) ✓ Habitat characteristic and threaten factors
February-March, 2010	Provincial Agricultural and Forest Office (**PAFO**), Protection Area Management Unit, Savannakhet Province	**Trainer and Researcher** **Topic:** Preliminary Vegetation/wildlife and wildlife Habitat Survey, Laving-Lavern National Protection Area **Activities performed:** ✓ take lead to design and develop the field guide for preliminary vegetation, wildlife and wildlife habitat assessment ✓ take lead to prepare methodology, field activities, work plan and budget for field working ✓ to train for local staff on required techniques for vegetation, wildlife and wildlife habitat survey ✓ take lead to conduct field working and technical report
Referencesno.1 (minimum of 3):	***Name:*** ***Assoc. Prof. Sithong THONGMANIVONG(PhD.)*** ***Designation:*** ***Vice Dean*** ***Organization:*** *Faculty of Forestry Science, National University of Laos* ***Mobile:*** 856-20-55897559 ***Email:*** *sithong@nuol.edu.la* ***Tel:*** *856-21-770097* ***Fax:****865-21-770294*	
Reference no.2	***Name:*** ***Somvang PHIMMAVONG (PhD.)*** ***Designation:*** ***Deputy Head of Department*** ***Organization:*** *Faculty of Forestry Science, National University of Laos* ***Mobile:*** 856-20-28886677 ***Email:*** *somvang@ nuol.edu.la* ***Tel:*** *856-21-770813* ***Fax:****865-21-770294*	
Reference no.3	***Name:*** ***Assoc. Prof. Naris Bhumpakphan (PhD.)*** ***Designation:*** ***Advisor/Researcher*** ***Organization:*** *Faculty of Forestry, Kasetsart University, Bangkok Thailand* *Mobile:* *66-862123469* *Email:* *ffornrb@ku.ac.th*	

Declaration:
I confirm my intention to serve in the stated position and present availability to serve for the term of the proposed contract. I also understand that any wilful misstatement described above may lead to my disqualification, before or during my engagement.

Oct 20nd, 2020

ninated Team Leader/Member Date Signed

Thananh Khotpathoom

3. Phansamai Phommexay, PhD Candidate/bat specialist

Personal:
Name : **Phansamai Phommexay, Ms.**
Date of Birth : 13 August 1981
Contact No. : +856 20 22444424
Email Address : phommexay@gmail.com, phansamai.p@kkumail.com

Educations:
- PhD Student in Biological Science, Faculty of Science, Khon Kaen University, Thailand. (Bat Species Diversity and taxonomy)
- Master of Science in Ecology, Faculty of Science, Prince of Sonkla University, Thailand. *(Thesis research on Bat Species Diversity and Feeding Intensity)*
- Bachelor of Science in Forestry. Faculty of Forest Science, National University of Laos.

Employment:
Oct. 2003- present Faculty of Forest Science (FFS), National University of Laos (NUoL).
- Full time academic Instructor:
  - Wildlife management, Forest and wildlife resources conflict management, Ecotourism (undergrad Student)
  - Biodiversity (Graduate Student, MSc)
- Head of Protected Conservation and Biodiversity Unit Subject.
  - Curriculum and syllabus collaboration
- Curriculum and syllabus collaboration development.
  - Developed Course Curriculum of Forest and Wildlife Conservation (undergraduate).
  - Ecotourism (undergraduate).
- Consultation for final year students on fields academic reports.

Teaching Manual:

Present	Ecotourism in Protected Area teaching material for undergraduate program. Team member
2019	Wildlife Conservation teaching material for undergraduate program. Leader.
2019	Wildlife Zoology teaching material for undergraduate program. Leader.
2019	Wildlife Population Census and Monitoring teaching material for undergraduate program. Team member
2018	Field Practice of Sustainable Community Livelihood Promotion Training Manual. Team member
2018	Wildlife Resource Utilization for Sustainability teaching material for undergraduate program. Leader.
2018	Wildlife Disease teaching material for undergraduate program. Leader
2017	Forest and Wildlife Resources Conflict Management teaching material for undergraduate program, Leader.
2017	Biodiversity teaching material for undergraduate program, Team.

2017 Field Practice of Protected Area and Wildlife Management Training Manual. Team member

2013- 2015 ASEAN Regional Climate Change Curriculum Development. Supported by LEAF-USAID. http://www.leafasia.org/

- Responsible for Module 2: Social and Environmental Soundness (SES).

Field Work Experience:

Dec. 2018- May. 2019. National Biodiversity Specialist (Zoology) of Carbon Assessment in the context of Emission Reductions Project under BCC project, Department of Forest, Ministry of Agriculture and Forestry.

Oct. 2016 – Jun., 2018. Principle Wildlife Trade Trainer of Human Resources Development for Protected Area and Wildlife Management Project (H-PAWP), Faculty of Forest Sciences, National University of Laos.

- Responsible for National Protected Area and Wildlife Management training

Feb.2003-2006 Finance by IDRC and Rockefeller Brother Fun.

- Project Assistant, organizes information used Endnote.
- Financial Assistant for IDRC Project, FFS, NUOL.

Training and Workshop

March 2020. Ethical Principles for the use and care of Animals in Science. Institutional Animal Care and Use Committee of Khon Kaen University, Khon Kaen University, Thailand.

23 March – 07 April 2019. Mekong Wet Training Program Train- the- Trainers Workshop. U Minh Thoung National Park, Kien Gien Giang Province.

18 November- 07 December 2018. Protection and Management of wet lands ecosystems and resources. Yunnan Provincial Science and Technology Department, China.

March,2016. The Collaborative Leadership for Development (CL4D), Training of Trainer, National University of Laos, Second Lao Environment and Social Project (LENS2). The World Bank and Faculty of Forest Sciences, Long Ngum Resort, Vientiane Province, Laos.

November, 2015. The Short Course on Payments for Environmental Services (PES) Scheme: Non-Market Environmental Valuation held in Vientiane Capital, Lao PDR.

2015. ToT on REDD+ Environment and Safeguard, RECOFT in Vangvieng, Laos.

January, 2015. Tropical Forest Ecology and Silviculture, Faculty of Forest Science, National University of Laos, Cambodia and Thailand.

October, 2015. Small Holder Teak Plantation Management, Faculty of Forestry, National University of Laos.

October, 2014. Teacher Training, Faculty of Art, National University of Laos.

August, 2014. Regional Climate Change Curriculum Development: Training of Trainer, Petaling Jaya, Malaysia.

2011. Protected Area Management and Biodiversity Conservation, Training of Trainer, Conservation Leadership Programme and WCS, Women Union, Vientiane, Laos.

December, 2010. Statistics and Study Design for Biology Monitoring and Conservation, Conservation Leadership Programme and WCS Malaysia Programme, Vientiane, Laos.

March, 2010. Third Executive Forest Policy Short Couse Enhancing Forest Policy in the Greater Mekong Subregion. RECOFTC-The Center for People and Forests, Bangkok, Thailand.

2006. Bat Taxonomy and Echolocation Workshop. Prince of Songkla University, Thailand – Harrison Institute, UK.

2003 – 2006. Training for Management Research Capacity Building Project on Community Based Natural Resource Management (CBNRM), International Development Research Centre (IDRC), Faculty of Forestry Science, NUoL.

Research work

Current research for PhD Researcher, Kon Kaen University, Thailand.

2019. Insect Diversity in Faculty of Forest Sciences, National University of Laos, Vientiane, Laos.

2011. The Impact of Rubber Plantations on the Diversity and Activity of Understory Insectivorous Bats in Southern Thailand, Biodiversity Conservation. **20**: 1441-1456

2010. Practices in plantation in forestry schemes in consultation with local communities and NGOs. Faculty of Forest Science, National University of Laos.

2009. Bat Species Diversity and Feeding Intensity in Intact Forest and Rubber Plantations in Southern Thailand. Prince of Songkla University.

2006. Study Tour on Wildlife Conservation in Lao PDR: Phou Khao Khouay National Biodiversity Conservation Area and Wildlife Utilization in Bolikhamxay Province, Lao PDR.

2003. Wildlife Utilization and Wildlife Status of People in Ngang Kheua Village, Phou Khao Khouay National Biodiversity Conservation Area, Borlikhamxay Province, Lao PDR.

4. Duangphachanh Souvanxay, M.Sc, Forest and wildlife ecology

Name and surname:	Duangphachan SOUVANSAI
Date of Birth:	17/10/1987
Citizenship	Lao

Education:

Master of science, Majoring in Integrated forest resources management, Faculty of Forestry, National
University of Laos, Vientiane, Lao PDR, 2012 – 2014,

Bachelor of Science, Forest Economic and wood technology, Faculty of Forestry, National University of
Lao PDR, Vientiane, Lao PDR, 2005 – 2011.

Employment record relevant to the assignment:

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
Jan 2014-present	**Employer:** Faculty of Forestry Science, Organizing courses for Master and PhD programmes **Position:** Staff member	Lao PDR	Keeping study affairs, mark records, class arrangement, contacting processor and students, secretary for thesis defense sessions.
2014-present	**Employer:** Faculty of Forestry Science, give lectures to Forest Law enforcement, and wildlife conservation subjects **Position:** Staff member	Lao PDR	Preparing modules and teaching materials, teaching planning for students, with giving lectures.
March - July 2014	**Employer:** GIZ PROFEGT, Study for Understanding timber flows and control in Lao PDR Position: Consultant Assistant. **Reference:**	Lao PDR	Analysis of trade routes of timber from Lao timber sources in Sayaboury and Khamoune and design a rapid traceability and inspection system.

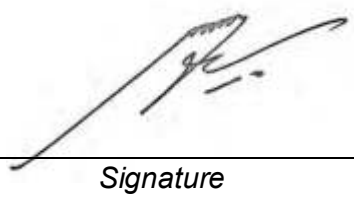
May 2019-…	**Employer: The small grant program (gef, UNDP)**	Lao PDR	Forest rehabilitation and plantations. Land use planning enforce the rule and regulations for the management of forest lands and forest resources gender equality workshop Improving weir

Language Skills (indicate only languages in which you can work):

LANGUAGE	Speaking	Reading	Writin
Lao	Native	Native	Native
Khmu	Good	Good	Good
English	Very good	Very good	Good
Thai	Good	Good	Good

contact information: (souvansai@gmail.com, Tel: +856 20 96889919)

Certification:
I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.



Date: 16/3/2020

Signature *Day/Month/Year*

Trainings:

2 year participate on the Youth Volunteer for participatory development program, Bokeo Province.

2 weeks Volunteer for PRA paper book writing on CIDSE-LAOS Project, Mahaxai District
Khammuan Province, Laos. Form 26 September - 8 October, 2011

One-week (March 10-17, 2013) training on Primate Research in Ban Konglor, Phou Hin Poun NPA, Khammouan.

2 weeks participate on Basic for Wildlife Ecology and Survey at Phu khieo Wildlife sanctuary (Thailand). (Practice in field work about how to identify wildlife species and forage plant species; provide techniques how to study habitat, population and behavior; how to work in team; analyze data and prepare report presentation. Activities practice such as: line transect, camera trap, pellet group counts, point counts, behavior observation, habitat survey, call count, night survey for amphibian and reptile).

3 months survey experience: Saola an endangered species: trapping, marking, transect walk with the use of GPS and Camera Trap, from April to June 2008. At Nakai-Nam Theun National Protected. Area Khammuan province, Laos.

Participated in the 56th Conference of the ASSOCIATION FOR TROPICAL BIOLOGY AND CONSERVATION from July 30-August 3 2019. CCI Invato, Antananarivo, Madagascar.

Publications:

Souvansai, D. (2014). Behavior of Phayre's Leaf Monkey (Trachypithecus phayrei crepusculus) in Nam Kan National Protected Area, Bokeo Province, Lao PDR. Faculty of forestry, National university of Laos. (Mater Thesis)

Souvansai, D. and Souliyavongsa, K. (2011). Physical, Mechanical Properties and Carbon Content Assessment of Ailanthus triphysa in the Plantation of Faculty of Forestry, Dongdok Campus, Xaithany District, Vientiane Capital. Lao PDR. (BSc Thesis)

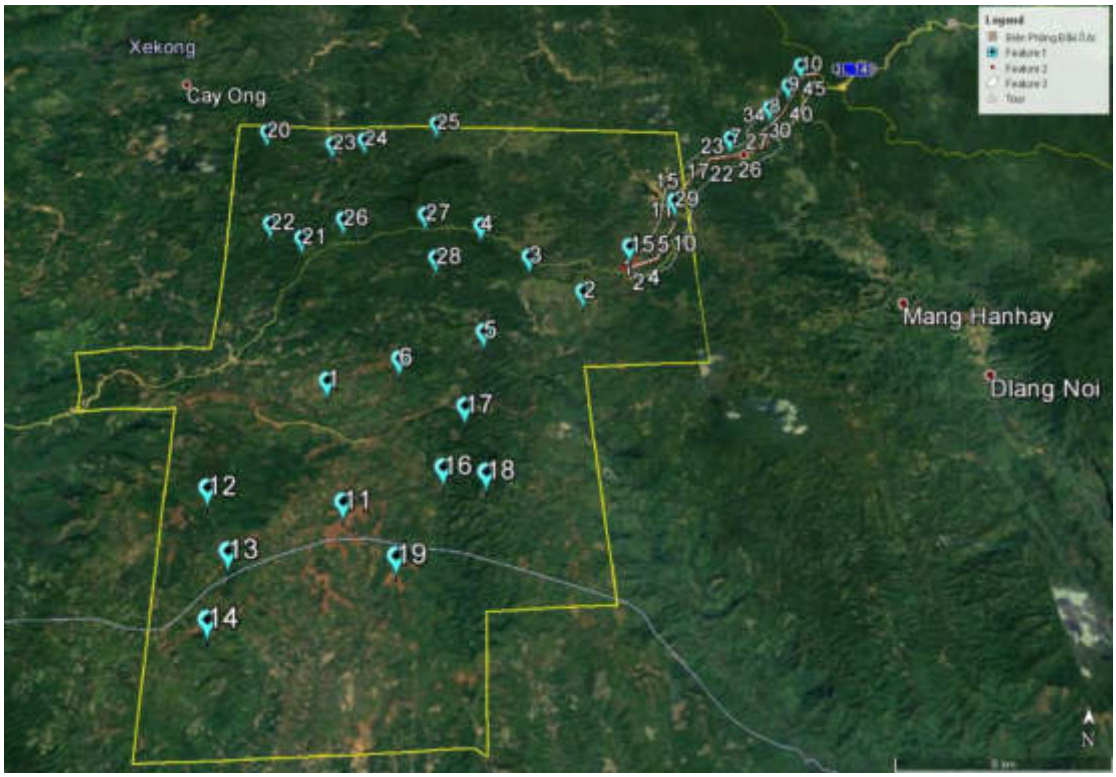
Khotpathoom, T. and Souvansai D. (2016). Status, Distribution and Human-Elephant Conflict Situation: A case study at Phu kao kouy National Protected Area

Souvansai D. and Khotpathoom, T. (2018). Assessment of Participatory on Conservation status of Silver leaf monkey (Trachypithecus germaini) in Dong Phuvieng National Protected Area, Savanakhet Province.

Chittakoun T. and Souvansai D. (2018). Crop insurance possibility assessment in 10 pilots, in Lao PDR.

Annex 2. Map of the project location

Annex 3. Map of REA survey sites



Survey point:	Long.	**GPS Elev.**	**Date**	**Project**
	Lat.			
Initial Field Assessment: Low Moderate High Exceptional **Reason for initial assessment:** **Habitat Description:** **Characteristic flora:** **Flora species of interest (present or likely to be present):** **Faunal species (present or highly likely to be present):** **Ecosystems Services comments:** Economically important olive plantation area.				

List of floral species recorded at location (dominants and notables)
List of fauna species recorded/ potentially present at location (please use * to record those actually seen or signs were present)
.

Survey point: NC: 1 Nearest location: XXXXX	Long. EXX.XXXXXX	**GPS Elev.**	**Date**	**Project**
	Lat. NXX.XXXXXX	80 m	29. 09 . 2011	XXXXX mine

Initial Field Assessment:

Low Moderate High Exceptional (Flora & Fauna)

Reason for initial assessment:
Agricultural area and dry river bank which is poor for fauna and flora. It is considered that the area does not support any endemic or rare species.

Habitat Description:
Olive plantation area
Seasonal stream (currently dry) likely wet only for six months of the year, dry in summer and autumn.

Characteristic flora:
Olea europaea

Flora species of interest (present or likely to be present):
Species of interest: none.

Faunal species (present or highly likely to be present):
Species/signs of species recorded during field survey: none.
Species of interest: none.

Ecosystems Services comments:
Economically important olive plantation area.

List of floral species recorded at location
Cydonia oblonga, Cerasus avium, Rubus sanctus, Ficus carica ssp. carica, Malus sylvestris, Armeniaca vulgaris, Brachypodium sylvaticum, Knautia integrifolia, Cichorium intybus, Melilotus officinalis, Populus alba, Tamus communis, Salix babylonica, Platanus orientalis, Melissa officinalis, Xanthium strumarium, Scariola viminea, Portulacca oleracea, Chenopodium botrys.
List of fauna species recorded at location
Common species highly likely to be present include: *Rattus rattus, Mus macedonicus, Mustela nivalis, Erinaceus concolor, Lepus europaeus, Vulpes vulpes, Martes foina, Sciurus anomalus, Sus scrofa, Apodemus sp., Meles meles, Bufo bufo, Bufo viridis, Rana ridibunda,* plus some common lizards and some common snakes.

Survey point:	Long. E	GPS Elev.	Date	Project
NC: 7 Nearest location: XXXXX	Lat. N	103 m	30.09. 2011	

Initial Field Assessment:

Low Moderate **High** Exceptional (Fauna & Flora)

Reason for initial assessment:
High quality habitats (woodland) in a mosaic of habitats.

Habitat Description:
Agriculture – crops and olive plantations
Riparian habitat along small stream
Mosaic of woodland within wider area.

Characteristic flora:
Riparian habitat: *Populus alba, Paliurus spina-christii, Rubus sanctus, Rosa canina.*
Woodland: *Quercus cerris* var. *cerris, Quercus petraea spp. iberica, Quercus infectoria, Acer sp.*

Flora species or interest (present or likely to be present):
Species of interest. None (but rare plants may be visible in spring).

Faunal species (present or highly likely to be present):
Species/signs of species recorded: *Microtus sp., .Erinaceus concolor, Vulpes vulpes, Spalax nehringi, Rana ridibunda*
Species of interest: *Vormela peregusna*

Ecosystems Services comments:
Agricultural land and woodland offering provisioning for local people.

List of floral species recorded at location
Riparian / Agricultural habitat: *Clematis cirrhosa, Daucus carota, Prunus spinosa* ssp. *dasyphylla, Cercis siliquastrum, Dactylis glomerata.* Woodland: *Cornus mas, Acer sp., Ruscus aculeatus, Sanguisorba minor, Crataegus monogyna, Anthemis tinctoria, Hypericum sp. Campanula sp. Cirsium sp., Salvia sp.*
List of faunal species recorded at location
Common species highly likely to be present: *Meles meles, Dryomys nitedula, Canis aureus, Rattus rattus, Lepus europaea, Apodemus flavicollis., Crocidura sp., Bufo bufo, Bufo viridis*

Survey point:	Long. E	GPS Elev.	Date	Project
NC: 13 Nearest location: XXXX	**Lat**. N	12 m	01.10.2011	

Initial Field Assessment:

Low **Moderate** High Exceptional (Flora & Fauna)

Reason for initial assessment:
Diversity of habitat including trees/copse next to a river, which offers greater floral and faunal diversity, otherwise surrounded by agricultural land.

Habitat Description:
Riverine habitat, including trees/copse
Agriculture – maize and tomato

Characteristic flora:
Salix babylonica, Populus canadensis, Rubus sanctus

Flora species or interest (present or likely to be present):
Species of interest. none

Faunal species (present or highly likely to be present):
Species/signs of species recorded: none.
Species of interest likely to be present: *Lutra lutra*

Ecosystems Services comments:
Water provisioning for surrounding crops
Fishing
Agricultural land

List of floral species recorded at location
Populus alba, Ulmus minor, Phragmites australis, Crataegus monogyna, Rosa canina, Cichorium intybus, Tamarix smyrnensis, Datura strumarium, Hedera helix
List of faunal species recorded at location
Common species highly likely to be present: *Martes foina, Vulpes vulpes, Arvicola amphibious, Rattus rattus, Apodemus sp. Mus macedonicus, Microtus levis, Mustela nivalis, Rana ridibunda, Bufo bufo, Bufo viridis, Hyla arborea, Mauremys sp, Natrix natrix, Natrix tessellata, Coluber caspius, Lacerta trilineata*

Survey point: NC: 15 Nearest location: XXXXXX	**Long**. E	**GPS Elev.**	**Date**	**Project**
	Lat. N	15 m	02.10.2011	

Initial Field Assessment:

Low Moderate High Exceptional (Flora & Fauna)

Reason for initial assessment:
Intense agricultural land with low floral diversity and few natural areas, so unlikely to support faunal species of interest.

Habitat Description:
Agricultural land – maize and tomato (with occasional irrigation ditches)

Characteristic flora:
Phragmites australis, Rubus sanctus

Flora species or interest (present or likely to be present):
Species of interest. none

Faunal species (present or highly likely to be present):
Species/signs of species recorded: none.
Species of interest likely to be present: none.

Ecosystems Services comments:
Agricultural land

List of floral species recorded at location
Ulmus minor, Tordylium sp., Knautia integrifolia var. bidens, Sanguisorba minor, Cynodon dactylon, Crepis sp., Rumex pulcher, Solanum nigrum.
List of faunal species recorded at location
Rattus rattus, Mus macedonicus

Survey point: NC: 16 Nearest location: XXXXX	**Long**. E	**GPS Elev.**	**Date**	**Project**
	Lat. N	11 m	02.10.2011	

Initial Field Assessment:

Low **Moderate** High Exceptional (Flora) (Fauna)

Reason for initial assessment:
Low diversity of flora species, although range of habitats (wetland, plantation, agricultural land) support faunal species with the wetland providing an important habitat resource.

Habitat Description:
Wetland including small lakes and canal irrigation system
Agricultural land
Populus canadensis plantation

Characteristic flora:
Salix babylonica, Phragmites australis, Tamarix smyrnensis, Populus canadensis

Flora species or interest (present or likely to be present):
Species of interest. none

Faunal species (present or highly likely to be present):
Species/signs of species recorded: *Emys orbicularis*.
Species of interest likely to be present: *Emys orbicularis, Testudo graeca*,

Ecosystems Services comments:
Water provisioning
Agriculture

List of floral species recorded at location
Plantago lancelota, Thypha latifolia, Rubus sanctus, Equisetum sp., Cichorium intybus, Centaurea solstitialis, Knautia integrifolia var. bidens, Xanthium strumarium, Verbascum sp., Lolium sp.
List of faunal species recorded at location
Common species highly likely to be present: *Arvicola amphibious, Vulpes vulpes, Martes foina, Mustela nivalis, Rattus rattus, Erinaceus concolor, Microtus levis, Mus macedonicus, Apodemus sp., Sciurus anomalus, Meles meles, Rana ridibunda, Bufo bufo, Bufo viridis, Hyla arborea, Natrix natrix, Natrix tessellata, Mauremys sp.*

Survey point: XXXX	Long. E	**GPS Elev.**	**Date**	**Project**
Nearest location: XXX	Lat. N	m	03.10.2011	

Initial Field Assessment:

Low Moderate **High** Exceptional
(Flora & Fauna)

Reason for initial assessment:
Flora is of high value due to quality Macchie habitat, although Macchie is of higher quality on the upper slopes. Fauna is of high value due to the presence of good quality habitat which supports *Tesudeio gracea* (present) and *Felis sylvestris* (anecdotal report).

Habitat Description:
The area is a proposed extension to an existing quarry, which currently supports Macchie habitat of progressively higher value on the upper slopes, with lowland areas under agricultural use or supporting degraded Macchie.

Characteristic flora:
Phillyrea latifolia, Quercus petraea ssp. *iberica, Pistacia terebinthus, Cistus creticus*

Flora species or interest (present or likely to be present):
Species of interest. None (but rare plants are likely to be visible in spring).

Faunal species (present or likely to be present):
Species/signs of species recorded: *Tesudeio gracea* (present) along with anecdotal reports from a local farmer of *Vulpes vulpes, Meles meles, Vormela peregusna, Felis sylvestris, Mustela nivalis, Sciurus anomalus, Lepus europaeus, Sus scrofa, Canis aureus, Dryomys nitedula, Vipera ammodytes*

Species of interest likely to be present: *Tesudeio gracea, Vormela peregusna, Felis sylvestris,*

Ecosystems Services comments:
Grazing for local villagers livestock. Collection of *Pistachio terebinthus* berries for eating.

List of floral species recorded at location
Stachys byzantina, Micromeria myrtifolia, Dactylis glomerata, Rosa canina, Teucrium polium, Anthemis tinctoria, Arbutus unedo, Globularia trichosantha, Psoralea bituminosa, Crataegus monogyna, Cerris siliquastrum, Lonicera etrusca, Crocus chrysanthus
List of faunal species recorded at location
See anecdotal list above.

Survey point: XXXX Quarry Nearest location: XXXX villge –	Long. Lat.	**GPS Elev.** 72 m	**Date** 3.10.2011	**Project**

Initial Field Assessment:

Low Moderate High **Exceptional** (Flora & Fauna)

Reason for initial assessment:
The large extent of continuous natural habitat supporting Macchie and Macchie-woodland and high quality riverine habitat is likely to support rare and endemic flora species and offers suitable habitat for rare faunal species, including (from anecdotal reports) *Ursus arctos*.

Habitat Description:
An extensive area of Macchie and Macchie-woodland within a larger natural upland area, with a very small former quarry situated in the lowland along with *Pinus pinea* plantation. The XXXX River flows through the north-eastern end of the proposed quarry area and is of exceptional quality.

Characteristic flora:
Quercus petraea ssp. *iberica, Phillyrea latifolia, Erica arborea, Arbutus unedo*

Flora species or interest (present or likely to be present):
Species of interest. None (but rare plants are likely to be visible in spring).

Faunal species (present or likely to be present):
Species/signs of species recorded: *Rana sp.* Crab species within the Kara River. Anecdotal reports from a local famer of: *Felis sylvestris, Canis lupus, Ursus arctos, Caracal caracal, Lynx lynx, Vormela peregusna, Testudo graeca* (along with common species).

Species of interest likely to be present: Crab species within the Kara River, *Felis sylvestris, Canis lupus, Ursus arctos, Caracal caracal, Lynx lynx, Vormela peregusna, Testudo graeca*

Ecosystems Services comments:

Survey point: XXXX Quarry Nearest location: XXXX villge –	Long.	**GPS Elev.**	**Date**	**Project**
	Lat.	72 m	3.10.2011	

Grazing for local villagers livestock.
Use of forest produce for food, recreation and hunting.
Water cleaning, regulation and provisioning.

List of floral species recorded at location

Macchie / Macchie forest: *Crataegus monogyna, Scariola vimirea, Spartium junceum, Cistus creticus, Asparagus acutifolius, Rubus sanctus, Paliurus spina-christii, Psorolea bituminosa, Eryngium campestre var. virens, Rosa canina, Dactylis glomerata, Juniperus oxycedrus, Daucus carota, Piptatherum miliaceum, Briza media, Anthemis tinctoria, Pistacia terebinthus, Jasminum fraticans, Verbascum sp., Hypericum sp.*
Wetter habitat patches: *Phragmities australis, Saix babylonica, Juncus heldeichionuis, Rubus sanctus, Platanus orientalis, Vitex agnus-costus*
XXXX River riverbank: *Plantanus orientalis, Salix babylonica, Ficus carica ssp. carica, Rubus sanctus, Alnus glutinosa* and Macchie around the river: *Phillyrea latifolia, Paliurus spina-christii, Rosa canina, Asparagus acutifolius, Quercus cerris* var. *cerris, Quesrcus petraea ssp. iberica, Juniperus oxycedrus, Erica arborea, Ruscus aculeatus, Anthemis tinctoria, Dactylis glomerata.*

List of faunal species recorded at location

See list above.

APPENDIX F BIRD VANTAGE POINT SURVEY APPROACH

Bird Diversity Survey Plan on Windfarm Project

I. Methodology

The methodology of this study will be conducted in Duk Chueng district, Xekong province, southern Lao PDR. According to the 70,800 ha of the project area with transmission line is approximately 21.3 km, the survey will be used both of the point count and line transect. The survey will be start in three times from November, 2020 to April, 2021 (See the purpose schedule). It will focus on 11 Vantage points (VP) in this survey. Each VP will be surveying a total of 36 hours, equating to 12 hours per month per VP (if possible, a minimum of 6 hours per VP should be undertaken) and each VP will be birding as least three hours (two days per VP, See map).

In addition, the transmission line will be use both of line transect and point count on 1 km per point count in totally, 21-point counts. Each point will be used 15-20 minutes and both methods of the survey will be completed twice a day for each survey location during the morning and afternoon. This survey will be conducted 2 times during November, 2020-April, 2021. In addition, 10 days per time in totally 30 field days during 6 months period.

In addition, the counting point will be expanded if the areas are in protected areas, wetlands, and Important Bird and Biodiversity Area (IBA) in Laos.

Species of bird found in field survey will be identified following Savengsueksa et al. (2003), Robson (2008), Naphitaphat et al. (2012; 2018) and (Birdlife international, 2020).

To determine endanger species, the conservation status of each species of birds found from the survey will be checked in the IUCN Red List of Threatened Species (IUCN, 2020). In conclusion, the number of type/kind birds, such as forest or water birds and resident and migration birds will be determined.

II. **Estimated budget for field working (in US dollars)**

No	Detail	No. of Item	Day	Prediem/ Price	Amount
1	Bird survey consultant	2	30	30	1,800
2	Province or District Authority	2	28	30	1,680
3	Villagers	2	28	10	560
5	Transportation (4x4 Pick Up)	1	30	150	4,500
6	Field Supply			150	150
7	Stationery			100	100
8	Insurance	2		100	200
9	Expert Cost	2	30	230	13,800
Total:					**22,790**

Note:

* the participant of field survey also up to the project

III. Proposed Schedule

Table1: this just estimate time for working (Up to the time frame of project)

Activities	2020						2021							
	7	8	9	10	11	12	1	2	3	4	5	6	7	8
Preparation/planning, 1st field survey														
1st field data analysis and draft field report														
2nd field survey and draft field report														
3rd field survey														
Final Report														

Annex 01: Map of proposed site/point survey areas

ACTIVITY SAMPLING	Date:	Time:	VP Location:	Surveyor:								
Hour:	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Cloud/mist (octa 0-8)												
Wind (Beaufort & direction)												
Precipitation (rain/snow, intensity)												
Visibility (0 - x)												
Temp												
Tide (if relevant)												
Bird Activity												

Hour:	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Cloud/mist (octa 0-8)												
Wind (Beaufort & direction)												
Precipitation (rain/snow, intensity)												
Visibility (0 - x)												
Temp												
Tide (if relevant)												
Bird Activity												

Hour:	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Cloud/mist (octa 0-8)												
Wind (Beaufort & direction)												
Precipitation (rain/snow, intensity)												
Visibility (0 - x)												
Temp												
Tide (if relevant)												
Bird Activity												

FOCAL SAMPLING Date: Time: VP Location: Height Bands:

Surveyor:

Rec #	Species	No.	Start time	1	2	3	4	5	6	7	8	9	10	11	12	Notes (Sex, Status, Flapping, Flying, hunting, foraging, carrying food etc.)

APPENDIX G BAT SURVEY APPROACH

Quotation: Dry & Wet Season Bat Surveys for IES Wind Power Project, Xekong & Attapeu Provinces, Lao PDR

1. All figures in US dollars
2. Professional fees are exclusive of any applicable taxes

Field sampling x3 Field Surveys (@ x16 days apiece, incl. to/from site travel); Timing tbd
Survey area Exclusive of transmission line
Survey methods Acoustic sampling, key-informant interviews, roost searches, live-trapping
Acoustic effort ≈100 static detector-nights/survey (≈300 static detector-nights total)
Reporting Interim & Final reports, each due x6 weeks after field surveys

Item / Description	Unit	Qty	Unit Cost	Total	Remarks
Professional Fees					
Lead: Field Surveys (B. Douangboubpha)	pers./day	54	300	16,200	Inclusive of to/from site travel (4 days/survey) + Data processing (2 days/survey)
Assistant: Field Surveys (tbd)	pers./day	54	150	8,100	Inclusive of to/from site travel (4 days/survey) + Data processing (2 days/survey)
Lead: Design, Analysis & Reporting - Interim (N. Furey)	pers./day	9	500	4,500	
Lead: Design, Analysis & Reporting - Final (N. Furey)	pers./day	9	500	4,500	
Subtotal				**33,300**	
Supporting Costs					
Purchase: Acoustic Device (x10 AudioMoth*)	device	10	155	1,550	Unit cost inclusive of device, case, micro-SD card + overseas delivery
Purchase: Data Storage (2TB external HDD)	device	1	100	100	
Field Per Diems (2 pers. x 16 days/survey x 3)	pers./day	96	28	2,688	Food + Accomodation, for lead & assistant surveyor
Field Consumables	survey	3	250	750	Mist nets, batteries, chemicals, plastic-ware etc
Personal Health Insurance (Field Surveys)	pers.	2	100	200	
Local porters & guides (2 pers. x 12 days/survey x 3)	pers./day	72	15	1,080	
[[Vehicle Hire (16 days/survey x 3)]]	pers./day	48	150	7,200	Pending ERM policy & arrangements
Statutory Fees: Provincial Authority (14 days/survey x 3)	pers./day	42	28	1,176	Pending ERM policy & arrangements
Statutory Fees: District Authority (14 days/survey x 3)	pers./day	42	28	1,176	Pending ERM policy & arrangements
Subtotal				**15,920**	
TOTAL				**49,220**	

* Assumes no import duty. Device + Case from Labmaker (EU/US): https://www.labmaker.org/products/audiomoth-v1-1-0

APPENDIX H APPLICABLE FRAMEWORK

IFC Performance Standards

Performance Standard name and number	Description	Objectives
Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts	Underscores the importance of managing social and environmental performance throughout the life of a project (any business activity that is subject to assessment and management).	■ To conduct impact identification and assessment. ■ To identify and assess social and environmental impacts, both adverse and beneficial, in the project's area of influence. ■ To avoid, or where avoidance is not possible, minimise, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment. ■ To conduct a robust stakeholder engagement. ■ To ensure that affected communities are appropriately engaged on issues that could potentially affect them. ■ To ensure effective management. ■ To promote improved social and environment performance of companies through the effective use of management systems.
Performance Standard 2 – Labour and Working Conditions	Recognises that the pursuit of economic growth through employment creation and income generation should be balanced with protection for basic rights of workers.	■ To promote fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labour and employment laws. ■ To establish, maintain and improve the worker management relationship. ■ To promote compliance with national employment and labour laws. ■ To protect the workforce by addressing child labour and forced labour. ■ To promote safe and healthy working conditions, and to protect and promote the health of workers.
Performance Standard 3 – Resource Efficiency and Pollution Prevention	Recognises that increased industrial activity and urbanization often generate increased levels of pollution to air, water, and land that may threaten people and the environment at the local, regional, and global level.	■ To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities. ■ To promote more sustainable use of resources, including energy and water. ■ To reduce project–related GHG emissions.
Performance Standard 4 – Community Health, Safety and Security	Recognises that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development.	■ To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. ■ To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimises risks to the Affected Communities.
Performance Standard 5 – Land Acquisition and Involuntary Resettlement	Outlines that involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income	■ To avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs. ■ To avoid forced eviction. ■ To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing

Performance Standard name and number	Description	Objectives
	sources or means of livelihood) as a result of project-related land acquisition	compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those affected. ■ To improve, or restore, the livelihoods and standards of living of displaced persons. ■ To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.
Performance Standard 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources	Recognises that protecting and conserving biodiversity—the variety of life in all its forms, including genetic, species and ecosystem diversity—and its ability to change and evolve, is fundamental to sustainable development	■ To protect and conserve biodiversity. ■ To maintain the benefits from ecosystem services. ■ To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.
Performance Standard 7 – Indigenous People	Recognises that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalized and vulnerable segments of the population.	■ To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples. ■ To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. ■ To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. ■ To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project life-cycle. ■ To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in the Performance Standard are present. ■ To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.
Performance Standard 8 – Cultural Heritage	Recognises the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities.	■ To protect cultural heritage from the adverse impacts of project activities and support its preservation. ■ To promote the equitable sharing of benefits from the use of cultural heritage.

Source: IFC, 2012.

Equator Principles

Equator Principles name and number	Description / Statement of Principles
Principle 1 – Review and Categorisation	When a Project is proposed for financing, the EPFI will, as part of its internal environmental and social review and due diligence, categorise the Project based on the magnitude of potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity. Such categorisation is based on the International Finance Corporation's (IFC) environmental and social categorisation process.
Principle 2 – Environmental and Social Assessment	The EPFI will require the client to conduct an appropriate assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project. The assessment documentation should propose measures to minimise, mitigate, and where residual impacts remain, to compensate / offset / remedy for risks and impacts to Workers, Affected Communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. The depth and nature of the climate change risk assessment will depend on the type of Project as well as the nature of risks, including their materiality and severity.
Principle 3 – Applicable Environmental and Social Standards	The assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The review of the assessment process will establish, to the EPFI's satisfaction, the Project's overall compliance with, or justified deviation from, the applicable standards. The applicable standards represent the minimum standards required by the EPFI. In addition, for Projects located in designated countries, the EPFI will evaluate the specific risks of the project to determine whether one or more of the IFC Performance Standards could be used as guidance to address those risks, in addition to host country laws.
Principle 4 – Environmental and Social Management System and Equator Principles Action Plan	An Environmental and Social Management Plan (ESMP) shall be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree to an Equator Principles Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards. For certain type of project, the EPFI will require the client to develop and / or maintain an Environmental and Social Management System (ESMS).
Principle 5 – Stakeholder Engagement	Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to: the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantages, and vulnerable groups. This process should be free from external manipulation, interference, coercion and intimidation. For certain type of project, the EPFI will require the client to demonstrate effective Stakeholder Engagement, as an ongoing process in a structured and culturally appropriate manner, with Affected Communities, Workers and, where relevant, other stakeholders.
Principle 6 – Grievance Mechanism	Grievance mechanisms are required to be scaled to the risks and impacts of the Project, and will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. Grievance mechanisms should not impede access to judicial or administrative remedies. The client will inform Affected Communities and Workers about the grievance mechanisms in the course of the Stakeholder Engagement process. For certain type of project, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate

Equator Principles name and number	Description / Statement of Principles
	resolution of concerns and grievances about the Project's environmental and social performance.
Principle 7 – Independent Review	For certain type of project, an Independent Environmental and Social Consultant, will carry out an Independent Review of the Assessment process including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence and determination of Equator Principles compliance. The Independent Environmental and Social Consultant will also propose or opine on a suitable EPAP capable of bringing the Project into compliance with the Equator Principles, or indicate where there is a justified deviation from the applicable standards.
Principle 8 – Covenants	For all Projects, where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, including calling an event of default, as considered appropriate.
Principle 9 – Independent Monitoring and Reporting	For certain type of project, in order to assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required as stated in the ESMP and EPAP (where applicable) and compliance with relevant local, state and host country environmental and social laws, regulations and permits.
Principle 10 – Reporting and Transparency	For certain type of project, the client must ensure the following: ■ At a minimum, a summary of the ESIA is accessible and available online and that it includes a summary of Human Rights and climate change risks and impacts when and where relevant. ■ The client will report publicly, on an annual basis, GHG emission levels (combined Scope 1 and Scope 2 Emissions, and, if appropriate, the GHG efficiency ratio) during the operational phase for Projects emitting over 100,000 tonnes of CO_2 equivalent annually. ■ The EPFI will encourage the client to share commercially non-sensitive Project-specific biodiversity data with the Global Biodiversity Information Facility and relevant national and global data repositories, using formats and conditions to enable such data to be accessed and re-used in future decisions and research applications. The EPFI will, at least annually, report publicly on transactions that have reached Financial Close and on its Equator Principles implementation processes and experience.

Source: Equator Principles, 2020.

Asian Development Bank (ADB) Safeguard Policy Statement (SPS)

ADB affirms that environmental and social sustainability is a cornerstone of economic growth and poverty reduction in Asia and the Pacific. ADB's 2020 strategy therefore emphasizes assisting potential clients and investees to pursue environmentally sustainable and inclusive economic growth while ensuring social and environmental sustainability of the project ADB supports and finances. Henceforth, the objectives of the overall ADB's safeguards policy statements are to:

- Avoid adverse impacts of projects on the environment and affected people, where possible;
- Minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
- Help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

The following table presents the list of ADB SPS and its associated objectives, scope and triggers. However, not all safeguard policy statements are applicable to the Project. Only project relevant aspects will be considered during the write-up of this Report and Study. Nevertheless, the list shown here is presented in full for completeness of the ADB SPS.

Asian Development Bank Safeguard Policy Statement

Safeguard Policy State name and number	Objectives	Scope and Triggers
Safeguard Requirements 1 – Environment	To ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process.	Environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts.
Safeguard Requirements 2 – Involuntary Resettlement	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.	The involuntary resettlement safeguards covers physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) as a result of (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. It covers them whether such losses and involuntary restrictions are full or partial, permanent or temporary.
Safeguard Requirements 3 – Indigenous Peoples	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.	The Indigenous Peoples safeguards are triggered if a project directly or indirectly affects the dignity, human rights, livelihood systems, or culture of Indigenous Peoples or affects the territories or natural or cultural resources that Indigenous Peoples own, use, occupy, or claim as an ancestral domain or asset. The term Indigenous Peoples is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees: (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. In considering these characteristics, national legislation, customary law, and any international conventions to which the country is a party will be taken into account. A group that has lost collective attachment to geographically distinct habitats or ancestral territories in the project area because of forced severance remains eligible for coverage under this policy.

Safeguard Policy State name and number	Objectives	Scope and Triggers
Safeguard Requirements 4 – Special Requirements for Different Finance Modalities	Various lending modalities and financial products are key instruments for ADB to promote inclusive growth and sustainable development in its potential clients and investees. In addition to standard project loads, ADB provides a variety of investment instruments, including program loads, sector finance, multitranche financing facilities (MFFs), emergency assistance loads, financial intermediaries and corporate finance. This Safeguard requirements outlines the special requirements for different finance modalities that borrowers / clients are requested to meet.	

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APPENDIX A_2 BIODIVERSITY BASELINE DATA COLLECTION

Biodiversity Baseline Data Collection: Wind Farm in Lao PDR

Survey Approach

22 February 2021

Project No.: 0573186

The business of sustainability

Document details	
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Signature Page

22 February 2021

Biodiversity Baseline Data Collection: Wind Farm in Lao PDR

Survey Approach

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Acronyms and Abbreviations

ADB	Asian Development Bank
COVID-19	Coronavirus disease 2019
DFC	United States International Development Finance Corporation
EAAA	Ecologically Appropriate Area(s) of Assessment
EIA	Environmental Impact Assessment
ERM	ERM-Siam Co., Ltd.
IBAT	Integrated Biodiversity Assessment Tool
IEAD	Impact Energy Asia Development
IFC	International Finance Corporation
km	Kilometre
Lao PDR	Lao People's Democratic Republic
MLA	Multi-Lateral Agency
REA	Rapid Ecological Assessment
VP	Vantage Point

1. BIODIVERSITY BASELINE DATA COLLECTION

1.1 Introduction

Impact Energy Asia Development ("IEAD" and/ or "the Client") is developing a Wind farm facility with an installed capacity of 600 MW (113 turbines of 5.3 MW capacity each) in Lao PDR. The development also includes a 500 kV transmission line extending 22 km connecting to the grid in Vietnam ("the Project").

ERM-Siam Co., Ltd. ("ERM") has been contracted by the Client to undertake a Phase 1 - Gap Analysis between the local EIA Study and the Lenders' Applicable Standard with recommended next steps approach to close the gaps.

The Project is a significant contribution to the low carbon economy transition and climate change targets. However the project is large scale and located in an area of high biodiversity potential. Feedback from Multi-Lateral Agency (MLA) consultation identified a requirement for robust baseline data collection. This report outlines the approach to the collection of baseline data.

1.2 Summary of Biodiversity Issues Raised in the Multi-Lateral Agency Response

The MLA response was received between the 22nd August 2017 and the 29th September 2017, and included responses from the International Finance Corporation (IFC), Asian Development Bank (ADB), and United States International Development Finance Corporation (DFC).

The wind farm site was identified as within the East Asia/Australasia bird migration flyway zone and being in proximity to, or overlapping, designated and protected areas. Initial screening by the MLA identified a number of species potentially triggering critical habitat (all restricted range or endemic species), and recommended further desk study, consultation, and screening for biodiversity and critical habitat.

Bird and bats surveys to international standards were identified as survey priorities, with the peak bird migration season particularly important for survey.

1.3 Survey Approach

1.3.1 Critical Habitat Screening

This is currently underway using Integrated Biodiversity Assessment Tool (IBAT) and other screening tools, review of available literature and discussions with in-country academics and fieldworkers, as well as international experts (bats). It includes a gap analysis of the existing environmental impact assessment (EIA) against lenders applicable standards. These early discussions and desk study indicate that in addition to birds and bats the southern Annamites are important for endemic and near endemic mammals, fish, amphibians and turtles.

Once completed the screening assessment will identify those species, habitats and ecosystems that potentially trigger critical habitat and any key data gaps. It will set the Project within the wider landscape with particular reference to designated and protected areas. Ecologically Appropriate Area(s) of Assessment (EAAA) will be defined.

1.3.2 Rapid Ecological Assessment

The Rapid Ecological Assessment (REA) is a wide but shallow survey designed to achieve two main outcomes;

- Help ground truth the aerial habitat mapping, by identifying the main types of habitat and dominant vegetation at pre-selected survey points in each of the main turbine areas and transmission line. These points cover both modified and natural habitats; and

- Provides an overview of the actual and likely species present, which in turn helps inform priority survey areas for the main wet and dry season follow up surveys.

Figure 1.1 provides the indicative location of the 28 REA points to cover the main habitat types associated with the wind farm and transmission line.

At each location, a multi-skilled ecology team including habitat, bird, and fauna specialists will assess the main habitat types, including dominant species and taking a photographic record. Data will be recorded in a standardised data form that also includes a judgement of the sensitivity of the site and the ecosystem services associated with it. A more detailed description of the methodology and standard data forms are included in ***Appendix A***.

Based on the results of the initial REA further species specific wet and dry season surveys will be organised to provide more detailed information where required.

Outputs will be standardised habitat descriptions, landscape level context of the project, and focus/scope for further studies.

1.3.3 Vantage Point Surveys

Given that the project covers an area of approximately 700km^2, it will not be possible to undertake vantage point surveys of the entire wind farm. Instead a sampling approach has been adopted that allows a proportion of the turbines in each of the main wind farm clusters to be surveyed. The data will be gathered using standard internationally recognised protocols (see ***Appendix B*** for a simplified method statement and standardised data form examples) based on Scottish Natural Heritage (now NatureScot) guidance.[1]

Expert ornithologists will track and map birds through the turbine area, recording species, numbers and flight height during timed watches to provide data in a format sufficient for input into a collision risk model. A total of twelve hours survey each month, at each Vantage Point (VP), will be undertaken.

This sampling will allow differences in species and collision risk between turbine clusters to be assessed and provide an overall collision risk.[2]

The exact location of the vantage points will be identified during the initial set up visit planned for late November, as issues such as viewsheds, access, and health and safety will inform the micro-siting of the VPs. The indicative location of the VPs is provided in ***Figure 1.2***.

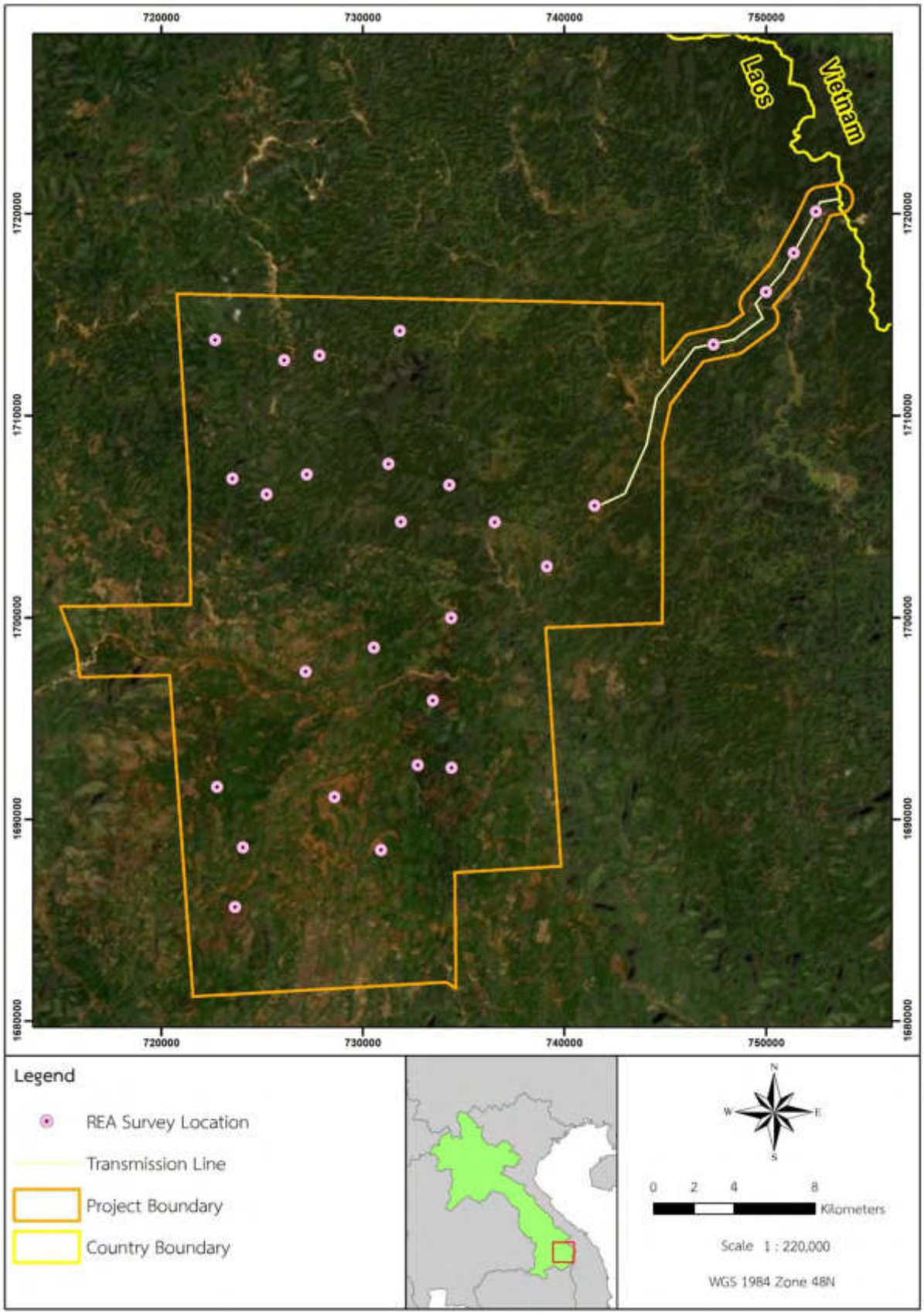
It had been hoped to initiate surveys during October to capture the peak of the migration season, which in Southeast Asia begins in late September through into November, although local bird experts indicate that in Lao migration extends through December. However the business disruption caused by the Coronavirus disease 2019 (COVID-19), and more significantly the impacts of a particularly fierce typhoon season made this impossible.

Outputs will be data on species, flight height, and activity at the VP's. This data will be used to identify collision risk across the entire wind farm.

[1] Scottish Natural Heritage August 2014. Recommended bird survey methods to inform impact assessment of onshore wind farms. Retrieved from https://www.nature.scot/sites/default/files/2017-09/Guidance%20note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf

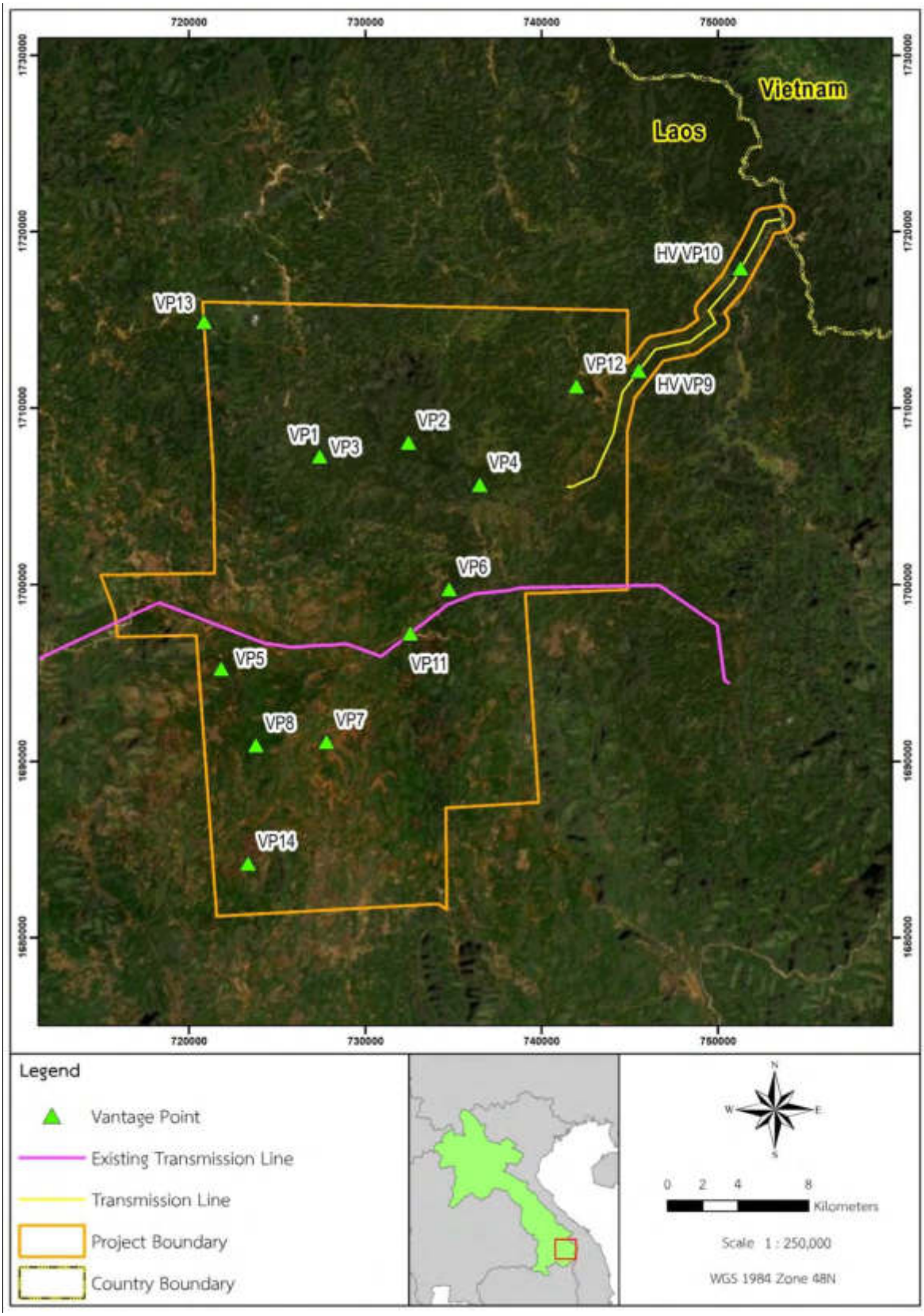
[2] Scottish Natural Heritage. 2000. Wind farms and birds: Calculating a theoretical collision risk assuming no avoiding action. Retrieved from https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Windfarms%20and%20birds%20-%20Calculating%20a%20theoretical%20collision%20risk%20assuming%20no%20avoiding%20action.pdf

Figure 1.1: Indicative REA Survey Locations



Source: ERM, 2020.

Figure 1.2: Indicative VP Survey Locations



Source: ERM, 2020.

Note: VP1 and VP3 are located nearby each other, with the intention of having the viewpoint of each survey point for VP1 and VP3 be conducted in the direction of North and South respectively.

1.3.4 Bat Surveys

Southeast Asia is recognised as a critical area for bat biodiversity[3], with a third of all mammals being bats. Currently estimates are that up to 40 % of bat species could be extinct by the end of the century at current rates of deforestation.

The surveys will require four separate field campaigns in total, with the first three between February and March 2021 (dry season), and the forth in June 2021 (wet season) to achieve sufficient sampling coverage of such a large area. The indicative location of the bat survey is provided in ***Figure 1.3***, in which the locations will focus on the main wind turbine clusters and transmission line.

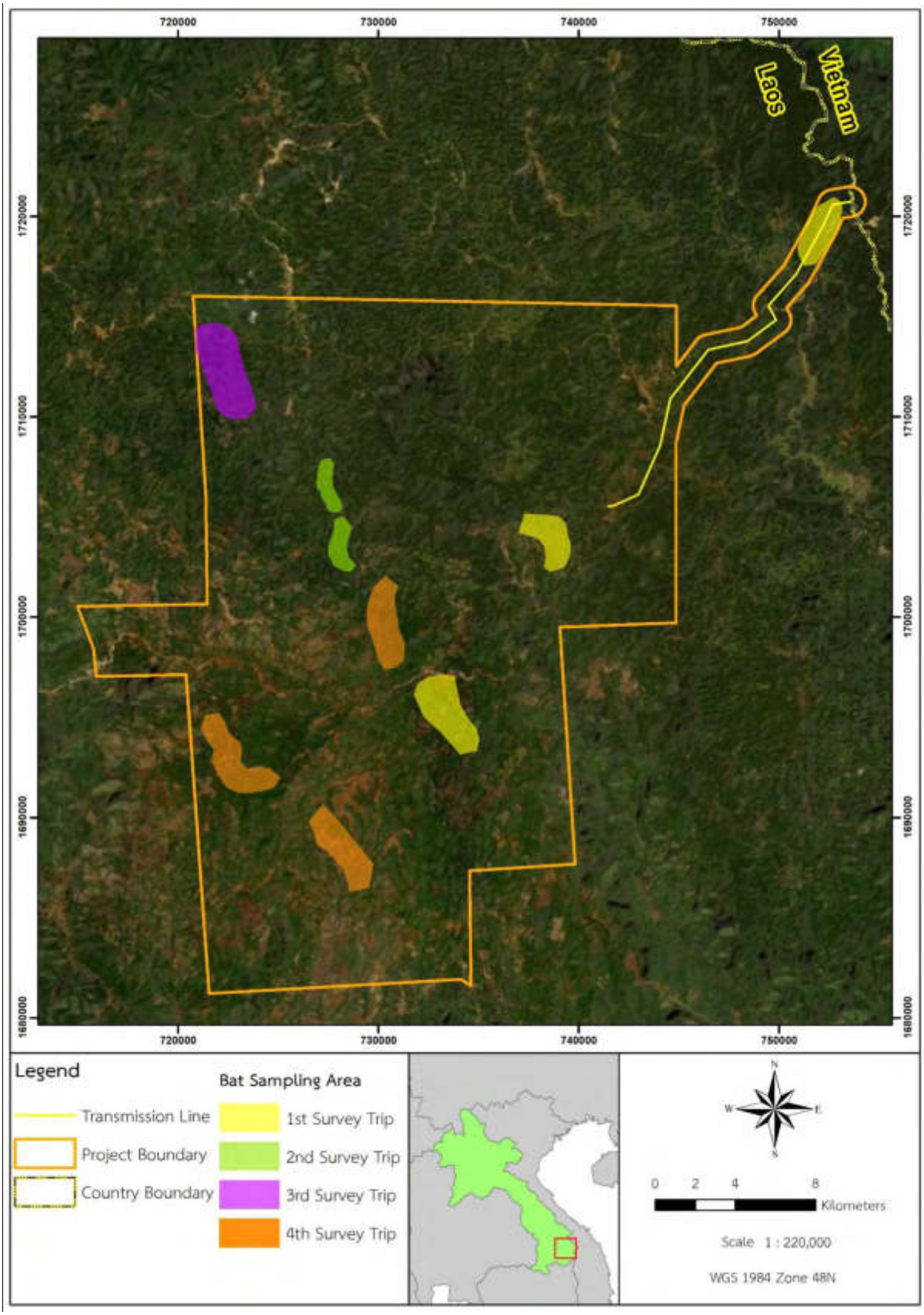
Based on a risk assessment and abiding by IUCN bats Specialist Sub Group requirements, the surveys will comprise a mixture of audio sampling using static detectors, hand held detector surveys and mist netting. Catching and handling of bats has been an issue due to the dangers of human spreading COVID-19 to bats. However, given the current COVID-19 free status in Laos, and using the IUCN protocols[4] to minimise potential infection mist netting is acceptable. This decision will be kept under review.

Outputs will be species diversity, relative abundance and differences in bat communities across the project.

[3] Kingston, Tigga. (2010). Research priorities for bat conservation in Southeast Asia: A consensus approach. Biodiversity and Conservation. 19. 471-484. 10.1007/s10531-008-9458-5.

[4] https://www.iucnbsg.org/uploads/6/5/0/9/6509077/map_recommendations_for_researchers_v._1.0_final.pdf

Figure 1.3: Indicative Bat Survey Locations



Source: Furrey, N., Douangboubpha, B., 2020. (Modified by ERM)

1.3.5 Detailed Surveys

These will be commissioned after the REA and will include;

- Bird surveys to identify presence of high priority species and community composition;
- Mammal surveys to identify high priority species .This is likely to involve a variety of techniques depending on the species involved, including camera trapping;
- Reptile and amphibian surveys;

The focus and methods for such surveys will be informed by the REA, desk study and consultation with experts. Additional survey requirements may be identified based on this process, and project impacts.

1.4 Survey Plan

Table 1.1 provides a summary of the indicative survey programme and timeline. ***Table 1.2*** provides a summary of the indicative reporting time for each survey programme and tasks. The survey programme is aligned with the financial programme and intended to provide sufficient information to inform that decision process. Further survey work to validate those results and/or complete wet season surveys for the detailed surveys may need to be considered.

Table 1.1: Indicative Survey Timeline

Survey	2020		2021					
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Rapid Ecological Assessment		■	■					
Vantage Point Survey.		■	■	■	■	■	■	
Bat Survey				■	■			■
Detailed Surveys (birds, mammals, herptiles)					■	■	■	■

Note: Highlighted cells only indicate months with planned survey activities, and does not imply that surveys will be undertaken continuously throughout the entire month.

Table 1.2: Indicative Reporting Timeline

Reporting	2020		2021							
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Critical Habitat Screening	■	■								
Gap Analysis	■	■								
Rapid Ecological Assessment			■	■						
Vantage Point Survey.[a]		■	■	■	■	■	■	■	■	■
Bat Survey						■		■		
Detailed Surveys (birds, mammals, herptiles)[b]						■	■	■		
Critical Habitat Assessment (CHA)[c]								■	■	■
Initial Biodiversity Action Plan (BAP)[d]									■	■

[a] *VP survey reports will include initial data from migration and final report.*

[b] *Detailed survey report for dry season. If wet season surveys required these will likely report late July-August 2021.*

[c] *The CHA will detail the use of the mitigation hierarchy and design changes to avoid effects, the distribution of natural and critical habitat, confirm any critical habitat triggers, and quantify likely effects on natural/critical habitat.*

[d] *The initial BAP will build on the CHA and identify the environmental liabilities associated with the project and how no net loss/ net gain can be achieved and the stakeholders and mechanisms required to deliver no net loss/net gain. A final BAP will be provided within six months that confirms the final suite of measures adopted, and the monitoring required to demonstrate progress.*

1.5 Budget

Table 1.3 provides a summary of the budget for each of the field surveys.

Table 1.3: Budget Summary

Survey	Sub-contractor Name	Total Cost (USD)
Bird Diversity Survey (Vantage point, line transect and point count)	Santi Xayyasith	66,760
Rapid Ecological Assessment	Phaivanh Phaipalath	58,179
Bat Surveys	Bounsavane Douangboubpha; Neil Furey	49,220
Detailed Surveys	Pending REA results	Pending REA results

APPENDIX A REA METHODOLOGY AND STANDARD DATA FORMS

Given the size of the proposed survey area a Rapid Ecological Assessment (REA) approach is recommended, and is an approach ERM have used on a number of similar large-scale projects.

REA works by first undertaking a GIS and desk study review of the search area identifying both the typical habitats present and areas of high nature conservation value. A series of points are then identified to allow sampling of typical habitats (e.g. cropland, plantations, livestock areas) and areas likely to have high biodiversity value (e.g. designated sites, natural habitats including intact steppe, wetlands, woodland).

A small multi-disciplinary team is deployed in the field to identify the key habitat, flora and faunal value of each area, usually averaging between 30-60 minutes at each site and ranging up to 500m around the GIS point. Expert judgement is used to identify what species are likely to occur on the site and to record any direct observations.

The output is a series of REA sheets based on each location that includes location data and photographs of the habitat. In addition to recording the key features of each site expert judgement is used to identify whether the site is low to high risk for the proposed seismic survey, and justification for that determination provided in each sheet. The REA also identifies where further species specific surveys may be required.

REA feeds into the mitigation hierarchy allowing the company to select those sites that have least impact on biodiversity or identifying those where additional mitigation will be required, thus allowing the company to assign costs and risks to different elements of the programme.

Survey point:	Long.	**GPS Elev.**	**Date**	**Project**
	Lat.			
Initial Field Assessment: Low Moderate High Exceptional **Reason for initial assessment:** **Habitat Description:** **Characteristic flora:** **Flora species of interest (present or likely to be present):** **Faunal species (present or highly likely to be present):** **Ecosystems Services comments:** Economically important olive plantation area.				

List of floral species recorded at location (dominants and notables)
List of fauna species recorded/ potentially present at location (please use * to record those actually seen or signs were present)
.

Survey point: NC: 1 Nearest location: XXXXX	Long. EXX.XXXXXX	**GPS Elev.**	**Date**	**Project**
	Lat. NXX.XXXXXX	80 m	29. 09 . 2011	XXXXX mine

Initial Field Assessment:

Low Moderate High Exceptional (Flora & Fauna)

Reason for initial assessment:
Agricultural area and dry river bank which is poor for fauna and flora. It is considered that the area does not support any endemic or rare species.

Habitat Description:
Olive plantation area
Seasonal stream (currently dry) likely wet only for six months of the year, dry in summer and autumn.

Characteristic flora:
Olea europaea

Flora species of interest (present or likely to be present):
Species of interest: none.

Faunal species (present or highly likely to be present):
Species/signs of species recorded during field survey: none.
Species of interest: none.

Ecosystems Services comments:
Economically important olive plantation area.

List of floral species recorded at location
Cydonia oblonga, Cerasus avium, Rubus sanctus, Ficus carica ssp. carica, Malus sylvestris, Armeniaca vulgaris, Brachypodium sylvaticum, Knautia integrifolia, Cichorium intybus, Melilotus officinalis, Populus alba, Tamus communis, Salix babylonica, Platanus orientalis, Melissa officinalis, Xanthium strumarium, Scariola viminea, Portulacca oleracea, Chenopodium botrys.
List of fauna species recorded at location
Common species highly likely to be present include: *Rattus rattus, Mus macedonicus, Mustela nivalis, Erinaceus concolor, Lepus europaeus, Vulpes vulpes, Martes foina, Sciurus anomalus, Sus scrofa, Apodemus sp., Meles meles, Bufo bufo, Bufo viridis, Rana ridibunda,* plus some common lizards and some common snakes.

Survey point:	Long. E	GPS Elev.	Date	Project
NC: 7 Nearest location: XXXXX	Lat. N	103 m	30.09. 2011	

Initial Field Assessment:

Low Moderate **High** Exceptional (Fauna & Flora)

Reason for initial assessment:
High quality habitats (woodland) in a mosaic of habitats.

Habitat Description:
Agriculture – crops and olive plantations
Riparian habitat along small stream
Mosaic of woodland within wider area.

Characteristic flora:
Riparian habitat: *Populus alba, Paliurus spina-christii, Rubus sanctus, Rosa canina.*
Woodland: *Quercus cerris* var. *cerris, Quercus petraea spp. iberica, Quercus infectoria, Acer sp.*

Flora species or interest (present or likely to be present):
Species of interest. None (but rare plants may be visible in spring).

Faunal species (present or highly likely to be present):
Species/signs of species recorded: *Microtus sp., .Erinaceus concolor, Vulpes vulpes, Spalax nehringi, Rana ridibunda*
Species of interest: *Vormela peregusna*

Ecosystems Services comments:
Agricultural land and woodland offering provisioning for local people.

List of floral species recorded at location
Riparian / Agricultural habitat: *Clematis cirrhosa, Daucus carota, Prunus spinosa* ssp. *dasyphylla, Cercis siliquastrum, Dactylis glomerata.* Woodland: *Cornus mas, Acer sp., Ruscus aculeatus, Sanguisorba minor, Crataegus monogyna, Anthemis tinctoria, Hypericum sp. Campanula sp. Cirsium sp., Salvia sp.*
List of faunal species recorded at location
Common species highly likely to be present: *Meles meles, Dryomys nitedula, Canis aureus, Rattus rattus, Lepus europaea, Apodemus flavicollis., Crocidura sp., Bufo bufo, Bufo viridis*

Survey point:	Long. E	GPS Elev.	Date	Project
NC: 13 Nearest location: XXXX	**Lat**. N	12 m	01.10.2011	

Initial Field Assessment:

Low **Moderate** High Exceptional (Flora & Fauna)

Reason for initial assessment:
Diversity of habitat including trees/copse next to a river, which offers greater floral and faunal diversity, otherwise surrounded by agricultural land.

Habitat Description:
Riverine habitat, including trees/copse
Agriculture – maize and tomato

Characteristic flora:
Salix babylonica, Populus canadensis, Rubus sanctus

Flora species or interest (present or likely to be present):
Species of interest. none

Faunal species (present or highly likely to be present):
Species/signs of species recorded: none.
Species of interest likely to be present: *Lutra lutra*

Ecosystems Services comments:
Water provisioning for surrounding crops
Fishing
Agricultural land

List of floral species recorded at location
Populus alba, Ulmus minor, Phragmites australis, Crataegus monogyna, Rosa canina, Cichorium intybus, Tamarix smyrnensis, Datura strumarium, Hedera helix
List of faunal species recorded at location
Common species highly likely to be present: *Martes foina, Vulpes vulpes, Arvicola amphibious, Rattus rattus, Apodemus sp. Mus macedonicus, Microtus levis, Mustela nivalis, Rana ridibunda, Bufo bufo, Bufo viridis, Hyla arborea, Mauremys sp, Natrix natrix, Natrix tessellata, Coluber caspius, Lacerta trilineata*

Survey point: NC: 15 Nearest location: XXXXXX	**Long**. E	**GPS Elev.**	**Date**	**Project**
	Lat. N	15 m	02.10.2011	

Initial Field Assessment:

Low Moderate High Exceptional (Flora & Fauna)

Reason for initial assessment:
Intense agricultural land with low floral diversity and few natural areas, so unlikely to support faunal species of interest.

Habitat Description:
Agricultural land – maize and tomato (with occasional irrigation ditches)

Characteristic flora:
Phragmites australis, Rubus sanctus

Flora species or interest (present or likely to be present):
Species of interest. none

Faunal species (present or highly likely to be present):
Species/signs of species recorded: none.
Species of interest likely to be present: none.

Ecosystems Services comments:
Agricultural land

List of floral species recorded at location
Ulmus minor, Tordylium sp., Knautia integrifolia var. bidens, Sanguisorba minor, Cynodon dactylon, Crepis sp., Rumex pulcher, Solanum nigrum.
List of faunal species recorded at location
Rattus rattus, Mus macedonicus

Survey point: NC: 16 Nearest location: XXXXX	**Long**. E	**GPS Elev.**	**Date**	**Project**
	Lat. N	11 m	02.10.2011	

Initial Field Assessment:

Low **Moderate** High Exceptional (Flora) (Fauna)

Reason for initial assessment:
Low diversity of flora species, although range of habitats (wetland, plantation, agricultural land) support faunal species with the wetland providing an important habitat resource.

Habitat Description:
Wetland including small lakes and canal irrigation system
Agricultural land
Populus canadensis plantation

Characteristic flora:
Salix babylonica, Phragmites australis, Tamarix smyrnensis, Populus canadensis

Flora species or interest (present or likely to be present):
Species of interest. none

Faunal species (present or highly likely to be present):
Species/signs of species recorded: *Emys orbicularis*.
Species of interest likely to be present: *Emys orbicularis, Testudo graeca*,

Ecosystems Services comments:
Water provisioning
Agriculture

List of floral species recorded at location
Plantago lancelota, Thypha latifolia, Rubus sanctus, Equisetum sp., Cichorium intybus, Centaurea solstitialis, Knautia integrifolia var. bidens, Xanthium strumarium, Verbascum sp., Lolium sp.
List of faunal species recorded at location
Common species highly likely to be present: *Arvicola amphibious, Vulpes vulpes, Martes foina, Mustela nivalis, Rattus rattus, Erinaceus concolor, Microtus levis, Mus macedonicus, Apodemus sp., Sciurus anomalus, Meles meles, Rana ridibunda, Bufo bufo, Bufo viridis, Hyla arborea, Natrix natrix, Natrix tessellata, Mauremys sp.*

Survey point: XXXX	Long. E	**GPS Elev.**	**Date**	**Project**
Nearest location: XXX	Lat. N	m	03.10.2011	

Initial Field Assessment:

Low Moderate **High** Exceptional
(Flora & Fauna)

Reason for initial assessment:
Flora is of high value due to quality Macchie habitat, although Macchie is of higher quality on the upper slopes. Fauna is of high value due to the presence of good quality habitat which supports *Tesudeio gracea* (present) and *Felis sylvestris* (anecdotal report).

Habitat Description:
The area is a proposed extension to an existing quarry, which currently supports Macchie habitat of progressively higher value on the upper slopes, with lowland areas under agricultural use or supporting degraded Macchie.

Characteristic flora:
Phillyrea latifolia, Quercus petraea ssp. *iberica, Pistacia terebinthus, Cistus creticus*

Flora species or interest (present or likely to be present):
Species of interest. None (but rare plants are likely to be visible in spring).

Faunal species (present or likely to be present):
Species/signs of species recorded: *Tesudeio gracea* (present) along with anecdotal reports from a local farmer of *Vulpes vulpes, Meles meles, Vormela peregusna, Felis sylvestris, Mustela nivalis, Sciurus anomalus, Lepus europaeus, Sus scrofa, Canis aureus, Dryomys nitedula, Vipera ammodytes*

Species of interest likely to be present: *Tesudeio gracea, Vormela peregusna, Felis sylvestris,*

Ecosystems Services comments:
Grazing for local villagers livestock. Collection of *Pistachio terebinthus* berries for eating.

List of floral species recorded at location
Stachys byzantina, Micromeria myrtifolia, Dactylis glomerata, Rosa canina, Teucrium polium, Anthemis tinctoria, Arbutus unedo, Globularia trichosantha, Psoralea bituminosa, Crataegus monogyna, Cerris siliquastrum, Lonicera etrusca, Crocus chrysanthus
List of faunal species recorded at location
See anecdotal list above.

Survey point: XXXX Quarry Nearest location: XXXX villge –	Long. Lat.	**GPS Elev.** 72 m	**Date** 3.10.2011	**Project**

Initial Field Assessment:

Low Moderate High **Exceptional** (Flora & Fauna)

Reason for initial assessment:
The large extent of continuous natural habitat supporting Macchie and Macchie-woodland and high quality riverine habitat is likely to support rare and endemic flora species and offers suitable habitat for rare faunal species, including (from anecdotal reports) *Ursus arctos*.

Habitat Description:
An extensive area of Macchie and Macchie-woodland within a larger natural upland area, with a very small former quarry situated in the lowland along with *Pinus pinea* plantation. The XXXX River flows through the north-eastern end of the proposed quarry area and is of exceptional quality.

Characteristic flora:
Quercus petraea ssp. *iberica, Phillyrea latifolia, Erica arborea, Arbutus unedo*

Flora species or interest (present or likely to be present):
Species of interest. None (but rare plants are likely to be visible in spring).

Faunal species (present or likely to be present):
Species/signs of species recorded: *Rana sp.* Crab species within the Kara River. Anecdotal reports from a local famer of: *Felis sylvestris, Canis lupus, Ursus arctos, Caracal caracal, Lynx lynx, Vormela peregusna, Testudo graeca* (along with common species).

Species of interest likely to be present: Crab species within the Kara River, *Felis sylvestris, Canis lupus, Ursus arctos, Caracal caracal, Lynx lynx, Vormela peregusna, Testudo graeca*

Ecosystems Services comments:

Survey point: XXXX Quarry Nearest location: XXXX villge –	Long.	**GPS Elev.**	**Date**	**Project**
	Lat.	72 m	3.10.2011	

Grazing for local villagers livestock.
Use of forest produce for food, recreation and hunting.
Water cleaning, regulation and provisioning.

List of floral species recorded at location

Macchie / Macchie forest: *Crataegus monogyna, Scariola vimirea, Spartium junceum, Cistus creticus, Asparagus acutifolius, Rubus sanctus, Paliurus spina-christii, Psorolea bituminosa, Eryngium campestre var. virens, Rosa canina, Dactylis glomerata, Juniperus oxycedrus, Daucus carota, Piptatherum miliaceum, Briza media, Anthemis tinctoria, Pistacia terebinthus, Jasminum fraticans, Verbascum sp., Hypericum sp.*
Wetter habitat patches: *Phragmities australis, Saix babylonica, Juncus heldeichionuis, Rubus sanctus, Platanus orientalis, Vitex agnus-costus*
XXXX River riverbank: *Plantanus orientalis, Salix babylonica, Ficus carica ssp. carica, Rubus sanctus, Alnus glutinosa* and Macchie around the river: *Phillyrea latifolia, Paliurus spina-christii, Rosa canina, Asparagus acutifolius, Quercus cerris* var. *cerris, Quesrcus petraea ssp. iberica, Juniperus oxycedrus, Erica arborea, Ruscus aculeatus, Anthemis tinctoria, Dactylis glomerata.*

List of faunal species recorded at location

See list above.

APPENDIX B VP METHOD STATEMENT AND STANDARDISED DATA FORM EXAMPLES

METHODOLOGY FOR FALL MIGRATION SURVEY AT ONSHORE WIND FARM

(1) Birds

The priority is to establish the species, number, flight heights, and behaviour and flight patterns of target species that may be vulnerable to collision with the turbines once they are operational. Target species are primarily but not exclusively migratory soaring birds, but will also include resident species of high conservation status (e.g. IUCN red data listed, species of high conservation concern within county).

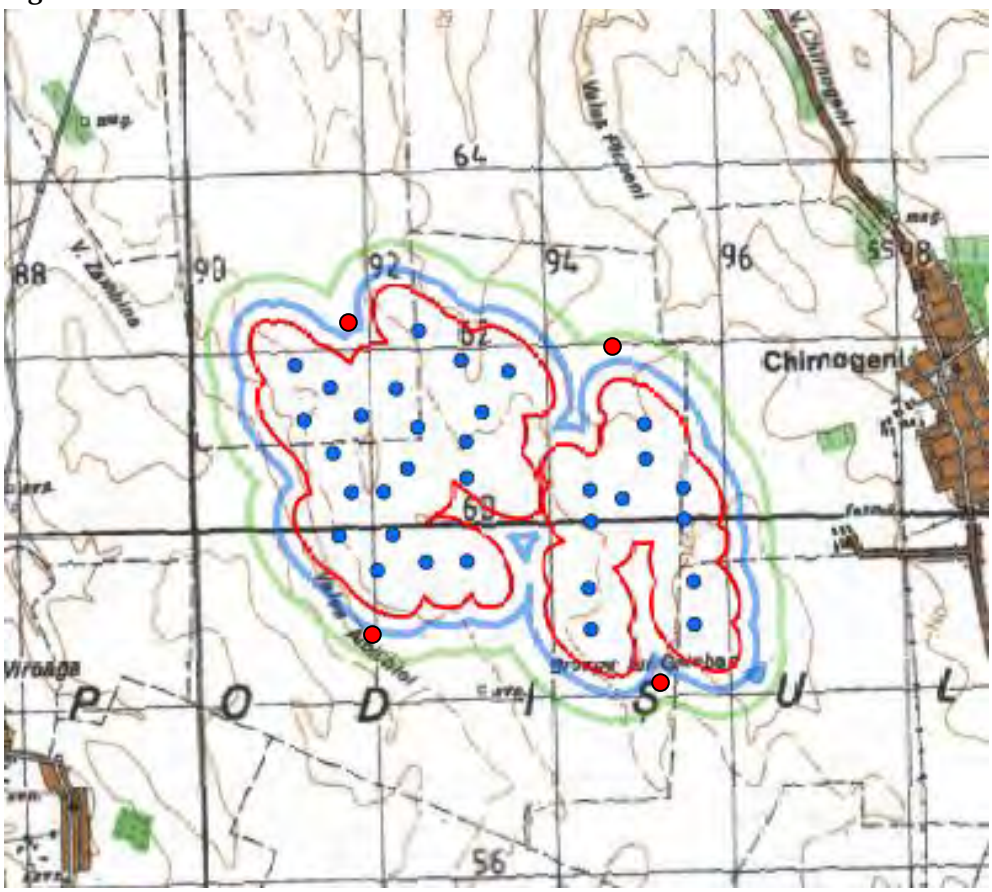
Enough vantage points should selected in order to provide sufficient coverage of the proposed windfarm area and selection of vantage points (VP's) and the protocols adopted are derived from published guidance[1]. The purpose of VP surveys is to obtain sufficient data on the number, height and duration of flights through the proposed windfarm by target species to inform an assessment of impacts. This can be derived both from analysis of movements and modelling of collision risks using the Band collision model[2].

The guidance stipulates that VP's should be situated as close to the site boundary as possible but not within the site, and usually a 200 metre buffer is required in order to avoid observer impacts on bird behaviour. Each VP has an arc of 2 km's of acceptable visibility based on 180° view from the VP (any birds beyond this distance can be recorded but cannot be used in collision risk modelling).

(1) Scottish Natural Heritage (November 2005 revised December 2010). Survey Methods for Assessing the Impacts of Onshore Windfarms on Bird Communities

(2) Band, W., Madders, M., & Whitfield, D.P. 2007. Developing field and analytical methods to assess avian collision risk at windfarms. In: de Lucas, M., Janss, G.F.E. & Ferrer, M. (eds.) Birds and Windfarms: Risk Assessment and Mitigation, pp. 259-275.

Figure 1 Indicative VP Locations



Red Dots = VP Locations

A site reconnaissance visit has not been possible and therefore VP's have been selected using maps and aerial photographs and in line with selection protocols stipulating location outside the 200m buffer zone and allowing for coverage of the whole site base on an 180 degree arc out to 2 km from the VP. As no ground truthing of the VP's has been possible the exact locations may need to differ slightly from the indicative points above in order to comply with the coverage protocol discussed in this paragraph. Once fixed a GPS co-ordinate and photograph from each of the VP's should be generated, and the VP's should be clearly labelled VP1, VP 2 etc.

Protocols for recording activity at the VP sites assume that the turbines will be XX megawatt units with a hub height of XX metres and rotor length of XX metres given a maximum height of XX metres.

Target species[1] entering the windfarm boundary will be tracked and their height estimated at 15 second intervals. Three bands will be used to estimate flight height;

1. XX metres or below (this allows for the effect of downdraft and compensates for potential height estimation difficulties over undulating terrain)

(3) These are all raptors, storks, pelicans and other migratory soaring birds. In addition any rare or threatened breeding birds such as raven or roller will be recorded, as will any flocks of birds exceeding five birds of species such as ducks, waders.

2. XXm-XXm. this is the height at which there is a collision risk with turbine blades.
3. XXm or above. Any birds in this area will be above collision risk height.

A number of landmarks (e.g. telegraph poles or phone masts) checked with a laser rangefinder to estimate their height and provide visual context for estimating flight heights.

In addition to mapping and timing of target species flying through the site (focal sampling) regular activity sampling will be undertaken of birds within view of the VP. This allows for recording of small passerine migration and activity on the ground such as feeding geese; although focal sampling will always take recording priority and when numbers of target species flying through the site are high activity sampling will be suspended.

During the migration period between September to November a total of 36 hours survey effort is required from each VP, equating to 12 hours per month per VP. As each VP watch must last no longer than three hours and be separated by a rest period of approximately one hour to retain observer acuity this will require eight days (assuming two VP watches of three hours duration each day)[1] of survey (two days per VP). In practice it is possible there will be insufficient time to fit 12 hours per VP during September but if possible a minimum of 6 hours per VP should be undertaken.

Observations should be spread over the month so that the site is visited at least weekly. Soaring bird activity usually begins between 0700-0800[2] and whilst effort should be concentrated during this period surveys should aim to cover other periods of the day as well, in particular watches ending at dusk should occur at each VP at least once each month as this is a time when birds may attempt to roost in or adjacent to the site.

The equipment required by each surveyor is;

- Maps showing red line boundary and 200m buffer
- Fine Pencil (preferably with an eraser) for marking flights on the map.
- Stopwatch (for timing flights).
- Binoculars and telescope.

On arrival the observer should record weather conditions and visibility and then begin scanning the 180 degree arc from their VP.

When a target species is acquired, identified and counted, once it has entered (or if it is seen already in the site boundary including the 200m buffer) the stopwatch should be started and the time recording started noted. The bird should be followed with binoculars and its flight height (band 1, 2 or 3) recorded at 15 second intervals.[3] Once the target(s) has landed, soared

(4) During the longer day length hours it is possible to do 3 x 3 hour watches in a day rather that 2 x 3 hour watches.

(5) Shirihai, H., Yosef, R., Alon, D., Kirwan, G.M. & Spaar, R. 2000. *Raptor Migration in Israel and the Middle East.* Tech. Publ. Int. Birding & Res. Centre in Eilat, Israel.

(6) In practice this is better done either by using a voice recorder or at the end of the flight estimating the time spent at different height bands.

out of sight or left the 200m buffer boundary it should be allocated a sequential number and its flight path recorded in pencil on the map. Once back at the office these flight lines should either be transferred to a fair copy or input directly onto the GIS system.

Examples of survey sheets are attached as is a worked example. Codes for recording birds should be consistent between observers and either use the BTO two letter codes, or use the first three letter of the genus and first three letters of the species (e.g. Aci nis for Accipiter nisus).

Full details of VP survey methods are available at https://www.nature.scot/sites/default/files/2018-06/Guidance%20Note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf

ACTIVITY SAMPLING	Date:	Time:	VP Location:	Surveyor:								
Hour:	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Cloud/mist (octa 0-8)												
Wind (Beaufort & direction)												
Precipitation (rain/snow, intensity)												
Visibility (0 - x)												
Temp												
Tide (if relevant)												
Bird Activity												

Hour:	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Cloud/mist (octa 0-8)												
Wind (Beaufort & direction)												
Precipitation (rain/snow, intensity)												
Visibility (0 - x)												
Temp												
Tide (if relevant)												
Bird Activity												

Hour:	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Cloud/mist (octa 0-8)												
Wind (Beaufort & direction)												
Precipitation (rain/snow, intensity)												
Visibility (0 - x)												
Temp												
Tide (if relevant)												
Bird Activity												

FOCAL SAMPLING **Date:** **Time:** **VP Location:** **Height Bands:**

Surveyor:

Rec #	Species	No.	Start time	1	2	3	4	5	6	7	8	9	10	11	12	Notes (Sex, Status, Flapping, Flying, hunting, foraging, carrying food etc.)

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APPENDIX B NOISE FIELD LOGS, CALIBRATION SHEETS, AND SAMPLING RAW DATA

Noise Measurements Datasheet at Noise Sampling Point 1

(Represent as **R1** in the report)

Receptor

Measurement Description
References time
Date 13-16/08/2021
Day time 72 hours

Coordinates: UTM
E 725350
N 1695974

Instrumentation

Noise Measure Instrument: ST-107S Class 2 Integrating Sound Level Meter
Wind Speed Instrument: Davis Vantage PRO2

Noise Pressure Levels (dBA) - Laeq, day/night

Date	Time	LeqA	L05	L10	L50	L90	L95
8/13/2021 12:00-18:00	Day time	37.1	40.8	39.3	33.4	28.8	28.3
8/13-14/2021 18:00-06:00	Night time	47	50	45.6	42.6	39.9	39.6
8/14/2021 06:00-18:00	Day time	46.8	53	51.6	39.2	34.9	33.5
8/14-15/2021 18:00-06:00	Night time	40.9	42.8	42.2	40.8	38.2	36.6
8/15/2021 06:00-18:00	Day time	37	41	39.6	34.1	30	29.5
8/15-16/2021 18:00-06:00	Night time	42.1	44.8	44.3	42.1	38.3	37.1
8/16/2021 06:00-12:00	Day time	37.9	40.5	38.9	34.5	30.6	29.8

Noise Pressure Levels (dBA) - Laeq, 1h

Date	**Time**	**LeqA**	**L05**	**L10**	**L50**	**L90**	**L95**
8/13/2021	12:00-13:00	38.9	45.1	41.4	33.5	30.5	29.9
8/13/2021	13:00-14:00	37.5	41.2	39.6	35.4	31.5	30.6
8/13/2021	14:00-15:00	35.2	38.8	38.4	34.7	29.9	29.1
8/13/2021	15:00-16:00	31.8	36.7	34.8	29	27.8	27.5
8/13/2021	16:00-17:00	32.7	36.9	34.6	31.4	28.8	28.5
8/13/2021	17:00-18:00	40.2	42.9	40	36.4	32.1	31.9
8/13/2021	18:00-19:00	50.6	57	55	46.3	42.7	37
8/13/2021	19:00-20:00	54.9	61.8	60.9	46.2	43.4	42.9
8/13/2021	20:00-21:00	42.6	44.7	44.4	42.4	39.9	39.4
8/13/2021	21:00-22:00	41.8	44	43.7	41.5	38.8	38.6
8/13/2021	22:00-23:00	43	44.9	44.5	42.6	40.1	39.4
8/13/2021	23:00-24:00	43.3	44.7	44.3	43.3	42	41.7
8/14/2021	00:00-01:00	43.4	45.1	44.8	43.1	42.2	41.7
8/14/2021	01:00-02:00	42.8	44.7	43.8	43	41.3	40.5
8/14/2021	02:00-03:00	42.4	43.5	43.1	42.4	41.2	40.9
8/14/2021	03:00-04:00	41.7	43.4	42.9	41.2	39.8	39.6
8/14/2021	04:00-05:00	40.7	42	41.8	40.5	39.8	39.7
8/14/2021	05:00-06:00	40.6	42.3	41.6	40.2	39.4	38.9
8/14/2021	06:00-07:00	45.3	51.2	45.2	37.9	34.7	33.6
8/14/2021	07:00-08:00	48.7	53	52.4	42.2	36.2	35.5
8/14/2021	08:00-09:00	50.9	55.3	54.1	49.3	41.5	36.9
8/14/2021	09:00-10:00	54.5	55.4	54.3	52.6	48.8	47.5
8/14/2021	10:00-11:00	44.6	49.1	48.2	41	35.8	35.4
8/14/2021	11:00-12:00	38.4	43.7	42.7	36.2	33.8	33.4
8/14/2021	12:00-13:00	35.9	39.5	38.9	34.3	31.7	31.5
8/14/2021	13:00-14:00	41.2	43.3	42.9	40.2	37.1	36
8/14/2021	14:00-15:00	37.2	39.8	39.1	36.9	34.2	33.3
8/14/2021	15:00-16:00	38.3	40.8	40.4	37.3	36.1	36
8/14/2021	16:00-17:00	39.8	42	41.6	39.4	38.2	37.7

8/14/2021	17:00-18:00	42.2	45.1	44.5	41.5	38	37.4
8/14/2021	18:00-19:00	41.7	44.3	43.8	40.9	38.8	38.3
8/14/2021	19:00-20:00	41.6	42.7	42.5	41.7	40.4	40.3
8/14/2021	20:00-21:00	41.4	42.8	42.6	41.3	39.8	39.7
8/14/2021	21:00-22:00	41.2	42.4	42.1	41.2	40	40
8/14/2021	22:00-23:00	41.2	42	41.8	41.1	40.4	40.2
8/14/2021	23:00-00:00	39.3	42.2	41.8	38	35.2	34.9
8/15/2021	00:00-01:00	40.1	41.6	41.3	41.6	36.8	36
8/15/2021	01:00-02:00	41	41.9	41.8	41.1	40.1	39.6
8/15/2021	02:00-03:00	41.5	43.1	42.9	41.5	38.9	38.8
8/15/2021	03:00-04:00	40.5	41.6	41.5	40.6	39.2	39
8/15/2021	04:00-05:00	40.8	42.5	41.9	40.5	39.4	39
8/15/2021	05:00-06:00	39	41.1	40.7	38.7	36.5	36
8/15/2021	06:00-07:00	37.8	41.7	41	36.4	35	34.9
8/15/2021	07:00-08:00	38.4	41.1	40.8	37.6	34.6	33.6
8/15/2021	08:00-09:00	36.4	40.1	39.4	34.5	32.2	31.7
8/15/2021	09:00-10:00	37.1	42.1	37.7	32.9	30.8	30.4
8/15/2021	10:00-11:00	34.2	38.1	37.2	32.6	29.9	29.7
8/15/2021	11:00-12:00	33.2	37.9	36.4	30.7	29.3	29.2
8/15/2021	12:00-13:00	33.4	36.9	36.4	31.8	29.8	29.4
8/15/2021	13:00-14:00	33.9	38.9	37.5	31.7	29.1	29
8/15/2021	14:00-15:00	33.8	38.9	37.6	31.4	29.5	29.2
8/15/2021	15:00-16:00	33.3	36.5	35.8	32.5	30.5	30.2
8/15/2021	16:00-17:00	42.3	49	44.1	38.2	31.3	30.5
8/15/2021	17:00-18:00	38.4	41	40.6	37.8	33.3	33
8/15/2021	18:00-19:00	43.5	45.4	45.1	43.5	40.3	39.7
8/15/2021	19:00-20:00	43.9	45.2	45.1	43.7	42.3	41.9
8/15/2021	20:00-21:00	43.5	44.3	44.1	43.4	42.7	42.4
8/15/2021	21:00-22:00	43.7	44.9	44.6	43.7	42.3	41.5
8/15/2021	22:00-23:00	42.9	43.6	43.5	42.9	42.3	42.1
8/15/2021	23:00-00:00	42.1	43.3	43	42.1	41.2	41.2
8/16/2021	00:00-01:00	42.7	44.9	43.8	42.4	41.3	41.2
8/16/2021	01:00-02:00	41.9	43.4	43	41.9	40.1	39.8
8/16/2021	02:00-03:00	40	41.5	41	39.8	38.7	38.3
8/16/2021	03:00-04:00	39	40.6	40.3	39	37.4	37.2
8/16/2021	04:00-05:00	40	41.4	41.2	39.9	38.5	38.5
8/16/2021	05:00-06:00	36.9	39	38.6	36.7	34.1	34.1
8/16/2021	06:00-07:00	36.9	40.4	38.4	35.7	33.9	33.7
8/16/2021	07:00-08:00	37.8	41.4	40.4	37.1	34.1	33.8
8/16/2021	08:00-09:00	36.9	40.5	39.2	36	31.3	30.8
8/16/2021	09:00-10:00	42.5	42.7	38.8	31.2	29.3	29.2
8/16/2021	10:00-11:00	34.1	38.1	36.5	32.5	30.4	29.9
8/16/2021	11:00-12:00	34.3	38.5	36.4	32.7	30.9	30.2

Receptor

Geographic Coordinations

Geographic Coordination System WGS 1984 – UTM 48N

Coordinate [m]	X	Y
	725350	1695974

Measurement Description

Reference Time

Date 13-16/08/2021

Day time 72 hours

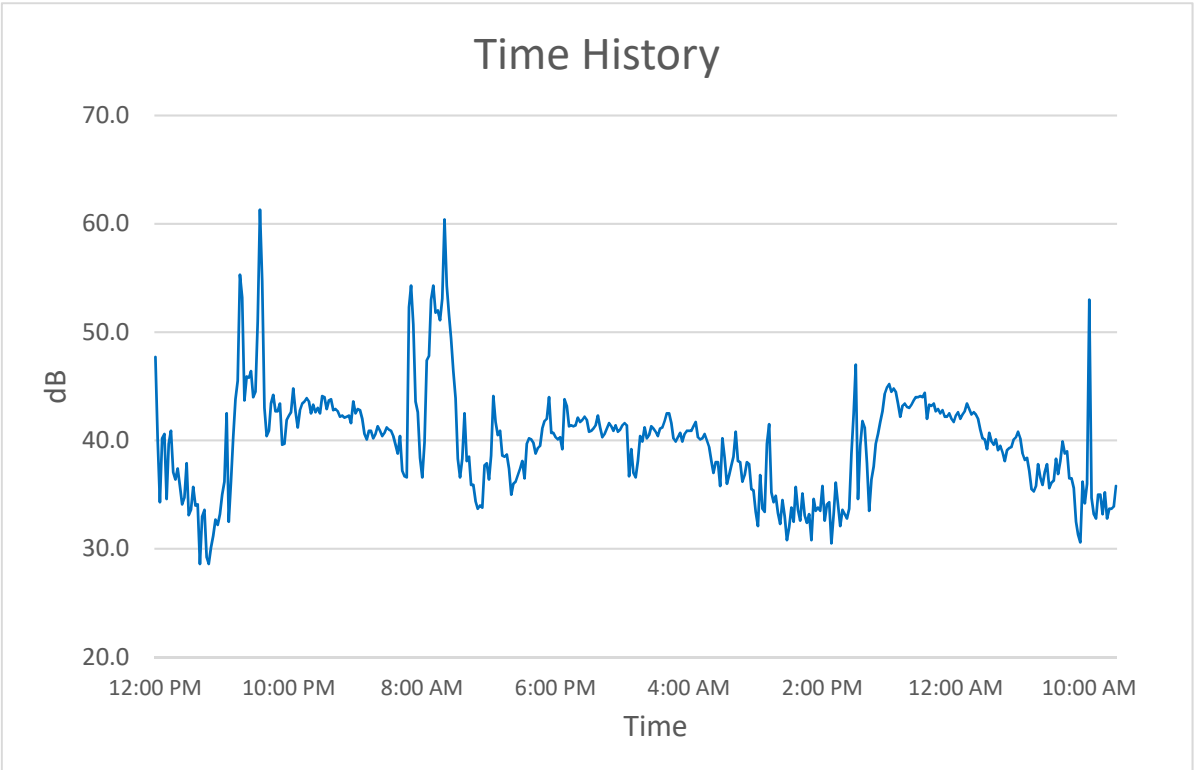
Instrumentation

Noise Measure Instrument: ST-107S Class 2 Integrating Sound Level Meter

Wind Speed Instrument: Davis Vantage PRO2

Metheorological Conditions

	u.m.		LeqA	L5	L10	L50	L90	L95
Temperature	[°C]	23.3	**40.3**	44.2	43.2	39.2	31.8	30.5
Wind Speed	[m/s]	2.35						
Pressure	[Hpa]	880.1						
Rainfall	[mm]	0						
(*) Average Values								



Recording activities surrounding at Noise measurement and Wind Speed.
Sampling Point: N1 (R1)

Recording activities surrounding at Noise measurement and Wind speed point N1 (R1). This point was in high school of Xienglouang village. Surrounding there are household, community, near 16B national road and farming area. Particularly observation sound hearing from truck, car, motorbike on road, noise from community, pets (cow) and noise from rain.

Wind Speed Measurement at Noise Sampling Point 1

(Represent as **R1** in the report)

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
8/13/2021 12:00	0:10:00	47.7	31.8	3.6
8/13/2021 12:10	0:10:00	40.1	30.3	3.1
8/13/2021 12:20	0:10:00	34.3	30.5	3.6
8/13/2021 12:30	0:10:00	40.2	33.0	4.5
8/13/2021 12:40	0:10:00	40.6	29.6	2.7
8/13/2021 12:50	0:10:00	34.6	30.8	4.5
8/13/2021 13:00	0:10:00	39.7	32.2	4.9
8/13/2021 13:10	0:10:00	40.9	33.2	4.9
8/13/2021 13:20	0:10:00	37.1	30.3	3.1
8/13/2021 13:30	0:10:00	36.4	33.8	3.6
8/13/2021 13:40	0:10:00	37.4	33.8	4.0
8/13/2021 13:50	0:10:00	35.8	32.2	3.6
8/13/2021 14:00	0:10:00	34.1	30.8	4.0
8/13/2021 14:10	0:10:00	34.7	31.4	4.0
8/13/2021 14:20	0:10:00	37.9	35.4	4.9
8/13/2021 14:30	0:10:00	33.1	28.6	3.1
8/13/2021 14:40	0:10:00	33.6	29.9	3.6
8/13/2021 14:50	0:10:00	35.7	30.0	3.1
8/13/2021 15:00	0:10:00	34.0	30.1	3.1
8/13/2021 15:10	0:10:00	34.1	29.8	3.1
8/13/2021 15:20	0:10:00	28.6	27.8	2.2
8/13/2021 15:30	0:10:00	33.0	28.3	2.7
8/13/2021 15:40	0:10:00	33.6	28.4	2.7
8/13/2021 15:50	0:10:00	29.2	28.0	2.2
8/13/2021 16:00	0:10:00	28.6	27.4	2.2
8/13/2021 16:10	0:10:00	30.1	28.4	2.2
8/13/2021 16:20	0:10:00	31.2	28.4	2.2
8/13/2021 16:30	0:10:00	32.7	29.1	2.2
8/13/2021 16:40	0:10:00	32.2	29.2	1.8
8/13/2021 16:50	0:10:00	33.2	30.4	1.8
8/13/2021 17:00	0:10:00	35.0	32.1	1.8
8/13/2021 17:10	0:10:00	36.2	34.6	1.8
8/13/2021 17:20	0:10:00	42.5	34.9	2.2
8/13/2021 17:30	0:10:00	32.5	30.4	1.3
8/13/2021 17:40	0:10:00	36.2	32.0	0.9
8/13/2021 17:50	0:10:00	40.3	35.7	2.2
8/13/2021 18:00	0:10:00	43.8	34.6	2.2
8/13/2021 18:10	0:10:00	45.5	34.7	2.2
8/13/2021 18:20	0:10:00	55.3	50.3	3.6
8/13/2021 18:30	0:10:00	53.2	51.0	1.8
8/13/2021 18:40	0:10:00	43.7	42.9	1.8
8/13/2021 18:50	0:10:00	45.9	43.5	2.7
8/13/2021 19:00	0:10:00	45.8	44.9	2.7
8/13/2021 19:10	0:10:00	46.4	45.2	2.7
8/13/2021 19:20	0:10:00	44.0	43.4	2.2
8/13/2021 19:30	0:10:00	44.5	42.9	1.3
8/13/2021 19:40	0:10:00	51.0	45.9	1.8
8/13/2021 19:50	0:10:00	61.3	59.8	4.0
8/13/2021 20:00	0:10:00	54.7	42.3	1.8
8/13/2021 20:10	0:10:00	43.0	41.2	1.3
8/13/2021 20:20	0:10:00	40.4	38.8	0.9
8/13/2021 20:30	0:10:00	40.9	40.3	1.3
8/13/2021 20:40	0:10:00	43.4	41.2	1.3
8/13/2021 20:50	0:10:00	44.2	43.3	1.3
8/13/2021 21:00	0:10:00	42.7	42.1	1.3

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
8/13/2021 21:10	0:10:00	42.7	41.4	1.3
8/13/2021 21:20	0:10:00	43.4	41.8	1.3
8/13/2021 21:30	0:10:00	39.6	38.6	1.8
8/13/2021 21:40	0:10:00	39.7	37.7	2.2
8/13/2021 21:50	0:10:00	41.9	41.0	2.7
8/13/2021 22:00	0:10:00	42.3	40.0	2.2
8/13/2021 22:10	0:10:00	42.6	41.8	2.7
8/13/2021 22:20	0:10:00	44.8	42.7	2.2
8/13/2021 22:30	0:10:00	42.7	41.0	2.2
8/13/2021 22:40	0:10:00	41.2	39.1	1.8
8/13/2021 22:50	0:10:00	42.8	41.5	1.3
8/13/2021 23:00	0:10:00	43.4	41.7	0.9
8/13/2021 23:10	0:10:00	43.6	42.4	0.9
8/13/2021 23:20	0:10:00	43.9	43.1	1.3
8/13/2021 23:30	0:10:00	43.6	42.6	0.9
8/13/2021 23:40	0:10:00	42.5	41.1	1.3
8/13/2021 23:50	0:10:00	43.3	42.5	0.9
8/14/2021 0:00	0:10:00	42.6	41.5	1.3
8/14/2021 0:10	0:10:00	43.0	42.3	1.3
8/14/2021 0:20	0:10:00	42.5	41.6	1.3
8/14/2021 0:30	0:10:00	44.1	43.1	1.3
8/14/2021 0:40	0:10:00	44.0	42.2	1.8
8/14/2021 0:50	0:10:00	42.9	41.8	1.3
8/14/2021 1:00	0:10:00	43.7	42.7	1.8
8/14/2021 1:10	0:10:00	43.8	42.5	2.2
8/14/2021 1:20	0:10:00	42.8	41.5	1.8
8/14/2021 1:30	0:10:00	42.9	41.8	2.7
8/14/2021 1:40	0:10:00	42.7	41.6	2.2
8/14/2021 1:50	0:10:00	42.2	40.0	2.2
8/14/2021 2:00	0:10:00	42.3	41.1	2.2
8/14/2021 2:10	0:10:00	42.1	41.2	3.1
8/14/2021 2:20	0:10:00	42.2	41.4	2.2
8/14/2021 2:30	0:10:00	42.3	41.0	2.7
8/14/2021 2:40	0:10:00	41.6	40.1	2.7
8/14/2021 2:50	0:10:00	43.6	42.3	2.7
8/14/2021 3:00	0:10:00	42.5	41.9	2.7
8/14/2021 3:10	0:10:00	42.9	42.5	2.7
8/14/2021 3:20	0:10:00	42.8	43.5	2.7
8/14/2021 3:30	0:10:00	42.0	40.7	2.7
8/14/2021 3:40	0:10:00	40.6	39.8	2.7
8/14/2021 3:50	0:10:00	40.1	39.2	3.1
8/14/2021 4:00	0:10:00	40.9	40.0	3.1
8/14/2021 4:10	0:10:00	40.9	40.1	2.7
8/14/2021 4:20	0:10:00	40.2	39.7	3.6
8/14/2021 4:30	0:10:00	40.6	39.9	4.0
8/14/2021 4:40	0:10:00	41.3	40.2	3.6
8/14/2021 4:50	0:10:00	40.9	40.2	3.6
8/14/2021 5:00	0:10:00	40.4	39.8	4.0
8/14/2021 5:10	0:10:00	40.7	39.7	3.6
8/14/2021 5:20	0:10:00	41.2	39.7	3.1
8/14/2021 5:30	0:10:00	41.0	39.8	2.7
8/14/2021 5:40	0:10:00	40.9	39.5	2.7
8/14/2021 5:50	0:10:00	40.4	39.4	2.7
8/14/2021 6:00	0:10:00	39.6	38.2	2.7
8/14/2021 6:10	0:10:00	38.8	38.2	3.6

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
8/14/2021 6:20	0:10:00	40.4	35.2	3.1
8/14/2021 6:30	0:10:00	37.2	35.8	2.7
8/14/2021 6:40	0:10:00	36.7	34.0	2.7
8/14/2021 6:50	0:10:00	36.6	33.5	1.8
8/14/2021 7:00	0:10:00	52.3	36.7	3.1
8/14/2021 7:10	0:10:00	54.3	48.1	2.2
8/14/2021 7:20	0:10:00	50.7	46.6	3.6
8/14/2021 7:30	0:10:00	43.6	41.1	4.5
8/14/2021 7:40	0:10:00	42.6	40.4	3.6
8/14/2021 7:50	0:10:00	38.4	34.8	3.1
8/14/2021 8:00	0:10:00	36.6	35.7	3.1
8/14/2021 8:10	0:10:00	39.8	35.5	3.1
8/14/2021 8:20	0:10:00	47.4	45.5	2.7
8/14/2021 8:30	0:10:00	47.8	46.3	3.1
8/14/2021 8:40	0:10:00	53.0	52.2	3.6
8/14/2021 8:50	0:10:00	54.3	52.2	3.6
8/14/2021 9:00	0:10:00	51.8	48.9	3.6
8/14/2021 9:10	0:10:00	52.0	47.8	1.3
8/14/2021 9:20	0:10:00	51.1	47.0	1.3
8/14/2021 9:30	0:10:00	53.1	51.9	2.2
8/14/2021 9:40	0:10:00	60.4	52.0	4.5
8/14/2021 9:50	0:10:00	54.3	52.6	5.4
8/14/2021 10:00	0:10:00	51.6	49.5	5.8
8/14/2021 10:10	0:10:00	49.4	45.8	5.4
8/14/2021 10:20	0:10:00	46.4	44.6	4.0
8/14/2021 10:30	0:10:00	43.9	39.7	3.1
8/14/2021 10:40	0:10:00	38.3	35.4	1.8
8/14/2021 10:50	0:10:00	36.6	35.4	1.8
8/14/2021 11:00	0:10:00	38.3	35.9	1.8
8/14/2021 11:10	0:10:00	42.5	39.0	2.2
8/14/2021 11:20	0:10:00	38.1	36.0	2.2
8/14/2021 11:30	0:10:00	38.5	34.9	2.2
8/14/2021 11:40	0:10:00	35.9	33.8	2.2
8/14/2021 11:50	0:10:00	35.9	34.4	2.7
8/14/2021 12:00	0:10:00	34.4	33.1	2.2
8/14/2021 12:10	0:10:00	33.7	32.1	1.8
8/14/2021 12:20	0:10:00	34.0	31.8	2.2
8/14/2021 12:30	0:10:00	33.8	31.3	2.2
8/14/2021 12:40	0:10:00	37.7	32.2	2.7
8/14/2021 12:50	0:10:00	37.9	35.0	2.2
8/14/2021 13:00	0:10:00	36.4	33.4	2.7
8/14/2021 13:10	0:10:00	38.6	36.8	3.1
8/14/2021 13:20	0:10:00	44.1	38.8	3.1
8/14/2021 13:30	0:10:00	41.7	40.1	3.1
8/14/2021 13:40	0:10:00	40.5	38.1	2.7
8/14/2021 13:50	0:10:00	40.9	39.4	2.7
8/14/2021 14:00	0:10:00	38.6	35.6	2.7
8/14/2021 14:10	0:10:00	38.5	36.1	2.2
8/14/2021 14:20	0:10:00	38.7	37.6	1.8
8/14/2021 14:30	0:10:00	37.4	35.7	2.7
8/14/2021 14:40	0:10:00	35.0	32.4	3.1
8/14/2021 14:50	0:10:00	36.0	33.9	2.7
8/14/2021 15:00	0:10:00	36.2	35.5	3.1
8/14/2021 15:10	0:10:00	36.8	36.0	2.2
8/14/2021 15:20	0:10:00	37.4	36.4	2.7

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
8/14/2021 15:30	0:10:00	38.1	36.9	3.1
8/14/2021 15:40	0:10:00	36.5	36.0	2.7
8/14/2021 15:50	0:10:00	39.7	38.7	2.2
8/14/2021 16:00	0:10:00	40.2	37.3	1.8
8/14/2021 16:10	0:10:00	40.1	37.6	2.7
8/14/2021 16:20	0:10:00	39.8	37.8	2.7
8/14/2021 16:30	0:10:00	38.8	38.3	2.2
8/14/2021 16:40	0:10:00	39.3	37.9	2.7
8/14/2021 16:50	0:10:00	39.5	38.8	2.7
8/14/2021 17:00	0:10:00	41.1	40.2	2.7
8/14/2021 17:10	0:10:00	41.8	37.9	2.2
8/14/2021 17:20	0:10:00	42.0	40.5	1.8
8/14/2021 17:30	0:10:00	44.0	42.9	1.8
8/14/2021 17:40	0:10:00	40.7	38.8	2.2
8/14/2021 17:50	0:10:00	40.7	37.8	1.8
8/14/2021 18:00	0:10:00	40.3	39.3	2.2
8/14/2021 18:10	0:10:00	40.1	38.3	2.7
8/14/2021 18:20	0:10:00	40.3	39.3	2.7
8/14/2021 18:30	0:10:00	39.2	38.3	3.1
8/14/2021 18:40	0:10:00	43.8	40.7	3.1
8/14/2021 18:50	0:10:00	43.2	41.5	2.7
8/14/2021 19:00	0:10:00	41.3	40.8	2.7
8/14/2021 19:10	0:10:00	41.4	40.5	2.7
8/14/2021 19:20	0:10:00	41.3	40.5	3.1
8/14/2021 19:30	0:10:00	41.4	40.3	2.7
8/14/2021 19:40	0:10:00	42.1	41.8	2.2
8/14/2021 19:50	0:10:00	41.7	40.4	2.2
8/14/2021 20:00	0:10:00	41.9	41.2	2.7
8/14/2021 20:10	0:10:00	42.2	41.0	2.2
8/14/2021 20:20	0:10:00	41.9	41.0	2.7
8/14/2021 20:30	0:10:00	40.8	39.2	2.7
8/14/2021 20:40	0:10:00	40.9	40.4	2.7
8/14/2021 20:50	0:10:00	41.1	39.8	2.2
8/14/2021 21:00	0:10:00	41.4	40.3	2.7
8/14/2021 21:10	0:10:00	42.3	41.5	2.7
8/14/2021 21:20	0:10:00	41.2	40.2	2.2
8/14/2021 21:30	0:10:00	40.3	40.0	2.7
8/14/2021 21:40	0:10:00	40.6	39.8	2.7
8/14/2021 21:50	0:10:00	41.1	40.5	2.7
8/14/2021 22:00	0:10:00	41.6	40.9	2.7
8/14/2021 22:10	0:10:00	41.3	40.9	1.8
8/14/2021 22:20	0:10:00	40.9	40.3	2.2
8/14/2021 22:30	0:10:00	41.4	40.4	2.7
8/14/2021 22:40	0:10:00	40.8	40.2	3.1
8/14/2021 22:50	0:10:00	41.0	40.6	3.1
8/14/2021 23:00	0:10:00	41.4	40.9	3.1
8/14/2021 23:10	0:10:00	41.6	40.5	3.1
8/14/2021 23:20	0:10:00	41.4	40.9	3.1
8/14/2021 23:30	0:10:00	36.7	35.3	3.1
8/14/2021 23:40	0:10:00	39.2	34.3	4.5
8/14/2021 23:50	0:10:00	37.0	34.9	2.7
8/15/2021 0:00	0:10:00	36.6	35.6	3.6
8/15/2021 0:10	0:10:00	38.1	35.1	2.2
8/15/2021 0:20	0:10:00	40.4	38.6	1.8
8/15/2021 0:30	0:10:00	39.9	38.4	1.8

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
8/15/2021 0:40	0:10:00	41.2	36.4	1.8
8/15/2021 0:50	0:10:00	40.2	36.7	2.2
8/15/2021 1:00	0:10:00	40.5	39.6	2.2
8/15/2021 1:10	0:10:00	41.3	41.1	2.2
8/15/2021 1:20	0:10:00	41.1	40.1	2.2
8/15/2021 1:30	0:10:00	40.8	39.6	2.2
8/15/2021 1:40	0:10:00	40.4	39.6	1.8
8/15/2021 1:50	0:10:00	41.1	40.3	1.3
8/15/2021 2:00	0:10:00	41.2	40.6	1.3
8/15/2021 2:10	0:10:00	41.8	40.7	1.8
8/15/2021 2:20	0:10:00	42.5	41.4	2.2
8/15/2021 2:30	0:10:00	42.5	41.2	1.8
8/15/2021 2:40	0:10:00	41.6	40.6	2.2
8/15/2021 2:50	0:10:00	40.2	38.8	2.7
8/15/2021 3:00	0:10:00	39.9	38.7	3.1
8/15/2021 3:10	0:10:00	40.3	38.3	2.2
8/15/2021 3:20	0:10:00	40.7	39.7	2.7
8/15/2021 3:30	0:10:00	39.9	39.2	2.7
8/15/2021 3:40	0:10:00	40.6	39.5	2.7
8/15/2021 3:50	0:10:00	40.9	40.1	2.2
8/15/2021 4:00	0:10:00	40.9	40.3	1.3
8/15/2021 4:10	0:10:00	40.9	39.9	1.3
8/15/2021 4:20	0:10:00	41.3	40.2	1.8
8/15/2021 4:30	0:10:00	41.7	39.7	2.2
8/15/2021 4:40	0:10:00	40.3	39.0	2.2
8/15/2021 4:50	0:10:00	40.1	39.4	1.3
8/15/2021 5:00	0:10:00	40.2	39.7	1.8
8/15/2021 5:10	0:10:00	40.6	40.0	1.8
8/15/2021 5:20	0:10:00	40.0	39.2	1.8
8/15/2021 5:30	0:10:00	39.4	37.9	2.2
8/15/2021 5:40	0:10:00	38.1	36.5	1.3
8/15/2021 5:50	0:10:00	37.0	35.6	1.3
8/15/2021 6:00	0:10:00	38.0	37.3	1.3
8/15/2021 6:10	0:10:00	38.0	35.0	1.8
8/15/2021 6:20	0:10:00	35.8	34.9	1.3
8/15/2021 6:30	0:10:00	40.2	36.9	1.3
8/15/2021 6:40	0:10:00	38.4	34.5	1.8
8/15/2021 6:50	0:10:00	36.0	35.1	1.3
8/15/2021 7:00	0:10:00	36.8	35.8	1.3
8/15/2021 7:10	0:10:00	37.7	34.9	0.9
8/15/2021 7:20	0:10:00	38.5	36.2	0.9
8/15/2021 7:30	0:10:00	40.8	37.4	1.8
8/15/2021 7:40	0:10:00	38.1	36.8	1.8
8/15/2021 7:50	0:10:00	38.0	33.8	2.7
8/15/2021 8:00	0:10:00	36.2	33.0	2.2
8/15/2021 8:10	0:10:00	36.8	33.8	4.0
8/15/2021 8:20	0:10:00	38.0	32.9	4.0
8/15/2021 8:30	0:10:00	37.8	33.0	4.0
8/15/2021 8:40	0:10:00	35.5	31.7	3.1
8/15/2021 8:50	0:10:00	35.4	32.2	2.7
8/15/2021 9:00	0:10:00	33.4	31.2	2.7
8/15/2021 9:10	0:10:00	32.1	30.3	2.7
8/15/2021 9:20	0:10:00	36.8	31.4	3.6
8/15/2021 9:30	0:10:00	33.7	31.1	3.1
8/15/2021 9:40	0:10:00	33.4	31.7	2.7

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
8/15/2021 9:50	0:10:00	39.7	34.5	2.7
8/15/2021 10:00	0:10:00	41.5	30.3	2.7
8/15/2021 10:10	0:10:00	35.2	31.7	3.1
8/15/2021 10:20	0:10:00	34.3	29.9	3.1
8/15/2021 10:30	0:10:00	34.9	30.6	3.1
8/15/2021 10:40	0:10:00	33.3	31.3	3.1
8/15/2021 10:50	0:10:00	32.3	29.7	3.1
8/15/2021 11:00	0:10:00	34.5	29.6	3.1
8/15/2021 11:10	0:10:00	33.0	29.5	3.1
8/15/2021 11:20	0:10:00	30.8	29.0	2.7
8/15/2021 11:30	0:10:00	32.0	29.4	2.7
8/15/2021 11:40	0:10:00	33.8	29.8	3.6
8/15/2021 11:50	0:10:00	32.5	29.5	3.6
8/15/2021 12:00	0:10:00	35.7	30.7	4.0
8/15/2021 12:10	0:10:00	33.6	30.9	4.0
8/15/2021 12:20	0:10:00	32.6	30.2	3.6
8/15/2021 12:30	0:10:00	35.1	30.0	3.1
8/15/2021 12:40	0:10:00	33.1	31.2	3.1
8/15/2021 12:50	0:10:00	32.4	30.2	2.7
8/15/2021 13:00	0:10:00	33.2	29.7	3.6
8/15/2021 13:10	0:10:00	30.8	29.4	1.8
8/15/2021 13:20	0:10:00	34.6	29.0	2.7
8/15/2021 13:30	0:10:00	33.5	29.1	2.7
8/15/2021 13:40	0:10:00	33.8	30.1	3.6
8/15/2021 13:50	0:10:00	33.5	29.2	2.7
8/15/2021 14:00	0:10:00	35.8	30.1	3.6
8/15/2021 14:10	0:10:00	32.6	29.7	3.6
8/15/2021 14:20	0:10:00	34.1	29.1	3.1
8/15/2021 14:30	0:10:00	34.3	29.4	3.1
8/15/2021 14:40	0:10:00	30.5	29.6	2.2
8/15/2021 14:50	0:10:00	33.2	30.1	2.7
8/15/2021 15:00	0:10:00	36.1	32.1	2.2
8/15/2021 15:10	0:10:00	34.1	31.5	3.1
8/15/2021 15:20	0:10:00	32.1	30.8	2.2
8/15/2021 15:30	0:10:00	33.6	31.0	2.7
8/15/2021 15:40	0:10:00	33.2	29.9	2.7
8/15/2021 15:50	0:10:00	32.8	30.5	1.8
8/15/2021 16:00	0:10:00	33.7	32.4	2.7
8/15/2021 16:10	0:10:00	38.8	31.8	4.0
8/15/2021 16:20	0:10:00	42.5	30.8	3.6
8/15/2021 16:30	0:10:00	47.0	30.3	1.8
8/15/2021 16:40	0:10:00	34.6	31.9	1.8
8/15/2021 16:50	0:10:00	39.5	37.2	1.8
8/15/2021 17:00	0:10:00	41.8	40.7	1.8
8/15/2021 17:10	0:10:00	41.2	38.3	1.3
8/15/2021 17:20	0:10:00	37.9	33.8	2.7
8/15/2021 17:30	0:10:00	33.5	32.2	2.2
8/15/2021 17:40	0:10:00	36.4	35.2	2.2
8/15/2021 17:50	0:10:00	37.6	35.8	1.8
8/15/2021 18:00	0:10:00	39.7	38.5	2.2
8/15/2021 18:10	0:10:00	40.6	39.4	1.8
8/15/2021 18:20	0:10:00	41.7	40.3	1.8
8/15/2021 18:30	0:10:00	42.7	41.8	1.3
8/15/2021 18:40	0:10:00	44.3	43.6	0.9
8/15/2021 18:50	0:10:00	44.9	44.7	0.9

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
8/15/2021 19:00	0:10:00	45.2	44.9	0.9
8/15/2021 19:10	0:10:00	44.5	43.8	0.9
8/15/2021 19:20	0:10:00	44.8	44.3	0.9
8/15/2021 19:30	0:10:00	44.5	43.1	1.3
8/15/2021 19:40	0:10:00	43.4	42.6	1.3
8/15/2021 19:50	0:10:00	42.2	41.8	1.8
8/15/2021 20:00	0:10:00	43.2	42.6	1.3
8/15/2021 20:10	0:10:00	43.4	42.8	1.3
8/15/2021 20:20	0:10:00	43.1	42.4	0.9
8/15/2021 20:30	0:10:00	43.0	42.4	0.9
8/15/2021 20:40	0:10:00	43.3	42.9	0.9
8/15/2021 20:50	0:10:00	43.7	43.2	0.4
8/15/2021 21:00	0:10:00	44.0	43.7	0.0
8/15/2021 21:10	0:10:00	44.0	43.4	0.0
8/15/2021 21:20	0:10:00	44.1	43.3	0.9
8/15/2021 21:30	0:10:00	44.0	43.3	0.9
8/15/2021 21:40	0:10:00	44.4	43.7	0.9
8/15/2021 21:50	0:10:00	42.0	40.8	1.3
8/15/2021 22:00	0:10:00	43.3	42.7	0.4
8/15/2021 22:10	0:10:00	43.2	42.7	0.0
8/15/2021 22:20	0:10:00	43.4	43.0	0.0
8/15/2021 22:30	0:10:00	42.7	42.4	0.0
8/15/2021 22:40	0:10:00	42.9	42.2	0.0
8/15/2021 22:50	0:10:00	42.5	42.1	0.4
8/15/2021 23:00	0:10:00	42.8	42.1	0.4
8/15/2021 23:10	0:10:00	42.2	41.6	0.9
8/15/2021 23:20	0:10:00	42.2	41.7	0.9
8/15/2021 23:30	0:10:00	42.5	41.9	0.9
8/15/2021 23:40	0:10:00	42.0	41.2	1.3
8/15/2021 23:50	0:10:00	41.7	40.8	0.9
8/16/2021 0:00	0:10:00	42.3	41.5	0.9
8/16/2021 0:10	0:10:00	42.6	41.4	0.9
8/16/2021 0:20	0:10:00	42.0	41.3	0.9
8/16/2021 0:30	0:10:00	42.4	41.4	0.9
8/16/2021 0:40	0:10:00	42.7	41.7	0.9
8/16/2021 0:50	0:10:00	43.4	42.3	0.9
8/16/2021 1:00	0:10:00	42.9	41.7	0.4
8/16/2021 1:10	0:10:00	42.4	40.6	0.4
8/16/2021 1:20	0:10:00	42.6	41.8	0.4
8/16/2021 1:30	0:10:00	42.4	41.5	0.9
8/16/2021 1:40	0:10:00	42.0	40.3	1.3
8/16/2021 1:50	0:10:00	41.0	39.7	1.3
8/16/2021 2:00	0:10:00	40.2	39.8	1.3
8/16/2021 2:10	0:10:00	40.1	39.2	1.3
8/16/2021 2:20	0:10:00	39.2	38.6	1.3
8/16/2021 2:30	0:10:00	40.7	39.4	1.3
8/16/2021 2:40	0:10:00	39.9	38.3	2.2
8/16/2021 2:50	0:10:00	39.6	38.8	2.2
8/16/2021 3:00	0:10:00	40.1	39.0	2.2
8/16/2021 3:10	0:10:00	39.1	36.9	2.2
8/16/2021 3:20	0:10:00	39.5	38.6	2.7
8/16/2021 3:30	0:10:00	38.9	37.4	2.7
8/16/2021 3:40	0:10:00	38.1	37.1	2.7
8/16/2021 3:50	0:10:00	39.1	38.0	1.8
8/16/2021 4:00	0:10:00	39.3	38.2	1.8

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
8/16/2021 4:10	0:10:00	39.4	38.5	1.8
8/16/2021 4:20	0:10:00	40.1	38.8	1.3
8/16/2021 4:30	0:10:00	40.3	39.0	1.3
8/16/2021 4:40	0:10:00	40.8	39.7	1.3
8/16/2021 4:50	0:10:00	40.2	39.2	1.3
8/16/2021 5:00	0:10:00	38.8	37.6	0.9
8/16/2021 5:10	0:10:00	38.2	37.5	0.4
8/16/2021 5:20	0:10:00	38.4	37.7	0.4
8/16/2021 5:30	0:10:00	37.2	35.6	0.9
8/16/2021 5:40	0:10:00	35.5	34.6	1.3
8/16/2021 5:50	0:10:00	35.3	34.1	1.3
8/16/2021 6:00	0:10:00	35.8	34.0	1.8
8/16/2021 6:10	0:10:00	37.8	36.0	1.3
8/16/2021 6:20	0:10:00	36.6	34.0	1.3
8/16/2021 6:30	0:10:00	35.9	34.4	0.9
8/16/2021 6:40	0:10:00	37.1	34.5	1.3
8/16/2021 6:50	0:10:00	37.8	33.6	1.8
8/16/2021 7:00	0:10:00	35.6	33.7	3.1
8/16/2021 7:10	0:10:00	36.1	33.4	3.1
8/16/2021 7:20	0:10:00	36.3	33.7	3.1
8/16/2021 7:30	0:10:00	38.3	35.3	3.1
8/16/2021 7:40	0:10:00	36.9	34.4	2.2
8/16/2021 7:50	0:10:00	38.1	34.9	2.7
8/16/2021 8:00	0:10:00	39.9	37.5	2.7
8/16/2021 8:10	0:10:00	38.8	36.1	3.1
8/16/2021 8:20	0:10:00	39.0	35.3	3.6
8/16/2021 8:30	0:10:00	36.5	34.6	3.1
8/16/2021 8:40	0:10:00	36.5	31.9	2.7
8/16/2021 8:50	0:10:00	35.6	31.5	2.7
8/16/2021 9:00	0:10:00	32.5	30.0	2.7
8/16/2021 9:10	0:10:00	31.3	29.1	2.2
8/16/2021 9:20	0:10:00	30.6	29.2	2.7
8/16/2021 9:30	0:10:00	36.2	29.5	3.1
8/16/2021 9:40	0:10:00	34.2	29.9	3.6
8/16/2021 9:50	0:10:00	36.0	29.6	2.7
8/16/2021 10:00	0:10:00	53.0	33.6	3.1
8/16/2021 10:10	0:10:00	34.7	30.5	3.6
8/16/2021 10:20	0:10:00	33.2	31.7	3.6
8/16/2021 10:30	0:10:00	32.8	29.7	3.1
8/16/2021 10:40	0:10:00	35.0	31.0	3.6
8/16/2021 10:50	0:10:00	35.0	30.2	3.6
8/16/2021 11:00	0:10:00	33.2	31.4	3.1
8/16/2021 11:10	0:10:00	35.2	30.2	2.7
8/16/2021 11:20	0:10:00	32.8	30.2	3.6
8/16/2021 11:30	0:10:00	33.7	31.5	3.6
8/16/2021 11:40	0:10:00	33.7	30.9	3.1
8/16/2021 11:50	0:10:00	33.9	31.9	3.6
8/16/2021 12:00	0:10:00	35.8	31.1	2.2

Noise Measurements Datasheet at Noise Sampling Point 2

(Represent as **R2** in the report)

Receptor

Measurement Description
References time
Date 1-4/11/2021
Day time 72 hours

Coordinates: UTM
E 723041
N 1686341

Instrumentation

Noise Measure Instrument: ST-107S Class 2 Integrating Sound Level Meter
Wind Speed Instrument: Davis Vantage PRO2

Noise Pressure Levels (dBA) - Laeq, day/night

Date	Time	LeqA	L05	L10	L50	L90	L95
11/01/2021 11:00-18:00	Day time	57.5	61.6	59.4	48.2	42	40.6
11/01-02/2021 18:00-06:0	Night time	50.4	56.3	49	44.3	41.1	40.7
11/02/2021 06:00-18:00	Day time	57.5	62	59.2	49	42.2	40.9
11/02-03/2021 18:00-06:0	Night time	49.8	52.4	50	47	42.2	40.9
11/03/2021 06:00-18:00	Day time	60.1	62.3	58.4	49.7	44.1	42.6
11/03-04/2021 18:00-06:0	Night time	51.9	55.2	50.4	45.7	41.6	39.9
11/04/2021 06:00-12:00	Day time	52.2	58.1	55.2	47.6	41.8	40.5

Noise Pressure Levels (dBA) - Laeq, 1h

Date	**Time**	**LeqA**	**L05**	**L10**	**L50**	**L90**	**L95**
11/1/2021	11:00-12:00	52	58.9	56.8	47.5	42.7	41.7
11/1/2021	12:00-13:00	54.3	59.8	59.3	44.5	40.1	38.3
11/1/2021	13:00-14:00	53	59.2	58	46.7	42.5	41.5
11/1/2021	14:00-15:00	54.5	59.3	56.4	46.6	41.5	41.2
11/1/2021	15:00-16:00	53.8	59.2	56.3	46.6	42.2	41.9
11/1/2021	16:00-17:00	56.4	62.2	58.7	49.5	44.6	43.4
11/1/2021	17:00-18:00	63.8	67.4	66.5	56.2	48.7	48
11/1/2021	18:00-19:00	55.1	62	59	47.6	45.5	45.1
11/1/2021	19:00-20:00	47.2	47.8	47.5	45.5	43.6	43.4
11/1/2021	20:00-21:00	44.3	47	46.5	43.6	41.9	41.7
11/1/2021	21:00-22:00	44.3	46.1	45.9	44.2	41.2	40.8
11/1/2021	22:00-23:00	43.8	46	45.9	44.2	39.8	39.5
11/1/2021	23:00-00:00	43.5	45.6	45.3	43.4	40.2	40.1
11/2/2021	00:00-01:00	45.2	46.8	46.6	45.2	43.3	42.9
11/2/2021	01:00-02:00	44.2	45.9	45.5	43.8	42.7	41.7
11/2/2021	02:00-03:00	43.4	45.7	45.1	43	41.1	40.9
11/2/2021	03:00-04:00	48.1	46.5	45.2	41.7	40.7	40.7
11/2/2021	04:00-05:00	44.8	50.3	49.2	42.4	41.1	40.7
11/2/2021	05:00-06:00	58.2	65.3	61.6	54.7	47.4	45.9
11/2/2021	06:00-07:00	60.3	62.9	60.7	53	46.2	43.9
11/2/2021	07:00-08:00	57	61.7	60	53.5	44.2	43.7
11/2/2021	08:00-09:00	56.5	61.1	60.7	53	46.3	45.3
11/2/2021	09:00-10:00	51.9	56.8	53.9	44.9	40.7	39
11/2/2021	10:00-11:00	55.9	58.2	55.5	46.7	42.3	41.5
11/2/2021	11:00-12:00	54.9	60.2	56.9	45.3	39.9	39
11/2/2021	12:00-13:00	54.8	61.9	57.1	46.3	42	40.8
11/2/2021	13:00-14:00	50.9	56.5	54.3	48.1	44.1	42.2
11/2/2021	14:00-15:00	57.8	65.6	61.3	49.1	41.3	40.3
11/2/2021	15:00-16:00	54.9	62.6	58.3	47.4	42.2	41.2

11/2/2021	16:00-17:00	58.7	64.7	62.3	53.8	45.4	44.9
11/2/2021	17:00-18:00	62.5	63.7	57.2	50.5	43.4	42.6
11/2/2021	18:00-19:00	49.3	53.3	51.2	48.6	45.1	44.6
11/2/2021	19:00-20:00	49.5	51.4	50.7	48.9	44.9	43.8
11/2/2021	20:00-21:00	47.7	49.6	49.2	47.5	45.3	43.5
11/2/2021	21:00-22:00	48.1	49.7	49.6	48.2	46.3	44.7
11/2/2021	22:00-23:00	48.2	49.5	49.4	48.3	46	44.1
11/2/2021	23:00-00:00	47.3	49.4	49.1	47.7	42.8	39.8
11/3/2021	00:00-01:00	46.9	49	48.6	46.9	43.7	43.5
11/3/2021	01:00-02:00	46.2	48.6	48.2	45.8	44.4	44.2
11/3/2021	02:00-03:00	46	48.5	47.4	45.6	44.1	44
11/3/2021	03:00-04:00	45.8	47.7	46.6	42.5	40.7	40.5
11/3/2021	04:00-05:00	51.9	57.8	48.1	42.6	40.5	40.2
11/3/2021	05:00-06:00	56.1	61.4	59.2	49.4	43.5	42.8
11/3/2021	06:00-07:00	64.3	70.9	65	52.4	46.4	45.7
11/3/2021	07:00-08:00	58.2	62.1	60.4	51.6	44.9	44.3
11/3/2021	08:00-09:00	53.5	57.7	56.8	50.1	46.4	45.7
11/3/2021	09:00-10:00	51.9	57.8	54.9	48.3	43	41.8
11/3/2021	10:00-11:00	54	57.1	55.8	48.8	43.1	42.5
11/3/2021	11:00-12:00	58.4	58.2	55	46.3	40.8	39.8
11/3/2021	12:00-13:00	57.2	62.5	57.2	50	44.2	43.6
11/3/2021	13:00-14:00	54.2	58.9	56.4	50.2	46.2	45.1
11/3/2021	14:00-15:00	67.7	63.3	59.7	50.9	43.6	43.1
11/3/2021	15:00-16:00	52.9	56.6	53.5	48.7	43.2	42.2
11/3/2021	16:00-17:00	56	62.5	59.3	48.8	44.1	43.6
11/3/2021	17:00-18:00	56	60.6	60.3	51.4	45.7	44.4
11/3/2021	18:00-19:00	52.3	57	53.4	49.2	46	45.3
11/3/2021	19:00-20:00	47.8	50.7	50.4	46.5	43.3	41.9
11/3/2021	20:00-21:00	46.6	48.5	48	46.7	43.6	42.4
11/3/2021	21:00-22:00	46.2	48.2	48	46	43.1	42.4
11/3/2021	22:00-23:00	45.6	47.5	47.1	45.5	42	41.8
11/3/2021	23:00-00:00	45.8	47.6	47.3	45.7	43.2	41.1
11/4/2021	00:00-01:00	43.2	46.9	46.7	46.9	38.6	37.9
11/4/2021	01:00-02:00	42.3	46	44.6	41.4	39.2	38.9
11/4/2021	02:00-03:00	43.2	45	44	42.9	42.4	42.3
11/4/2021	03:00-04:00	46.4	48.3	46.6	45.5	42.3	42.1
11/4/2021	04:00-05:00	52.4	61.6	53.1	46.3	44.6	43.8
11/4/2021	05:00-06:00	60.7	63.4	60.6	53.4	42.6	41.5
11/4/2021	06:00-07:00	53.1	58.2	56	49.6	45.2	44.5
11/4/2021	07:00-08:00	53.1	60.9	56.5	49.2	43	41.5
11/4/2021	08:00-09:00	49.3	55.4	52	45.4	40.2	39.2
11/4/2021	09:00-10:00	49.8	56.6	54.2	45.4	40.1	39.1
11/4/2021	10:00-11:00	54	58.3	55.8	48.5	43.9	41.9
11/4/2021	11:00-12:00	52.3	58.4	54.7	47.6	43.7	41.3

Receptor

Geographic Coordinations

Geographic Coordination System WGS 1984–UTM 48N

Coordinate [m]	X	Y
	723041	1686341

Measurement Description

Reference Time

Date 01-04/11/2021

Day time 72 hours

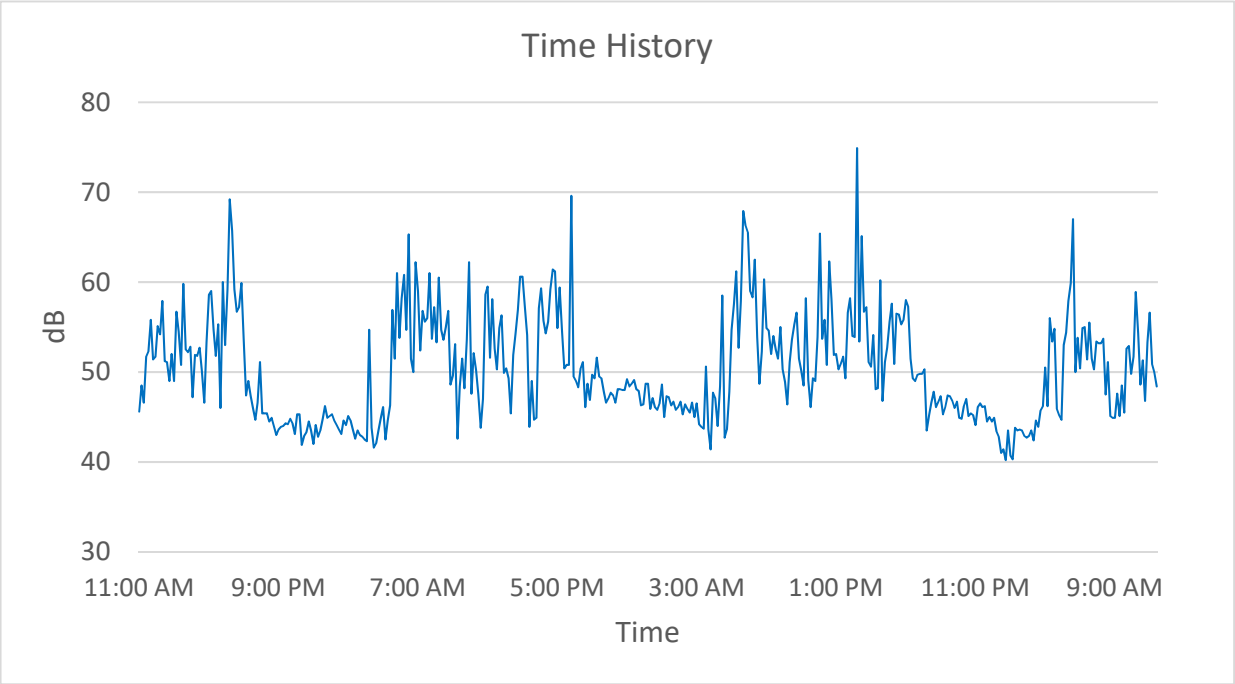
Instrumentation

Noise Measure Instrument: ST-107S Class 2 Integrating Sound Level Meter

Wind Speed Instrument: Davis Vantage PRO2

Metheorological Conditions

	u.m.		LeqA	L5	L10	L50	L90	L95
Temperature	[°C]	23.8	**55.9**	59.8	56.4	46.7	41.9	40.8
Wind Speed	[m/s]	1.93						
Pressure	[Hpa]	893.1						
Rainfall	[mm]	0						
(*) Average Values								



Recording activities surrounding at Noise measurement and Wind Speed.

Sampling Point: N2 (R2)

Recording activities surrounding at Noise measurement and Wind speed point N2 (R2). This point was near the house of Daksamor village, Sanxay District, Attapue Province. Surrounding area are nearly the household, community, near the access road and farming area. Particularly observation sound hearing from noise people speaking, Activities from hosehold, noise from community, pets (Chicken, Dogs) and People listen music.

Noise Measurements Datasheet at Noise Sampling Point 2

(Represent as **R2** in the report)

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
11/1/2021 11:00	0:10:00	45.6	41.0	3.1
11/1/2021 11:10	0:10:00	48.5	42.2	2.7
11/1/2021 11:20	0:10:00	46.6	44.0	3.1
11/1/2021 11:30	0:10:00	51.7	42.7	3.6
11/1/2021 11:40	0:10:00	52.3	43.3	2.7
11/1/2021 11:50	0:10:00	55.8	44.3	2.7
11/1/2021 12:00	0:10:00	51.4	42.2	2.7
11/1/2021 12:10	0:10:00	51.7	41.6	2.7
11/1/2021 12:20	0:10:00	55.1	40.9	2.2
11/1/2021 12:30	0:10:00	54.2	40.4	1.8
11/1/2021 12:40	0:10:00	57.9	43.7	2.7
11/1/2021 12:50	0:10:00	51.2	37.2	2.2
11/1/2021 13:00	0:10:00	51.1	38.7	1.8
11/1/2021 13:10	0:10:00	49.0	38.6	2.2
11/1/2021 13:20	0:10:00	52	44.9	1.3
11/1/2021 13:30	0:10:00	49.0	41.8	1.8
11/1/2021 13:40	0:10:00	56.7	45.7	1.8
11/1/2021 13:50	0:10:00	54.5	44.3	1.3
11/1/2021 14:00	0:10:00	50.8	43.7	1.3
11/1/2021 14:10	0:10:00	59.8	43.1	1.3
11/1/2021 14:20	0:10:00	52.5	44.0	2.2
11/1/2021 14:30	0:10:00	52.2	43.6	1.8
11/1/2021 14:40	0:10:00	52.8	41.6	1.8
11/1/2021 14:50	0:10:00	47.2	41.7	1.8
11/1/2021 15:00	0:10:00	51.9	41.3	2.7
11/1/2021 15:10	0:10:00	51.8	42.9	2.7
11/1/2021 15:20	0:10:00	52.7	42.2	2.2
11/1/2021 15:30	0:10:00	50.1	42.0	3.1
11/1/2021 15:40	0:10:00	46.6	42.6	3.1
11/1/2021 15:50	0:10:00	53.3	43.3	2.2
11/1/2021 16:00	0:10:00	58.6	44.4	2.2
11/1/2021 16:10	0:10:00	59.0	46.2	3.6
11/1/2021 16:20	0:10:00	54.7	49.3	3.6
11/1/2021 16:30	0:10:00	51.8	45.0	3.1
11/1/2021 16:40	0:10:00	55.3	45.0	3.6
11/1/2021 16:50	0:10:00	46.0	43.2	2.7
11/1/2021 17:00	0:10:00	60.0	46.4	1.8
11/1/2021 17:10	0:10:00	53.0	48.3	2.7
11/1/2021 17:20	0:10:00	59.2	48.6	2.7
11/1/2021 17:30	0:10:00	69.2	54.0	2.7
11/1/2021 17:40	0:10:00	65.7	56.2	3.1
11/1/2021 17:50	0:10:00	59.2	46.9	2.2
11/1/2021 18:00	0:10:00	56.7	50.7	2.2
11/1/2021 18:10	0:10:00	57.2	49.6	2.2
11/1/2021 18:20	0:10:00	59.9	45.2	2.2
11/1/2021 18:30	0:10:00	53.7	45.0	2.2
11/1/2021 18:40	0:10:00	47.4	46.2	2.7
11/1/2021 18:50	0:10:00	49.0	45.4	2.2
11/1/2021 19:00	0:10:00	47.3	45.6	2.7
11/1/2021 19:10	0:10:00	46.0	44.4	2.7
11/1/2021 19:20	0:10:00	44.7	43.6	1.8
11/1/2021 19:30	0:10:00	46.6	45.2	1.8
11/1/2021 19:40	0:10:00	51.1	44.0	2.2
11/1/2021 19:50	0:10:00	45.4	43.3	2.2
11/1/2021 20:00	0:10:00	45.4	43.5	2.2

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
11/1/2021 20:10	0:10:00	45.4	43.8	2.7
11/1/2021 20:20	0:10:00	44.5	42.8	1.8
11/1/2021 20:30	0:10:00	44.9	43.1	1.8
11/1/2021 20:40	0:10:00	44.0	42.7	1.3
11/1/2021 20:50	0:10:00	43.0	41.6	1.3
11/1/2021 21:00	0:10:00	43.6	40.9	1.3
11/1/2021 21:10	0:10:00	43.9	41.1	1.3
11/1/2021 21:20	0:10:00	44.0	40.8	1.3
11/1/2021 21:30	0:10:00	44.3	41.7	1.3
11/1/2021 21:40	0:10:00	44.2	42.9	1.3
11/1/2021 21:50	0:10:00	44.8	43.0	1.3
11/1/2021 22:00	0:10:00	44.3	42.1	1.8
11/1/2021 22:10	0:10:00	43.1	39.8	2.2
11/1/2021 22:20	0:10:00	45.3	44.6	2.7
11/1/2021 22:30	0:10:00	45.3	44.2	2.2
11/1/2021 22:40	0:10:00	41.9	39.2	1.8
11/1/2021 22:50	0:10:00	42.9	39.5	2.2
11/1/2021 23:00	0:10:00	43.3	41.0	2.7
11/1/2021 23:10	0:10:00	44.5	44.1	2.2
11/1/2021 23:20	0:10:00	43.5	40.2	2.2
11/1/2021 23:30	0:10:00	42.0	39.7	1.8
11/1/2021 23:40	0:10:00	44.1	42.6	1.3
11/1/2021 23:50	0:10:00	42.8	40.2	1.3
11/2/2021 0:00	0:10:00	43.5	42.0	1.8
11/2/2021 0:10	0:10:00	44.8	43.5	1.8
11/2/2021 0:20	0:10:00	46.2	45.8	1.8
11/2/2021 0:30	0:10:00	44.9	42.4	1.3
11/2/2021 0:40	0:10:00	45.1	42.9	2.2
11/2/2021 0:50	0:10:00	45.3	43.7	2.7
11/2/2021 1:00	0:10:00	44.6	43.2	1.8
11/2/2021 1:10	0:10:00	44.1	43.3	1.8
11/2/2021 1:20	0:10:00	43.6	43.3	1.3
11/2/2021 1:30	0:10:00	43.1	41.4	1.3
11/2/2021 1:40	0:10:00	44.6	42.0	1.3
11/2/2021 1:50	0:10:00	44.1	43.4	0.4
11/2/2021 2:00	0:10:00	45.1	44.6	0
11/2/2021 2:10	0:10:00	44.6	43.1	0
11/2/2021 2:20	0:10:00	43.6	41.5	0
11/2/2021 2:30	0:10:00	42.6	41.3	0.4
11/2/2021 2:40	0:10:00	43.5	41.1	1.3
11/2/2021 2:50	0:10:00	43.0	40.9	1.3
11/2/2021 3:00	0:10:00	42.8	41.3	1.3
11/2/2021 3:10	0:10:00	42.5	40.8	0.4
11/2/2021 3:20	0:10:00	42.3	40.7	0.4
11/2/2021 3:30	0:10:00	54.7	40.6	0
11/2/2021 3:40	0:10:00	43.8	40.8	0.9
11/2/2021 3:50	0:10:00	41.6	40.7	1.3
11/2/2021 4:00	0:10:00	42.1	40.9	1.3
11/2/2021 4:10	0:10:00	43.5	41.1	0.9
11/2/2021 4:20	0:10:00	44.9	41.1	0.9
11/2/2021 4:30	0:10:00	46.1	41.3	1.3
11/2/2021 4:40	0:10:00	42.5	40.6	1.3
11/2/2021 4:50	0:10:00	44.6	42.3	2.2
11/2/2021 5:00	0:10:00	46.3	41.2	2.2
11/2/2021 5:10	0:10:00	56.9	42.7	1.8

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
11/2/2021 5:20	0:10:00	51.5	47.2	1.3
11/2/2021 5:30	0:10:00	61.0	56.2	1.8
11/2/2021 5:40	0:10:00	53.8	48.2	2.2
11/2/2021 5:50	0:10:00	58.2	48.3	2.2
11/2/2021 6:00	0:10:00	60.8	56.2	2.7
11/2/2021 6:10	0:10:00	54.7	47.4	2.2
11/2/2021 6:20	0:10:00	65.3	46.9	1.8
11/2/2021 6:30	0:10:00	51.5	43.7	1.8
11/2/2021 6:40	0:10:00	50.0	46.0	2.2
11/2/2021 6:50	0:10:00	62.2	48.6	2.2
11/2/2021 7:00	0:10:00	59.0	51.0	1.8
11/2/2021 7:10	0:10:00	52.4	44.0	2.7
11/2/2021 7:20	0:10:00	56.8	46.9	3.1
11/2/2021 7:30	0:10:00	55.6	44.1	3.1
11/2/2021 7:40	0:10:00	56.0	49.6	3.1
11/2/2021 7:50	0:10:00	61.0	47.7	2.7
11/2/2021 8:00	0:10:00	53.7	47.7	2.7
11/2/2021 8:10	0:10:00	57.2	52.6	4
11/2/2021 8:20	0:10:00	53.3	44.3	3.6
11/2/2021 8:30	0:10:00	60.5	54.7	2.7
11/2/2021 8:40	0:10:00	54.7	48.3	3.1
11/2/2021 8:50	0:10:00	53.6	45.6	3.6
11/2/2021 9:00	0:10:00	55.0	47.7	3.6
11/2/2021 9:10	0:10:00	56.8	44.4	3.6
11/2/2021 9:20	0:10:00	48.6	42.3	3.6
11/2/2021 9:30	0:10:00	49.6	44.2	3.6
11/2/2021 9:40	0:10:00	53.1	42.0	3.1
11/2/2021 9:50	0:10:00	42.6	39.1	3.1
11/2/2021 10:00	0:10:00	48.4	39.0	3.1
11/2/2021 10:10	0:10:00	51.5	43.5	3.1
11/2/2021 10:20	0:10:00	48.2	40.5	2.2
11/2/2021 10:30	0:10:00	53.6	42.6	2.7
11/2/2021 10:40	0:10:00	62.2	43.7	3.6
11/2/2021 10:50	0:10:00	47.6	42.1	4
11/2/2021 11:00	0:10:00	52.1	45.9	4
11/2/2021 11:10	0:10:00	50.2	45.1	3.1
11/2/2021 11:20	0:10:00	47.5	39.8	2.7
11/2/2021 11:30	0:10:00	43.8	39.0	2.7
11/2/2021 11:40	0:10:00	47.0	38.8	3.1
11/2/2021 11:50	0:10:00	58.6	42.0	4
11/2/2021 12:00	0:10:00	59.5	40.6	3.1
11/2/2021 12:10	0:10:00	51.6	39.4	3.1
11/2/2021 12:20	0:10:00	58.1	40.8	3.6
11/2/2021 12:30	0:10:00	52.6	42.0	3.6
11/2/2021 12:40	0:10:00	50.3	42.4	3.1
11/2/2021 12:50	0:10:00	54.9	43.5	3.6
11/2/2021 13:00	0:10:00	56.3	45.5	3.6
11/2/2021 13:10	0:10:00	49.9	44.9	3.6
11/2/2021 13:20	0:10:00	50.4	44.9	4
11/2/2021 13:30	0:10:00	49.3	44.8	3.1
11/2/2021 13:40	0:10:00	45.4	42.2	3.1
11/2/2021 13:50	0:10:00	51.9	43.9	4
11/2/2021 14:00	0:10:00	54.2	45.0	3.6
11/2/2021 14:10	0:10:00	56.9	49.1	4
11/2/2021 14:20	0:10:00	60.6	48.6	2.7

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
11/2/2021 14:30	0:10:00	60.6	46.7	2.7
11/2/2021 14:40	0:10:00	57.4	42.0	3.1
11/2/2021 14:50	0:10:00	54.1	41.8	3.6
11/2/2021 15:00	0:10:00	43.9	39.2	2.2
11/2/2021 15:10	0:10:00	49.0	41.8	2.7
11/2/2021 15:20	0:10:00	44.7	39.7	2.7
11/2/2021 15:30	0:10:00	44.9	42.3	3.1
11/2/2021 15:40	0:10:00	57.1	43.4	3.6
11/2/2021 15:50	0:10:00	59.3	47.1	3.6
11/2/2021 16:00	0:10:00	55.7	49.4	3.6
11/2/2021 16:10	0:10:00	54.3	46.9	3.6
11/2/2021 16:20	0:10:00	55.6	45.7	1.3
11/2/2021 16:30	0:10:00	59.2	46.1	0.9
11/2/2021 16:40	0:10:00	61.4	50.3	0.9
11/2/2021 16:50	0:10:00	61.2	44.7	1.3
11/2/2021 17:00	0:10:00	54.9	47.8	0.9
11/2/2021 17:10	0:10:00	59.4	44.7	0.9
11/2/2021 17:20	0:10:00	54.5	43.4	0.4
11/2/2021 17:30	0:10:00	50.4	43.3	0.9
11/2/2021 17:40	0:10:00	50.8	43.8	1.3
11/2/2021 17:50	0:10:00	50.8	42.6	1.3
11/2/2021 18:00	0:10:00	69.6	49.9	0.9
11/2/2021 18:10	0:10:00	49.5	45.4	1.3
11/2/2021 18:20	0:10:00	49.0	47.2	1.3
11/2/2021 18:30	0:10:00	48.3	45.7	0.9
11/2/2021 18:40	0:10:00	50.4	46.9	0
11/2/2021 18:50	0:10:00	51.1	48.5	1.3
11/2/2021 19:00	0:10:00	46.1	43.8	0.4
11/2/2021 19:10	0:10:00	48.7	44.1	0.9
11/2/2021 19:20	0:10:00	46.9	43.6	1.3
11/2/2021 19:30	0:10:00	49.7	45.6	1.3
11/2/2021 19:40	0:10:00	49.3	48.3	1.3
11/2/2021 19:50	0:10:00	51.6	47.0	1.8
11/2/2021 20:00	0:10:00	49.5	48.3	1.8
11/2/2021 20:10	0:10:00	49.3	47.6	1.3
11/2/2021 20:20	0:10:00	47.8	45.2	1.3
11/2/2021 20:30	0:10:00	46.6	40.9	1.3
11/2/2021 20:40	0:10:00	47.1	44.9	1.8
11/2/2021 20:50	0:10:00	47.7	46.6	1.8
11/2/2021 21:00	0:10:00	47.4	46.8	1.3
11/2/2021 21:10	0:10:00	46.6	41.4	0.9
11/2/2021 21:20	0:10:00	48.1	46.4	0.9
11/2/2021 21:30	0:10:00	48.1	47.1	0.9
11/2/2021 21:40	0:10:00	48.0	44.5	1.3
11/2/2021 21:50	0:10:00	48.0	46.8	1.8
11/2/2021 22:00	0:10:00	49.2	48.8	1.8
11/2/2021 22:10	0:10:00	48.4	47.8	1.3
11/2/2021 22:20	0:10:00	48.7	48.2	1.3
11/2/2021 22:30	0:10:00	49.1	48.5	0.9
11/2/2021 22:40	0:10:00	48.1	47.2	0.9
11/2/2021 22:50	0:10:00	47.9	46.9	0.9
11/2/2021 23:00	0:10:00	46.3	41.8	0.4
11/2/2021 23:10	0:10:00	46.4	38.7	0.9
11/2/2021 23:20	0:10:00	48.7	47.9	1.3
11/2/2021 23:30	0:10:00	48.7	47.9	1.3

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
11/2/2021 23:40	0:10:00	45.9	39.8	1.8
11/2/2021 23:50	0:10:00	47.1	45.5	1.8
11/3/2021 0:00	0:10:00	46.1	43.9	2.2
11/3/2021 0:10	0:10:00	45.8	43.8	2.2
11/3/2021 0:20	0:10:00	46.5	44.3	2.2
11/3/2021 0:30	0:10:00	48.6	47.1	2.2
11/3/2021 0:40	0:10:00	45.0	43.6	2.2
11/3/2021 0:50	0:10:00	47.3	44.6	1.8
11/3/2021 1:00	0:10:00	47.2	44.2	1.8
11/3/2021 1:10	0:10:00	46.3	45.1	2.2
11/3/2021 1:20	0:10:00	46.7	44.4	2.2
11/3/2021 1:30	0:10:00	45.8	44.2	2.7
11/3/2021 1:40	0:10:00	46.1	44.5	2.7
11/3/2021 1:50	0:10:00	46.7	44.8	2.7
11/3/2021 2:00	0:10:00	45.3	44.6	1.8
11/3/2021 2:10	0:10:00	46.4	45.4	1.8
11/3/2021 2:20	0:10:00	45.9	44.0	1.3
11/3/2021 2:30	0:10:00	45.5	44.1	1.8
11/3/2021 2:40	0:10:00	46.6	44.1	2.7
11/3/2021 2:50	0:10:00	45.0	43.9	2.2
11/3/2021 3:00	0:10:00	46.5	44.4	1.8
11/3/2021 3:10	0:10:00	44.2	40.9	1.3
11/3/2021 3:20	0:10:00	43.9	41.8	2.2
11/3/2021 3:30	0:10:00	43.7	41.3	2.2
11/3/2021 3:40	0:10:00	50.6	40.5	2.2
11/3/2021 3:50	0:10:00	43.6	40.7	1.8
11/3/2021 4:00	0:10:00	41.4	40.5	2.7
11/3/2021 4:10	0:10:00	47.7	40.4	2.7
11/3/2021 4:20	0:10:00	47.1	40.9	3.6
11/3/2021 4:30	0:10:00	44.0	40.7	2.7
11/3/2021 4:40	0:10:00	48.4	40.5	1.8
11/3/2021 4:50	0:10:00	58.5	40.1	2.2
11/3/2021 5:00	0:10:00	42.7	40.5	3.6
11/3/2021 5:10	0:10:00	43.6	41.8	3.6
11/3/2021 5:20	0:10:00	47.8	45.6	3.1
11/3/2021 5:30	0:10:00	54.7	44.4	1.8
11/3/2021 5:40	0:10:00	57.6	52.0	1.8
11/3/2021 5:50	0:10:00	61.2	49.8	2.2
11/3/2021 6:00	0:10:00	52.7	47.3	2.7
11/3/2021 6:10	0:10:00	57.9	47.8	2.2
11/3/2021 6:20	0:10:00	67.9	49.5	2.2
11/3/2021 6:30	0:10:00	66.3	45.4	2.2
11/3/2021 6:40	0:10:00	65.5	46.1	2.2
11/3/2021 6:50	0:10:00	59.0	49.7	1.8
11/3/2021 7:00	0:10:00	58.3	47.6	1.8
11/3/2021 7:10	0:10:00	62.5	49.5	1.8
11/3/2021 7:20	0:10:00	53.9	48.5	2.2
11/3/2021 7:30	0:10:00	48.7	44.2	2.2
11/3/2021 7:40	0:10:00	52.3	44.2	2.2
11/3/2021 7:50	0:10:00	60.3	50.0	1.8
11/3/2021 8:00	0:10:00	54.9	48.4	2.2
11/3/2021 8:10	0:10:00	54.6	50.4	1.8
11/3/2021 8:20	0:10:00	52.0	46.0	1.8
11/3/2021 8:30	0:10:00	54.0	48.7	1.3
11/3/2021 8:40	0:10:00	52.5	45.7	1.8

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
11/3/2021 8:50	0:10:00	51.5	46.8	1.8
11/3/2021 9:00	0:10:00	55.0	46.5	1.8
11/3/2021 9:10	0:10:00	50.3	42.5	2.2
11/3/2021 9:20	0:10:00	48.9	41.3	2.7
11/3/2021 9:30	0:10:00	46.4	43.0	2.7
11/3/2021 9:40	0:10:00	51.1	45.3	2.2
11/3/2021 9:50	0:10:00	53.6	45.4	2.2
11/3/2021 10:00	0:10:00	55.3	48.2	2.7
11/3/2021 10:10	0:10:00	56.6	46.0	2.7
11/3/2021 10:20	0:10:00	51.5	43.8	2.2
11/3/2021 10:30	0:10:00	50.2	46.2	2.7
11/3/2021 10:40	0:10:00	48.5	43.5	3.1
11/3/2021 10:50	0:10:00	58.2	43.4	3.1
11/3/2021 11:00	0:10:00	49.1	42.4	2.7
11/3/2021 11:10	0:10:00	46.1	41.3	2.7
11/3/2021 11:20	0:10:00	49.3	39.8	3.1
11/3/2021 11:30	0:10:00	49.0	41.6	2.7
11/3/2021 11:40	0:10:00	53.9	45.2	2.7
11/3/2021 11:50	0:10:00	65.4	40.9	2.2
11/3/2021 12:00	0:10:00	53.7	43.3	2.2
11/3/2021 12:10	0:10:00	55.8	46.6	2.2
11/3/2021 12:20	0:10:00	50.8	47.1	1.8
11/3/2021 12:30	0:10:00	62.3	43.8	1.8
11/3/2021 12:40	0:10:00	58.1	46.5	2.2
11/3/2021 12:50	0:10:00	51.9	44.0	1.8
11/3/2021 13:00	0:10:00	52.0	43.5	1.3
11/3/2021 13:10	0:10:00	50.3	47.9	2.2
11/3/2021 13:20	0:10:00	50.9	47.2	3.6
11/3/2021 13:30	0:10:00	51.7	45.2	3.6
11/3/2021 13:40	0:10:00	49.3	43.8	3.1
11/3/2021 13:50	0:10:00	56.6	48.9	3.6
11/3/2021 14:00	0:10:00	58.2	48.3	2.7
11/3/2021 14:10	0:10:00	54.0	42.5	1.8
11/3/2021 14:20	0:10:00	53.9	46.0	2.7
11/3/2021 14:30	0:10:00	74.9	43.2	1.3
11/3/2021 14:40	0:10:00	53.4	44.8	1.3
11/3/2021 14:50	0:10:00	65.1	45.4	1.3
11/3/2021 15:00	0:10:00	56.7	44.0	1.3
11/3/2021 15:10	0:10:00	57.2	45.7	1.3
11/3/2021 15:20	0:10:00	51.1	44.3	1.8
11/3/2021 15:30	0:10:00	50.6	43.9	1.3
11/3/2021 15:40	0:10:00	54.1	42.9	1.3
11/3/2021 15:50	0:10:00	48.1	42.3	0.9
11/3/2021 16:00	0:10:00	48.2	44.3	1.3
11/3/2021 16:10	0:10:00	60.2	44.4	1.3
11/3/2021 16:20	0:10:00	46.8	43.2	1.3
11/3/2021 16:30	0:10:00	51.1	43.9	1.3
11/3/2021 16:40	0:10:00	52.7	46.4	1.3
11/3/2021 16:50	0:10:00	55.6	46.5	1.3
11/3/2021 17:00	0:10:00	57.6	45.0	1.3
11/3/2021 17:10	0:10:00	50.9	44.2	1.3
11/3/2021 17:20	0:10:00	56.5	44.3	1.3
11/3/2021 17:30	0:10:00	56.4	47.9	0.9
11/3/2021 17:40	0:10:00	55.3	49.0	0.9
11/3/2021 17:50	0:10:00	55.8	48.9	1.3

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
11/3/2021 18:00	0:10:00	58.0	48.5	1.3
11/3/2021 18:10	0:10:00	57.3	47.4	1.8
11/3/2021 18:20	0:10:00	51.5	46.1	1.3
11/3/2021 18:30	0:10:00	49.3	45.0	0.9
11/3/2021 18:40	0:10:00	49.0	46.8	0.9
11/3/2021 18:50	0:10:00	49.7	47.9	1.3
11/3/2021 19:00	0:10:00	49.8	47.9	1.3
11/3/2021 19:10	0:10:00	49.8	47.7	1.3
11/3/2021 19:20	0:10:00	50.3	46.9	1.3
11/3/2021 19:30	0:10:00	43.5	41.8	1.3
11/3/2021 19:40	0:10:00	45.2	44.0	1.3
11/3/2021 19:50	0:10:00	46.6	45.1	2.2
11/3/2021 20:00	0:10:00	47.8	45.0	2.7
11/3/2021 20:10	0:10:00	46.1	44.3	2.2
11/3/2021 20:20	0:10:00	46.7	45.6	1.3
11/3/2021 20:30	0:10:00	47.3	43.9	1.3
11/3/2021 20:40	0:10:00	45.3	42.4	0.4
11/3/2021 20:50	0:10:00	46.1	41.2	1.8
11/3/2021 21:00	0:10:00	47.4	46.7	1.3
11/3/2021 21:10	0:10:00	47.3	46.2	1.3
11/3/2021 21:20	0:10:00	46.8	43.5	1.3
11/3/2021 21:30	0:10:00	46.0	43.9	
11/3/2021 21:40	0:10:00	46.7	43.5	1.3
11/3/2021 21:50	0:10:00	44.9	42.1	1.3
11/3/2021 22:00	0:10:00	44.8	42.8	1.8
11/3/2021 22:10	0:10:00	46.2	44.3	1.3
11/3/2021 22:20	0:10:00	47.0	45.8	1.3
11/3/2021 22:30	0:10:00	45.1	42.4	1.3
11/3/2021 22:40	0:10:00	45.4	42.0	1.3
11/3/2021 22:50	0:10:00	45.2	42.7	1.8
11/3/2021 23:00	0:10:00	44.1	40.3	2.7
11/3/2021 23:10	0:10:00	46.1	44.2	0.9
11/3/2021 23:20	0:10:00	46.5	45.4	0.4
11/3/2021 23:30	0:10:00	46.1	45.1	0.9
11/3/2021 23:40	0:10:00	46.2	45.1	0.4
11/3/2021 23:50	0:10:00	44.5	43.2	0.9
11/4/2021 0:00	0:10:00	45.0	41.1	1.3
11/4/2021 0:10	0:10:00	44.5	41.7	1.3
11/4/2021 0:20	0:10:00	44.9	40.5	0.9
11/4/2021 0:30	0:10:00	43.4	39.9	0
11/4/2021 0:40	0:10:00	42.8	39.7	0
11/4/2021 0:50	0:10:00	41.0	38.2	0
11/4/2021 1:00	0:10:00	41.4	37.7	0
11/4/2021 1:10	0:10:00	40.2	39.1	0
11/4/2021 1:20	0:10:00	43.5	40.2	0
11/4/2021 1:30	0:10:00	40.7	38.9	0
11/4/2021 1:40	0:10:00	40.3	39.1	0
11/4/2021 1:50	0:10:00	43.8	41.0	0.4
11/4/2021 2:00	0:10:00	43.5	42.7	0
11/4/2021 2:10	0:10:00	43.6	42.7	0
11/4/2021 2:20	0:10:00	43.5	42.6	0
11/4/2021 2:30	0:10:00	42.9	42.6	0
11/4/2021 2:40	0:10:00	42.7	42.3	0
11/4/2021 2:50	0:10:00	42.9	42.5	0
11/4/2021 3:00	0:10:00	43.5	42.3	2.2

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
11/4/2021 3:10	0:10:00	42.4	42.1	1.8
11/4/2021 3:20	0:10:00	44.6	42.3	1.3
11/4/2021 3:30	0:10:00	43.9	42.2	1.8
11/4/2021 3:40	0:10:00	45.7	45.1	1.8
11/4/2021 3:50	0:10:00	46.2	45.8	3.1
11/4/2021 4:00	0:10:00	50.5	46.2	2.7
11/4/2021 4:10	0:10:00	46.2	45.2	3.1
11/4/2021 4:20	0:10:00	56.0	45.6	2.7
11/4/2021 4:30	0:10:00	53.4	45.9	2.2
11/4/2021 4:40	0:10:00	54.8	46.0	2.7
11/4/2021 4:50	0:10:00	45.9	45.3	2.2
11/4/2021 5:00	0:10:00	45.2	43.6	2.2
11/4/2021 5:10	0:10:00	44.7	40.7	2.2
11/4/2021 5:20	0:10:00	53.0	42.0	2.2
11/4/2021 5:30	0:10:00	54.4	44.5	2.7
11/4/2021 5:40	0:10:00	57.9	55.4	3.1
11/4/2021 5:50	0:10:00	59.9	53.2	2.7
11/4/2021 6:00	0:10:00	67.0	48.0	2.2
11/4/2021 6:10	0:10:00	50.0	44.7	2.7
11/4/2021 6:20	0:10:00	53.8	46.8	3.1
11/4/2021 6:30	0:10:00	50.4	45.3	3.1
11/4/2021 6:40	0:10:00	54.9	44.3	2.7
11/4/2021 6:50	0:10:00	55.0	49.0	2.7
11/4/2021 7:00	0:10:00	51.4	45.1	3.1
11/4/2021 7:10	0:10:00	55.5	45.7	2.7
11/4/2021 7:20	0:10:00	51.5	40.9	2.7
11/4/2021 7:30	0:10:00	50.3	46.2	2.2
11/4/2021 7:40	0:10:00	53.4	47.3	2.2
11/4/2021 7:50	0:10:00	53.2	50.1	2.2
11/4/2021 8:00	0:10:00	53.2	44.4	1.8
11/4/2021 8:10	0:10:00	53.7	47.0	1.8
11/4/2021 8:20	0:10:00	47.5	42.6	2.2
11/4/2021 8:30	0:10:00	51.1	41.5	1.8
11/4/2021 8:40	0:10:00	45.1	39.2	1.3
11/4/2021 8:50	0:10:00	44.9	40.8	1.3
11/4/2021 9:00	0:10:00	44.9	39.8	1.8
11/4/2021 9:10	0:10:00	47.6	42.2	1.3
11/4/2021 9:20	0:10:00	45.1	41.9	0.9
11/4/2021 9:30	0:10:00	48.5	38.0	1.3
11/4/2021 9:40	0:10:00	45.5	40.1	1.3
11/4/2021 9:50	0:10:00	52.6	44.0	1.3
11/4/2021 10:00	0:10:00	52.9	46.3	0.9
11/4/2021 10:10	0:10:00	49.8	41.8	0.4
11/4/2021 10:20	0:10:00	51.7	44.3	0.4
11/4/2021 10:30	0:10:00	58.9	48.3	0.4
11/4/2021 10:40	0:10:00	54.3	43.4	0.4
11/4/2021 10:50	0:10:00	48.6	46.1	0
11/4/2021 11:00	0:10:00	51.3	44.2	0
11/4/2021 11:10	0:10:00	46.8	43.3	0
11/4/2021 11:20	0:10:00	53.3	44.2	0
11/4/2021 11:30	0:10:00	56.6	44.3	0
11/4/2021 11:40	0:10:00	50.9	46.6	0
11/4/2021 11:50	0:10:00	50.0	43.6	0
11/4/2021 12:00	0:10:00	48.4	43.6	0

Noise Measurements Datasheet at Noise Sampling Point 3

(Represent as **R3** in the report)

Receptor

Measurement Description
References time
Date 28-31/10/2021
Day time 72 hours

Coordinates: UTM
E 730100
N 1698592

Instrumentation
Noise Measure Instrument: ST-107S Class 2 Integrating Sound Level Meter
Wind Speed Instrument: Davis Vantage PRO2

Noise Pressure Levels (dBA) - Laeq, day/night

Date	Time	LeqA	L05	L10	L50	L90	L95
10/28/2021 11:00-18:00	Day time	51.8	51.8	47.2	38.7	33.8	32.4
10/28-29/2021 18:00-06:00	Night time	46.5	51.4	50.4	43.9	41.7	41.3
10/29/2021 06:00-18:00	Day time	49	52.3	49.5	39.9	35	33.9
10/29-30/2021 18:00-06:00	Night time	47.9	51.7	50.4	45.7	43	42.2
10/30/2021 06:00-18:00	Day time	50.5	56.2	51.9	42.2	36.1	34.7
10/30-31//2021 18:00-06:00	Night time	48.9	51.4	49.9	46.2	42.3	41.7
10/31//2021 06:00-12:00	Day time	54	59.8	57.8	42.8	35.2	33.7

Noise Pressure Levels (dBA) - Laeq, 1h

Date	**Time**	**LeqA**	**L05**	**L10**	**L50**	**L90**	**L95**
10/28/2021	11:00-12:00	39.5	44.1	42.2	36.7	32	31.2
10/28/2021	12:00-13:00	49.7	52.7	48	39.5	36.2	35.7
10/28/2021	13:00-14:00	42.5	47.3	46.1	39.6	35.8	34.7
10/28/2021	14:00-15:00	44.5	49.3	46.2	39.7	35.2	34.4
10/28/2021	15:00-16:00	41.8	47.7	42.3	35.4	32.1	30.9
10/28/2021	16:00-17:00	56.3	56	50.2	39.8	33.5	32.1
10/28/2021	17:00-18:00	56.7	58.3	51.8	41.1	37.2	36.5
10/28/2021	18:00-19:00	46.6	51.1	50.5	44.9	42.5	41.9
10/28/2021	19:00-20:00	44.9	49.6	47.4	43.3	41.7	41.6
10/28/2021	20:00-21:00	48.1	50.4	50.3	48.2	44.4	43.9
10/28/2021	21:00-22:00	50.4	52.9	52.4	49.5	48.4	47.5
10/28/2021	22:00-23:00	50.1	51.9	51.8	50.6	45.9	45.7
10/28/2021	23:00-00:00	45.6	48	47.3	45.5	42.6	42.2
10/29/2021	00:00-01:00	42.5	43.5	43.2	42.1	41.3	41.2
10/29/2021	01:00-02:00	41.9	44.1	43.2	41.8	40.5	40.3
10/29/2021	02:00-03:00	43.7	45.3	44.1	43.2	42	41.5
10/29/2021	03:00-04:00	43.9	44.9	44.3	43.6	42.9	42.7
10/29/2021	04:00-05:00	43.9	45.4	44.8	43.7	42.5	42.2
10/29/2021	05:00-06:00	46.1	51.2	47.7	43.7	41.6	40.6
10/29/2021	06:00-07:00	51	45.4	43.9	40.8	39	38.8
10/29/2021	07:00-08:00	48.3	53.1	50.4	43.6	39	38.4
10/29/2021	08:00-09:00	42.8	48.3	44	39.4	36.8	36.4
10/29/2021	09:00-10:00	47.2	51.4	45.7	39.5	35.6	34.8
10/29/2021	10:00-11:00	40.5	45.3	42.4	37.5	34.7	33.8
10/29/2021	11:00-12:00	44.1	44	42	37.4	34.4	33.6
10/29/2021	12:00-13:00	42.1	46.9	45.3	35.6	33	32.4
10/29/2021	13:00-14:00	43.1	50.7	45.3	37.1	34.5	33.6
10/29/2021	14:00-15:00	43.7	49.8	47.5	38	34.9	34.2
10/29/2021	15:00-16:00	53.4	55.5	54.4	43.9	35.6	34.9

10/29/2021	16:00-17:00	49.3	51.2	50	41.6	37.2	36.5
10/29/2021	17:00-18:00	54.5	59.9	57.6	46.9	42.4	41.5
10/29/2021	18:00-19:00	48.8	52.8	51.7	47.3	43.9	43.3
10/29/2021	19:00-20:00	48.9	51.8	50.7	48.6	46.3	46.2
10/29/2021	20:00-21:00	50.5	55.9	54.8	47.8	42.7	41.9
10/29/2021	21:00-22:00	50.4	50.6	49.9	48.1	43.2	42.7
10/29/2021	22:00-23:00	48.2	50.9	50.4	46.9	44.9	44.2
10/29/2021	23:00-00:00	48.7	51.7	51.3	47.5	45.4	44.1
10/30/2021	00:00-01:00	46.4	49.1	47.8	46	44.6	44
10/30/2021	01:00-02:00	45.9	49.9	47.8	44.5	43.4	43
10/30/2021	02:00-03:00	44.2	47.6	45.3	42.7	40	39.6
10/30/2021	03:00-04:00	46.9	49.9	49.3	45.5	44	43.7
10/30/2021	04:00-05:00	44.4	47.1	46.4	43.9	42.6	42.2
10/30/2021	05:00-06:00	45.4	46.5	46	44.3	42.7	41.9
10/30/2021	06:00-07:00	42.7	45.5	45.1	42.3	38.6	38.2
10/30/2021	07:00-08:00	49.8	55.6	54.6	45	39.8	39.3
10/30/2021	08:00-09:00	48.6	50.9	47.6	40.9	37.9	36.8
10/30/2021	09:00-10:00	49.5	55.9	53.8	44.8	37.4	36.5
10/30/2021	10:00-11:00	50.4	46.2	44.4	39.4	36	35.3
10/30/2021	11:00-12:00	44	51	48.3	38.2	35.4	34.4
10/30/2021	12:00-13:00	38.7	43.4	41.4	37	33.1	32
10/30/2021	13:00-14:00	42.7	47	43.8	37.5	32.6	32.4
10/30/2021	14:00-15:00	53.1	60.2	52.9	44.9	37.5	36.2
10/30/2021	15:00-16:00	56.3	63.5	58.4	49.1	40.4	38.6
10/30/2021	16:00-17:00	54.1	59.8	58.9	48.3	42.9	41.4
10/30/2021	17:00-18:00	44	46.2	45.7	43.1	39.3	38.9
10/30/2021	18:00-19:00	47.7	49.4	49.3	48	43.1	42.9
10/30/2021	19:00-20:00	51.8	52.4	51.4	49	47.8	47.3
10/30/2021	20:00-21:00	48.2	50	49.7	48.2	46.4	45.8
10/30/2021	21:00-22:00	48.9	51.1	50.6	48.7	47	46.7
10/30/2021	22:00-23:00	48.6	51.7	51.1	48	45.4	45
10/30/2021	23:00-00:00	47.8	52.2	50.1	46.7	45.6	45
10/31/2021	00:00-01:00	46.4	49	48.1	45.9	44.6	44.4
10/31/2021	01:00-02:00	44.1	47.7	46.9	42.9	41.3	41.1
10/31/2021	02:00-03:00	42.1	43.3	42.8	42	41.2	40.8
10/31/2021	03:00-04:00	51.1	45.6	45	43.8	42.7	42.3
10/31/2021	04:00-05:00	46	46.1	45.8	44.3	43.4	43
10/31/2021	05:00-06:00	52.8	54.7	52.8	45.6	42.7	42.1
10/31/2021	06:00-07:00	56.5	60	59.3	55.2	49.3	42.4
10/31/2021	07:00-08:00	55.1	61.1	59.9	47.4	39.6	39.2
10/31/2021	08:00-09:00	58.1	63.5	59.8	45.6	37.7	35.5
10/31/2021	09:00-10:00	48.1	49.8	46.6	39.3	34.5	33.7
10/30/2021	10:00-11:00	45.4	52.7	49	41	36	34.9
10/31/2021	11:00-12:00	39.9	44.7	42.6	36.7	32.9	31.7
10/31/2021	12:00-13:00	53.7	55.5	49.8	40.3	33.5	32.9
10/31/2021	13:00-14:00	44.3	46.8	46.1	39.6	35.6	35.2
10/31/2021	14:00-15:00	54	60.2	56.9	44.4	37.7	36.9
10/31/2021	15:00-16:00	46.1	51	49.4	43.5	38.3	37.5
10/31/2021	16:00-17:00	52.3	59.8	57.4	46.6	39.8	38.4

Receptor

Geographic Coordinations

Geographic Coordination System WGS 1984 – UTM 48N

Coordinate [m]	X	Y
	730100	1698592

Measurement Description

Reference Time

Date 28-31/10/2021

Day time 72 hours

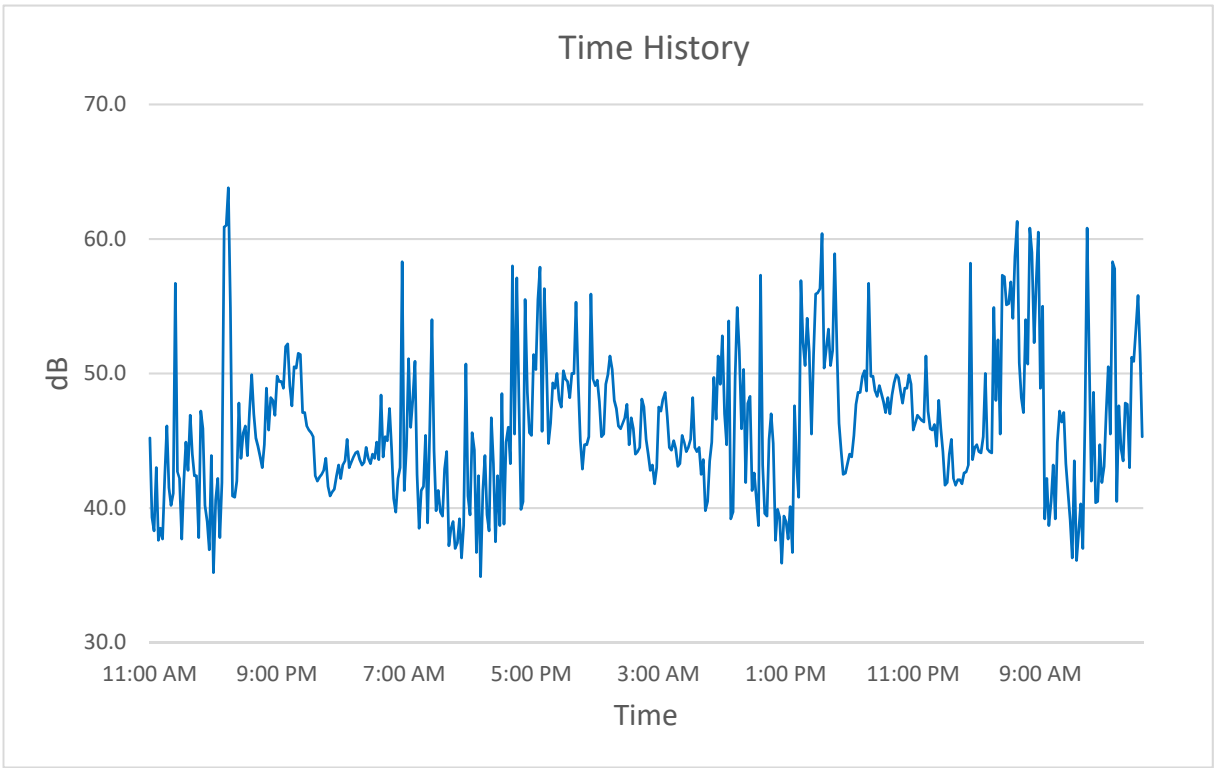
Instrumentation

Noise Measure Instrument: ST-107S Class 2 Integrating Sound Level Meter

Wind Speed Instrument: Davis Vantage PRO2

Metheorological Conditions

	u.m.		LeqA	L5	L10	L50	L90	L95
Temperature	[°C]	26.9	**49.9**	53.0	50.7	43.9	36.7	35.0
Wind Speed	[m/s]	2.27						
Pressure	[Hpa]	882.2						
Rainfall	[mm]	0						
(*) Average Values								



Recording activities surrounding at Noise measurement and Wind Speed.
Sampling Point: N3 (R3)

Recording activities surrounding at Noise measurement and Wind speed point N3 (R3). This point was near the house of Dakbrang village. Surrounding there are household, community, near the access road to village and farming area. Particularly observation sound hearing from noise people speaking, motorbike on road, noise from community, pets (cow) and noise from rain.

Wind Speed Measurement at Noise Sampling Point 3

(Represent as **R3** in the report)

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/28/2021 11:00	0:10:00	45.2	35.1	2.2
10/28/2021 11:10	0:10:00	39.3	31.9	1.8
10/28/2021 11:20	0:10:00	38.3	31.0	1.3
10/28/2021 11:30	0:10:00	43	34.4	3.6
10/28/2021 11:40	0:10:00	37.6	34.2	2.7
10/28/2021 11:50	0:10:00	38.5	33.4	3.6
10/28/2021 12:00	0:10:00	37.7	35.5	4
10/28/2021 12:10	0:10:00	42.4	37.1	2.7
10/28/2021 12:20	0:10:00	46.1	36.8	2.7
10/28/2021 12:30	0:10:00	41.5	36.7	2.7
10/28/2021 12:40	0:10:00	40.2	37.3	2.7
10/28/2021 12:50	0:10:00	41.1	35.3	2.7
10/28/2021 13:00	0:10:00	56.7	36.4	4.5
10/28/2021 13:10	0:10:00	42.7	36.9	3.1
10/28/2021 13:20	0:10:00	42.2	34.7	3.6
10/28/2021 13:30	0:10:00	37.7	34.7	4
10/28/2021 13:40	0:10:00	42.0	38.2	3.6
10/28/2021 13:50	0:10:00	44.9	38.6	4
10/28/2021 14:00	0:10:00	42.8	38.2	4
10/28/2021 14:10	0:10:00	46.9	37.3	3.6
10/28/2021 14:20	0:10:00	44.0	34.8	4.5
10/28/2021 14:30	0:10:00	42.4	39.5	4.9
10/28/2021 14:40	0:10:00	42.4	36.5	4.9
10/28/2021 14:50	0:10:00	37.8	35.1	4.5
10/28/2021 15:00	0:10:00	47.2	34.2	1.8
10/28/2021 15:10	0:10:00	45.9	30.6	1.8
10/28/2021 15:20	0:10:00	40.2	31.4	1.8
10/28/2021 15:30	0:10:00	39.0	32.7	2.7
10/28/2021 15:40	0:10:00	36.9	34.6	3.1
10/28/2021 15:50	0:10:00	43.9	34.0	1.8
10/28/2021 16:00	0:10:00	35.2	33.3	1.8
10/28/2021 16:10	0:10:00	40.6	33.8	1.8
10/28/2021 16:20	0:10:00	42.2	32.0	1.3
10/28/2021 16:30	0:10:00	37.8	32.8	0.9
10/28/2021 16:40	0:10:00	41.9	36.4	0.9
10/28/2021 16:50	0:10:00	60.9	36.6	0.9
10/28/2021 17:00	0:10:00	61.0	42.8	0.4
10/28/2021 17:10	0:10:00	63.8	37.0	1.3
10/28/2021 17:20	0:10:00	54.9	37.1	2.2
10/28/2021 17:30	0:10:00	40.9	35.7	2.2
10/28/2021 17:40	0:10:00	40.8	37.5	0.4
10/28/2021 17:50	0:10:00	42.0	38.1	0.9
10/28/2021 18:00	0:10:00	47.8	41.3	0.4
10/28/2021 18:10	0:10:00	43.7	41.7	0
10/28/2021 18:20	0:10:00	45.6	42.6	1.3
10/28/2021 18:30	0:10:00	46.1	42.5	0.9
10/28/2021 18:40	0:10:00	43.9	42.7	0.9
10/28/2021 18:50	0:10:00	47.1	45.7	1.3
10/28/2021 19:00	0:10:00	49.9	44.6	2.2
10/28/2021 19:10	0:10:00	47.0	42.4	1.8
10/28/2021 19:20	0:10:00	45.2	42.5	1.8
10/28/2021 19:30	0:10:00	44.6	41.7	2.2
10/28/2021 19:40	0:10:00	43.8	41.9	1.8
10/28/2021 19:50	0:10:00	43.0	41.6	2.2
10/28/2021 20:00	0:10:00	44.7	42.2	2.2

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/28/2021 20:10	0:10:00	48.9	45.8	2.2
10/28/2021 20:20	0:10:00	45.8	42.0	2.2
10/28/2021 20:30	0:10:00	48.2	47.0	1.8
10/28/2021 20:40	0:10:00	48.0	45.0	1.3
10/28/2021 20:50	0:10:00	46.9	44.1	1.8
10/28/2021 21:00	0:10:00	49.8	49.0	2.2
10/28/2021 21:10	0:10:00	49.4	48.7	2.2
10/28/2021 21:20	0:10:00	49.4	48.0	2.2
10/28/2021 21:30	0:10:00	48.9	47.5	2.2
10/28/2021 21:40	0:10:00	52.0	51.4	1.8
10/28/2021 21:50	0:10:00	52.2	51.4	1.3
10/28/2021 22:00	0:10:00	49.1	48.2	0.9
10/28/2021 22:10	0:10:00	47.6	45.8	0.9
10/28/2021 22:20	0:10:00	50.5	45.7	1.3
10/28/2021 22:30	0:10:00	50.4	49.7	1.3
10/28/2021 22:40	0:10:00	51.5	51.1	0.9
10/28/2021 22:50	0:10:00	51.4	50.4	1.3
10/28/2021 23:00	0:10:00	47.1	45.4	1.3
10/28/2021 23:10	0:10:00	47.1	45.4	1.3
10/28/2021 23:20	0:10:00	46.1	44.9	1.8
10/28/2021 23:30	0:10:00	45.8	45.1	1.3
10/28/2021 23:40	0:10:00	45.6	44.6	2.2
10/28/2021 23:50	0:10:00	45.3	44.6	2.2
10/29/2021 0:00	0:10:00	42.4	41.8	1.8
10/29/2021 0:10	0:10:00	42.0	41.4	1.8
10/29/2021 0:20	0:10:00	42.3	41.6	2.2
10/29/2021 0:30	0:10:00	42.5	41.8	1.8
10/29/2021 0:40	0:10:00	42.8	41.8	1.8
10/29/2021 0:50	0:10:00	43.7	41.2	2.2
10/29/2021 1:00	0:10:00	41.6	41.1	1.8
10/29/2021 1:10	0:10:00	40.9	40.3	1.8
10/29/2021 1:20	0:10:00	41.2	40.1	1.8
10/29/2021 1:30	0:10:00	41.4	40.6	1.3
10/29/2021 1:40	0:10:00	42.4	40.8	1.3
10/29/2021 1:50	0:10:00	43.2	42.0	1.8
10/29/2021 2:00	0:10:00	42.2	41.6	1.8
10/29/2021 2:10	0:10:00	43.2	41.5	1.3
10/29/2021 2:20	0:10:00	43.5	42.0	1.8
10/29/2021 2:30	0:10:00	45.1	41.6	1.3
10/29/2021 2:40	0:10:00	43.0	42.4	1.8
10/29/2021 2:50	0:10:00	43.4	42.9	1.8
10/29/2021 3:00	0:10:00	43.8	42.7	1.8
10/29/2021 3:10	0:10:00	44.1	43.3	2.2
10/29/2021 3:20	0:10:00	44.2	43.2	2.2
10/29/2021 3:30	0:10:00	43.6	43.0	2.2
10/29/2021 3:40	0:10:00	43.2	42.7	2.2
10/29/2021 3:50	0:10:00	43.4	43.0	1.3
10/29/2021 4:00	0:10:00	44.5	43.2	2.2
10/29/2021 4:10	0:10:00	43.7	43.0	2.2
10/29/2021 4:20	0:10:00	43.3	42.6	2.2
10/29/2021 4:30	0:10:00	44.0	42.5	1.8
10/29/2021 4:40	0:10:00	43.7	42.5	1.8
10/29/2021 4:50	0:10:00	44.9	43.4	1.8
10/29/2021 5:00	0:10:00	43.6	42.3	2.2
10/29/2021 5:10	0:10:00	48.4	42.9	1.8

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/29/2021 5:20	0:10:00	43.8	42.7	2.2
10/29/2021 5:30	0:10:00	45.3	41.9	2.2
10/29/2021 5:40	0:10:00	45.0	41.6	1.8
10/29/2021 5:50	0:10:00	47.4	40.6	1.8
10/29/2021 6:00	0:10:00	44.4	40.1	1.8
10/29/2021 6:10	0:10:00	40.7	39.4	1.8
10/29/2021 6:20	0:10:00	39.7	38.8	2.2
10/29/2021 6:30	0:10:00	42.2	39.0	1.8
10/29/2021 6:40	0:10:00	43.0	40.1	1.8
10/29/2021 6:50	0:10:00	58.3	40.0	2.2
10/29/2021 7:00	0:10:00	41.3	39.9	2.2
10/29/2021 7:10	0:10:00	44.6	38.4	2.2
10/29/2021 7:20	0:10:00	51.1	39.9	2.7
10/29/2021 7:30	0:10:00	46.0	42.4	2.7
10/29/2021 7:40	0:10:00	48.0	43.0	3.1
10/29/2021 7:50	0:10:00	50.9	40.6	2.7
10/29/2021 8:00	0:10:00	42.5	38.6	2.2
10/29/2021 8:10	0:10:00	38.5	36.8	2.7
10/29/2021 8:20	0:10:00	41.3	37.3	3.1
10/29/2021 8:30	0:10:00	41.6	38.3	3.6
10/29/2021 8:40	0:10:00	45.4	37.8	3.1
10/29/2021 8:50	0:10:00	38.9	36.9	2.2
10/29/2021 9:00	0:10:00	45.7	36.2	1.8
10/29/2021 9:10	0:10:00	54.0	37.9	2.7
10/29/2021 9:20	0:10:00	44.3	35.9	3.1
10/29/2021 9:30	0:10:00	39.8	36.4	2.7
10/29/2021 9:40	0:10:00	41.3	36.1	3.1
10/29/2021 9:50	0:10:00	39.7	35.9	3.1
10/29/2021 10:00	0:10:00	39.4	34.8	3.1
10/29/2021 10:10	0:10:00	42.9	36.4	2.7
10/29/2021 10:20	0:10:00	44.2	35.4	2.2
10/29/2021 10:30	0:10:00	37.2	34.5	2.2
10/29/2021 10:40	0:10:00	38.5	33.8	2.7
10/29/2021 10:50	0:10:00	39.0	37.4	3.1
10/29/2021 11:00	0:10:00	37.0	34.6	3.1
10/29/2021 11:10	0:10:00	37.4	35.0	3.6
10/29/2021 11:20	0:10:00	39.2	34.6	3.1
10/29/2021 11:30	0:10:00	36.3	33.6	2.7
10/29/2021 11:40	0:10:00	38.7	33.6	3.1
10/29/2021 11:50	0:10:00	50.7	35.3	3.1
10/29/2021 12:00	0:10:00	40.9	37.4	3.1
10/29/2021 12:10	0:10:00	39.5	33.1	2.7
10/29/2021 12:20	0:10:00	45.6	35.0	2.2
10/29/2021 12:30	0:10:00	44.3	35.5	2.7
10/29/2021 12:40	0:10:00	36.7	33.3	2.2
10/29/2021 12:50	0:10:00	42.4	32.9	3.1
10/29/2021 13:00	0:10:00	34.9	32.1	2.2
10/29/2021 13:10	0:10:00	41.3	34.5	3.1
10/29/2021 13:20	0:10:00	43.9	35.8	2.2
10/29/2021 13:30	0:10:00	39.5	33.9	2.2
10/29/2021 13:40	0:10:00	38.3	36.0	1.3
10/29/2021 13:50	0:10:00	46.7	35.5	2.2
10/29/2021 14:00	0:10:00	43.3	33.4	1.8
10/29/2021 14:10	0:10:00	37.5	35.0	2.2
10/29/2021 14:20	0:10:00	42.4	36.0	2.2

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/29/2021 14:30	0:10:00	38.7	34.6	3.1
10/29/2021 14:40	0:10:00	48.5	34.8	2.2
10/29/2021 14:50	0:10:00	38.8	35.5	1.8
10/29/2021 15:00	0:10:00	44.9	35.0	1.8
10/29/2021 15:10	0:10:00	46.0	37.9	3.6
10/29/2021 15:20	0:10:00	43.3	35.5	2.2
10/29/2021 15:30	0:10:00	58.0	35.5	1.8
10/29/2021 15:40	0:10:00	45.5	32.9	1.8
10/29/2021 15:50	0:10:00	57.1	49.2	2.7
10/29/2021 16:00	0:10:00	48.3	37.6	2.7
10/29/2021 16:10	0:10:00	39.9	36.4	2.7
10/29/2021 16:20	0:10:00	40.5	36.5	3.1
10/29/2021 16:30	0:10:00	55.5	39.2	3.1
10/29/2021 16:40	0:10:00	48.6	41.7	2.7
10/29/2021 16:50	0:10:00	45.6	38.8	2.7
10/29/2021 17:00	0:10:00	45.4	40.0	2.2
10/29/2021 17:10	0:10:00	51.4	42.0	2.2
10/29/2021 17:20	0:10:00	50.3	41.6	2.7
10/29/2021 17:30	0:10:00	55.5	43.2	2.2
10/29/2021 17:40	0:10:00	57.9	41.4	2.2
10/29/2021 17:50	0:10:00	45.7	43.0	1.8
10/29/2021 18:00	0:10:00	56.3	43.8	2.7
10/29/2021 18:10	0:10:00	50.9	42.8	1.8
10/29/2021 18:20	0:10:00	44.8	43.5	2.7
10/29/2021 18:30	0:10:00	46.3	43.9	2.7
10/29/2021 18:40	0:10:00	49.3	47.1	1.8
10/29/2021 18:50	0:10:00	48.9	47.1	1.3
10/29/2021 19:00	0:10:00	50.0	48.4	2.2
10/29/2021 19:10	0:10:00	48.1	46.6	2.7
10/29/2021 19:20	0:10:00	47.5	46.2	3.1
10/29/2021 19:30	0:10:00	50.2	47.9	2.7
10/29/2021 19:40	0:10:00	49.6	46.3	2.7
10/29/2021 19:50	0:10:00	49.4	48.7	2.7
10/29/2021 20:00	0:10:00	48.2	46.6	3.1
10/29/2021 20:10	0:10:00	50.0	48.3	3.6
10/29/2021 20:20	0:10:00	50.0	45.0	3.6
10/29/2021 20:30	0:10:00	55.3	53.3	3.6
10/29/2021 20:40	0:10:00	49.3	44.4	3.1
10/29/2021 20:50	0:10:00	45.0	42.5	3.1
10/29/2021 21:00	0:10:00	42.9	41.1	3.1
10/29/2021 21:10	0:10:00	44.7	42.5	2.7
10/29/2021 21:20	0:10:00	44.7	42.8	3.1
10/29/2021 21:30	0:10:00	45.3	43.0	3.1
10/29/2021 21:40	0:10:00	55.9	48.5	3.1
10/29/2021 21:50	0:10:00	49.6	48.7	2.7
10/29/2021 22:00	0:10:00	49.1	48.3	3.1
10/29/2021 22:10	0:10:00	49.5	45.9	3.6
10/29/2021 22:20	0:10:00	47.9	45.1	2.7
10/29/2021 22:30	0:10:00	45.3	44.0	2.2
10/29/2021 22:40	0:10:00	45.5	45.0	2.2
10/29/2021 22:50	0:10:00	49.2	47.1	2.7
10/29/2021 23:00	0:10:00	49.9	49.2	1.8
10/29/2021 23:10	0:10:00	51.3	49.7	2.2
10/29/2021 23:20	0:10:00	50.3	49.5	1.8
10/29/2021 23:30	0:10:00	48.0	43.5	2.7

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/29/2021 23:40	0:10:00	47.4	46.4	2.2
10/29/2021 23:50	0:10:00	46.1	45.0	3.1
10/30/2021 0:00	0:10:00	45.9	45.3	2.7
10/30/2021 0:10	0:10:00	46.3	45.5	1.8
10/30/2021 0:20	0:10:00	46.7	44.9	2.2
10/30/2021 0:30	0:10:00	47.7	45.7	2.7
10/30/2021 0:40	0:10:00	44.7	43.6	2.7
10/30/2021 0:50	0:10:00	46.7	45.8	1.8
10/30/2021 1:00	0:10:00	45.9	45.2	1.8
10/30/2021 1:10	0:10:00	44.0	43.0	1.8
10/30/2021 1:20	0:10:00	44.2	43.5	1.8
10/30/2021 1:30	0:10:00	44.5	43.7	1.8
10/30/2021 1:40	0:10:00	48.1	44.5	1.3
10/30/2021 1:50	0:10:00	47.5	44.1	1.8
10/30/2021 2:00	0:10:00	45.1	42.8	1.3
10/30/2021 2:10	0:10:00	44.0	42.2	0.9
10/30/2021 2:20	0:10:00	42.8	41.9	0.4
10/30/2021 2:30	0:10:00	43.2	39.8	0.4
10/30/2021 2:40	0:10:00	41.8	39.3	0.9
10/30/2021 2:50	0:10:00	43.0	41.4	0.9
10/30/2021 3:00	0:10:00	47.5	40.7	0.9
10/30/2021 3:10	0:10:00	47.2	43.9	1.3
10/30/2021 3:20	0:10:00	48.1	44.7	0.9
10/30/2021 3:30	0:10:00	48.6	46.6	1.3
10/30/2021 3:40	0:10:00	46.8	44.2	1.8
10/30/2021 3:50	0:10:00	44.5	44.0	1.3
10/30/2021 4:00	0:10:00	44.3	43.7	0.9
10/30/2021 4:10	0:10:00	45.0	43.7	1.3
10/30/2021 4:20	0:10:00	44.4	42.9	2.2
10/30/2021 4:30	0:10:00	43.1	42.6	2.2
10/30/2021 4:40	0:10:00	43.3	42.1	2.2
10/30/2021 4:50	0:10:00	45.4	43.4	1.8
10/30/2021 5:00	0:10:00	44.9	43.9	2.2
10/30/2021 5:10	0:10:00	44.2	42.7	1.8
10/30/2021 5:20	0:10:00	44.5	44.0	1.8
10/30/2021 5:30	0:10:00	45.1	43.6	1.3
10/30/2021 5:40	0:10:00	48.2	42.1	1.8
10/30/2021 5:50	0:10:00	44.5	42.5	1.8
10/30/2021 6:00	0:10:00	44.2	41.6	1.8
10/30/2021 6:10	0:10:00	44.5	43.7	2.2
10/30/2021 6:20	0:10:00	42.5	39.2	2.7
10/30/2021 6:30	0:10:00	43.6	39.0	2.7
10/30/2021 6:40	0:10:00	39.8	37.6	2.2
10/30/2021 6:50	0:10:00	40.5	38.6	2.2
10/30/2021 7:00	0:10:00	43.5	39.1	2.7
10/30/2021 7:10	0:10:00	44.9	39.5	2.7
10/30/2021 7:20	0:10:00	49.7	40.4	2.7
10/30/2021 7:30	0:10:00	46.6	40.3	3.1
10/30/2021 7:40	0:10:00	51.3	41.7	3.1
10/30/2021 7:50	0:10:00	49.2	40.1	3.1
10/30/2021 8:00	0:10:00	52.8	43.6	2.2
10/30/2021 8:10	0:10:00	47.0	38.5	3.1
10/30/2021 8:20	0:10:00	44.7	39.0	3.1
10/30/2021 8:30	0:10:00	53.9	37.7	2.7
10/30/2021 8:40	0:10:00	39.2	38.0	3.1

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/30/2021 8:50	0:10:00	39.7	36.1	2.7
10/30/2021 9:00	0:10:00	49.7	38.1	4
10/30/2021 9:10	0:10:00	54.9	45.7	4
10/30/2021 9:20	0:10:00	51.7	45.7	3.6
10/30/2021 9:30	0:10:00	45.9	43.9	2.7
10/30/2021 9:40	0:10:00	50.3	40.2	3.6
10/30/2021 9:50	0:10:00	41.9	36.2	3.1
10/30/2021 10:00	0:10:00	47.8	36.6	3.6
10/30/2021 10:10	0:10:00	48.3	34.5	4
10/30/2021 10:20	0:10:00	41.3	37.4	4
10/30/2021 10:30	0:10:00	42.6	37.1	2.7
10/30/2021 10:40	0:10:00	40.8	37.4	2.7
10/30/2021 10:50	0:10:00	38.7	36.1	2.7
10/30/2021 11:00	0:10:00	57.3	35.9	3.6
10/30/2021 11:10	0:10:00	43.2	35.9	3.1
10/30/2021 11:20	0:10:00	39.6	36.1	2.7
10/30/2021 11:30	0:10:00	39.4	36.9	3.1
10/30/2021 11:40	0:10:00	45.1	37.1	2.7
10/30/2021 11:50	0:10:00	47.0	34.1	2.2
10/30/2021 12:00	0:10:00	44.8	36.7	3.1
10/30/2021 12:10	0:10:00	37.6	35.6	3.1
10/30/2021 12:20	0:10:00	39.9	33.8	2.7
10/30/2021 12:30	0:10:00	39.3	35.5	3.1
10/30/2021 12:40	0:10:00	35.9	31.7	2.2
10/30/2021 12:50	0:10:00	39.4	33.9	3.1
10/30/2021 13:00	0:10:00	39.0	33.9	2.7
10/30/2021 13:10	0:10:00	37.7	32.3	2.2
10/30/2021 13:20	0:10:00	40.1	35.1	3.1
10/30/2021 13:30	0:10:00	36.7	32.3	2.2
10/30/2021 13:40	0:10:00	47.6	35.6	2.7
10/30/2021 13:50	0:10:00	43.2	34.4	2.2
10/30/2021 14:00	0:10:00	40.8	35.6	2.7
10/30/2021 14:10	0:10:00	56.9	35.6	2.7
10/30/2021 14:20	0:10:00	52.3	43.4	2.7
10/30/2021 14:30	0:10:00	50.6	39.3	1.8
10/30/2021 14:40	0:10:00	54.1	43.1	3.1
10/30/2021 14:50	0:10:00	51.6	39.0	1.8
10/30/2021 15:00	0:10:00	45.5	36.7	1.8
10/30/2021 15:10	0:10:00	51.4	41.1	1.8
10/30/2021 15:20	0:10:00	55.9	44.1	1.8
10/30/2021 15:30	0:10:00	56.0	43.0	1.3
10/30/2021 15:40	0:10:00	56.3	38.7	1.8
10/30/2021 15:50	0:10:00	60.4	43.6	1.8
10/30/2021 16:00	0:10:00	50.4	38.5	1.8
10/30/2021 16:10	0:10:00	51.8	40.9	1.8
10/30/2021 16:20	0:10:00	53.3	44.6	1.3
10/30/2021 16:30	0:10:00	50.6	41.3	0.9
10/30/2021 16:40	0:10:00	51.7	44.3	1.3
10/30/2021 16:50	0:10:00	58.9	47.6	2.2
10/30/2021 17:00	0:10:00	51.8	46.3	1.8
10/30/2021 17:10	0:10:00	46.3	41.0	1.3
10/30/2021 17:20	0:10:00	44.3	39.2	1.8
10/30/2021 17:30	0:10:00	42.5	38.9	1.8
10/30/2021 17:40	0:10:00	42.6	39.2	2.2
10/30/2021 17:50	0:10:00	43.3	41.6	2.2

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/30/2021 18:00	0:10:00	44.0	41.8	2.7
10/30/2021 18:10	0:10:00	43.8	42.6	1.8
10/30/2021 18:20	0:10:00	45.4	43.1	1.8
10/30/2021 18:30	0:10:00	47.7	46.8	1.8
10/30/2021 18:40	0:10:00	48.6	48.0	2.2
10/30/2021 18:50	0:10:00	48.6	47.5	2.2
10/30/2021 19:00	0:10:00	49.8	48.2	2.7
10/30/2021 19:10	0:10:00	50.2	48.4	1.8
10/30/2021 19:20	0:10:00	48.7	46.7	2.2
10/30/2021 19:30	0:10:00	56.7	47.7	1.8
10/30/2021 19:40	0:10:00	49.8	48.7	1.8
10/30/2021 19:50	0:10:00	49.8	48.8	1.8
10/30/2021 20:00	0:10:00	48.7	48.2	1.8
10/30/2021 20:10	0:10:00	48.3	47.2	2.2
10/30/2021 20:20	0:10:00	49.1	48.5	3.1
10/30/2021 20:30	0:10:00	48.5	47.4	3.1
10/30/2021 20:40	0:10:00	47.9	46.9	3.1
10/30/2021 20:50	0:10:00	47.1	45.4	3.1
10/30/2021 21:00	0:10:00	48.2	46.1	2.7
10/30/2021 21:10	0:10:00	47.0	46.3	2.7
10/30/2021 21:20	0:10:00	48.4	47.6	1.8
10/30/2021 21:30	0:10:00	49.3	48.0	2.2
10/30/2021 21:40	0:10:00	49.9	49.0	2.2
10/30/2021 21:50	0:10:00	49.7	47.5	2.2
10/30/2021 22:00	0:10:00	48.7	47.6	2.2
10/30/2021 22:10	0:10:00	47.8	45.5	1.8
10/30/2021 22:20	0:10:00	48.9	46.4	2.2
10/30/2021 22:30	0:10:00	48.9	46.5	2.2
10/30/2021 22:40	0:10:00	49.9	47.7	2.2
10/30/2021 22:50	0:10:00	49.2	45.6	1.8
10/30/2021 23:00	0:10:00	45.8	45.0	1.8
10/30/2021 23:10	0:10:00	46.3	44.2	1.8
10/30/2021 23:20	0:10:00	46.9	46.1	2.7
10/30/2021 23:30	0:10:00	46.7	45.9	1.8
10/30/2021 23:40	0:10:00	46.5	46.1	2.2
10/30/2021 23:50	0:10:00	46.4	45.0	1.8
10/31/2021 0:00	0:10:00	51.3	45.6	1.8
10/31/2021 0:10	0:10:00	47.2	45.5	1.8
10/31/2021 0:20	0:10:00	45.9	44.9	1.8
10/31/2021 0:30	0:10:00	45.8	45.5	1.8
10/31/2021 0:40	0:10:00	46.2	45.8	1.3
10/31/2021 0:50	0:10:00	44.6	43.9	2.2
10/31/2021 1:00	0:10:00	48.0	44.7	1.3
10/31/2021 1:10	0:10:00	45.9	43.6	1.8
10/31/2021 1:20	0:10:00	44.2	43.2	1.8
10/31/2021 1:30	0:10:00	41.7	41.1	0.9
10/31/2021 1:40	0:10:00	41.9	41.2	1.3
10/31/2021 1:50	0:10:00	44.0	41.3	0.9
10/31/2021 2:00	0:10:00	45.1	42.4	0.4
10/31/2021 2:10	0:10:00	42.2	41.5	0.9
10/31/2021 2:20	0:10:00	41.7	41.0	0.9
10/31/2021 2:30	0:10:00	42.1	41.0	0.9
10/31/2021 2:40	0:10:00	42.1	40.8	0.9
10/31/2021 2:50	0:10:00	41.8	41.3	0.9
10/31/2021 3:00	0:10:00	42.6	42.1	0.9

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/31/2021 3:10	0:10:00	42.7	41.1	0.9
10/31/2021 3:20	0:10:00	43.2	42.6	1.3
10/31/2021 3:30	0:10:00	58.2	43.1	0.9
10/31/2021 3:40	0:10:00	43.6	42.6	0.9
10/31/2021 3:50	0:10:00	44.5	43.9	0.9
10/31/2021 4:00	0:10:00	44.7	43.8	0.9
10/31/2021 4:10	0:10:00	44.2	43.0	0.9
10/31/2021 4:20	0:10:00	44.1	43.3	1.3
10/31/2021 4:30	0:10:00	45.3	44.4	1.3
10/31/2021 4:40	0:10:00	50.0	43.4	1.3
10/31/2021 4:50	0:10:00	44.4	43.4	1.3
10/31/2021 5:00	0:10:00	44.2	43.5	1.8
10/31/2021 5:10	0:10:00	44.1	42.2	1.8
10/31/2021 5:20	0:10:00	54.9	43.8	1.8
10/31/2021 5:30	0:10:00	48.0	44.5	2.2
10/31/2021 5:40	0:10:00	52.5	44.5	2.7
10/31/2021 5:50	0:10:00	45.5	42.1	2.2
10/31/2021 6:00	0:10:00	57.3	42.7	2.2
10/31/2021 6:10	0:10:00	57.2	42.4	2.2
10/31/2021 6:20	0:10:00	55.1	48.5	2.2
10/31/2021 6:30	0:10:00	55.2	49.5	1.8
10/31/2021 6:40	0:10:00	56.8	49.3	1.8
10/31/2021 6:50	0:10:00	54.1	49.3	1.8
10/31/2021 7:00	0:10:00	58.7	56.7	1.8
10/31/2021 7:10	0:10:00	61.3	58.7	2.2
10/31/2021 7:20	0:10:00	50.8	39.1	2.2
10/31/2021 7:30	0:10:00	48.2	41.7	1.8
10/31/2021 7:40	0:10:00	47.1	39.2	1.8
10/31/2021 7:50	0:10:00	54.0	41.6	1.8
10/31/2021 8:00	0:10:00	50.7	39.0	2.2
10/31/2021 8:10	0:10:00	60.8	37.4	2.7
10/31/2021 8:20	0:10:00	59.0	39.6	2.2
10/31/2021 8:30	0:10:00	52.3	37.2	2.7
10/31/2021 8:40	0:10:00	56.8	35.3	2.7
10/31/2021 8:50	0:10:00	60.5	38.7	3.1
10/31/2021 9:00	0:10:00	48.9	41.0	3.1
10/31/2021 9:10	0:10:00	55.0	38.1	2.2
10/31/2021 9:20	0:10:00	39.2	33.1	2.7
10/31/2021 9:30	0:10:00	42.2	35.8	3.1
10/31/2021 9:40	0:10:00	38.7	33.9	2.2
10/31/2021 9:50	0:10:00	40.5	36.5	2.2
10/31/2021 10:00	0:10:00	43.2	37.3	3.1
10/31/2021 10:10	0:10:00	39.2	36.1	3.1
10/31/2021 10:20	0:10:00	44.9	36.1	3.1
10/31/2021 10:30	0:10:00	47.2	38.2	3.1
10/31/2021 10:40	0:10:00	46.4	37.6	2.2
10/31/2021 10:50	0:10:00	47.1	37.1	2.7
10/31/2021 11:00	0:10:00	43.3	35.7	2.7
10/31/2021 11:10	0:10:00	41.1	35.3	2.2
10/31/2021 11:20	0:10:00	39.1	33.4	2.7
10/31/2021 11:30	0:10:00	36.3	32.0	2.2
10/31/2021 11:40	0:10:00	43.5	31.5	2.7
10/31/2021 11:50	0:10:00	36.1	32.6	2.2
10/31/2021 12:00	0:10:00	38.2	33.4	2.2
10/31/2021 12:10	0:10:00	40.3	33.9	1.8

Start time	Elapsed time	LAeq	LA 90	Wind 10 m
10/31/2021 12:20	0:10:00	37.0	32.2	1.8
10/31/2021 12:30	0:10:00	46.9	34.9	2.2
10/31/2021 12:40	0:10:00	60.8	37.0	1.8
10/31/2021 12:50	0:10:00	51.2	39.3	2.2
10/31/2021 13:00	0:10:00	42.0	37.8	1.8
10/31/2021 13:10	0:10:00	48.6	36.6	2.2
10/31/2021 13:20	0:10:00	40.4	35.4	1.8
10/31/2021 13:30	0:10:00	40.5	35.6	1.3
10/31/2021 13:40	0:10:00	44.7	35.4	2.2
10/31/2021 13:50	0:10:00	41.9	36.6	1.8
10/31/2021 14:00	0:10:00	43.1	36.8	2.2
10/31/2021 14:10	0:10:00	47.1	37.5	2.2
10/31/2021 14:20	0:10:00	50.5	38.3	1.8
10/31/2021 14:30	0:10:00	45.5	37.7	1.8
10/31/2021 14:40	0:10:00	58.3	44.2	1.8
10/31/2021 14:50	0:10:00	57.8	45.6	0.9
10/31/2021 15:00	0:10:00	40.5	36.9	0.4
10/31/2021 15:10	0:10:00	47.6	38.9	0.9
10/31/2021 15:20	0:10:00	44.4	37.0	0.9
10/31/2021 15:30	0:10:00	43.5	37.5	0.4
10/31/2021 15:40	0:10:00	47.8	44.1	0
10/31/2021 15:50	0:10:00	47.7	43.3	0
10/31/2021 16:00	0:10:00	43.0	38.8	0.4
10/31/2021 16:10	0:10:00	51.2	39.6	0.9
10/31/2021 16:20	0:10:00	50.9	45.6	1.3
10/31/2021 16:30	0:10:00	53.2	45.3	0.9
10/31/2021 16:40	0:10:00	55.8	40.6	0.9
10/31/2021 16:50	0:10:00	51.4	37.8	1.3
10/31/2021 17:00	0:10:00	45.3	40.7	1.8

Noise Measurements Datasheet at Noise Sampling Point 4

(Represent as **R4** in the report)

Receptor

Measurement description

References time		Coordinates: UTM	
Date	09-12/8/2021	E	742952
Day time	72 Hours	N	1710413

Instrumentation

Noise Measure Instrument: ST-107S Class 2 Integrating Sound Level Meter
Wind Speed Instrument: Davis Vantage PRO2

Noise Pressure Level [dBA] – LAeq, Day/Night

Date	Time	LeqA	L5	L10	L50	L90	L95
8/9/2021	12:00-18:00	*Day time*	42.6	46.2	42.8	35	30.8	30.2
8/9-10/2021	18:00-06:00	*Night time*	43	45.1	44.1	40.1	37.9	36.4
8/10/2021	06:00-18:00	*Day time*	51.7	48.8	44.8	34.4	30.8	30.2
8/10-11/2021	18:00-06:00	*Night time*	48.8	50.4	45.9	41.3	39.4	37.9
8/11/2021	06:00-18:00	*Day time*	40.1	44.7	41.8	35	32	31
8/11-12/2021	18:00-06:00	*Night time*	42.9	48.2	45.3	39.7	37.6	36.5
8/12/2021	06:00-12:00	*Day time*	40.6	43.9	41.8	33.6	30.6	29.8

Noise Pressure Level [dBA] – LAeq,1 Hours

Date	Time	LeqA	L5	L10	L50	L90	L95
8/9/2021	11:30-12:00	55	58.1	54.2	43.1	31.9	30.5
8/9/2021	12:00-13:00	40.8	46.8	43.6	34.6	30.3	29.9
8/9/2021	13:00-14:00	40.9	46.8	45.6	34.7	30.5	29.8
8/9/2021	14:00-15:00	45.9	51.2	41.4	35.8	32.5	31.8
8/9/2021	15:00-16:00	35.7	40.1	37.5	34.2	31.5	31.1
8/9/2021	16:00-17:00	45.2	46.4	42.8	36.8	31	30.7
8/9/2021	17:00-18:00	39.9	45.9	42.6	32.9	30.3	29.8
8/9/2021	18:00-19:00	41.5	46.4	45.9	36.7	33.4	32.5
8/9/2021	19:00-20:00	44.1	48.2	47.8	41.7	40.1	39.9
8/9/2021	20:00-21:00	41	43.9	41.5	40.2	39.1	38.5
8/9/2021	21:00-22:00	40.5	42.5	41.8	39.8	38.9	38.7
8/9/2021	22:00-23:00	39.2	40.2	40	38.9	37.8	37.6
8/9/2021	23:00-00:00	39.1	40.4	40	38.8	38	37.8
8/10/2021	00:00-01:00	40.3	42.5	42.2	39.5	38.5	38.3
8/10/2021	01:00-02:00	40.3	43.2	42.8	39.3	38.1	37.7
8/10/2021	02:00-03:00	39.4	41.1	40.9	39.3	37.7	37.4
8/10/2021	03:00-04:00	42.5	44.1	43.8	42.3	40.3	40.2
8/10/2021	04:00-05:00	43.9	45	45	43.8	42.4	42.2
8/10/2021	05:00-06:00	49.5	45.1	44.8	42	35.6	34.6
8/10/2021	06:00-07:00	37.5	41.3	39.5	34.6	32.4	32.3
8/10/2021	07:00-08:00	41	47	45.2	35	32.8	32.3
8/10/2021	08:00-09:00	61.8	47.6	45	34.7	31.3	30.7
8/10/2021	09:00-10:00	36.5	43.3	39.5	34.2	30.7	30.2
8/10/2021	10:00-11:00	35.5	41	37.8	32	30.3	29.8
8/10/2021	11:00-12:00	51.5	61.2	48.8	35.2	32.2	31.4
8/10/2021	12:00-13:00	36.2	37	36	31.6	29.9	29.6
8/10/2021	13:00-14:00	34.5	37.2	36.2	32.2	29.8	29
8/10/2021	14:00-15:00	50.6	58.1	53.8	40.3	32.3	30.7
8/10/2021	15:00-16:00	47.1	51.9	49.2	37.4	32.6	31.9

8/10/2021	16:00-17:00	45	54.7	47.4	35.7	32.6	32.3
8/10/2021	17:00-18:00	35.5	40.2	38.9	33.5	30.9	30.8
8/10/2021	18:00-19:00	51.6	52.1	47.3	39	35.6	35.4
8/10/2021	19:00-20:00	57.3	66.6	64.3	41.8	40.6	40.4
8/10/2021	20:00-21:00	42.6	46.2	43.5	40.6	39.8	39.6
8/10/2021	21:00-22:00	48	53.7	53.2	41.8	40.4	40.3
8/10/2021	22:00-23:00	45.5	51	50.4	40.8	39.3	39.1
8/10/2021	23:00-00:00	40.7	42.1	41.9	40.2	39.4	39.2
8/11/2021	00:00-01:00	42.8	42.7	42.1	40.3	39.6	39.4
8/11/2021	01:00-02:00	41.5	43.4	42.8	41.1	40	39.7
8/11/2021	02:00-03:00	42	43.5	43.2	41.8	40.7	40.6
8/11/2021	03:00-04:00	43	45.4	45	42.5	40.2	40
8/11/2021	04:00-05:00	44	45.3	44.9	44	42.8	42.4
8/11/2021	05:00-06:00	41.9	44.8	44.1	41.1	36.4	35.5
8/11/2021	06:00-07:00	40.4	43.6	40.6	36.8	34.3	34.1
8/11/2021	07:00-08:00	41.2	45.8	43.7	38.2	34.9	34.4
8/11/2021	08:00-09:00	43.7	45	43.6	35.5	32.4	32
8/11/2021	09:00-10:00	36.2	41.5	39.6	34.5	31.6	31
8/11/2021	10:00-11:00	37.9	40	38.8	35.4	33.6	32.9
8/11/2021	11:00-12:00	38.6	45.1	39.6	34.5	32.4	31.4
8/11/2021	12:00-13:00	42	47.6	40.5	34.4	31.4	30.8
8/11/2021	13:00-14:00	36.6	40.9	39.6	35	31.9	30.7
8/11/2021	14:00-15:00	38.6	40.9	39.7	35.1	33.9	33.5
8/11/2021	15:00-16:00	42.2	48.1	45.2	36.6	34.1	33.4
8/11/2021	16:00-17:00	40.5	46.5	44.4	37.7	33.1	32.6
8/11/2021	17:00-18:00	38.3	43.6	40.5	33.3	30	29.2
8/11/2021	18:00-19:00	39.3	42.9	40.3	36.2	34.2	33.7
8/11/2021	19:00-20:00	39.8	41.3	41	39.7	38.4	38.2
8/11/2021	20:00-21:00	46.6	51.9	49.8	42	37.4	37.3
8/11/2021	21:00-22:00	39.8	40.9	40.1	38.9	37.8	37.5
8/11/2021	22:00-23:00	40.8	45.3	41.6	39.9	39.2	39
8/11/2021	23:00-00:00	39.7	40.4	40.3	39.4	38.9	38.6
8/12/2021	00:00-01:00	40.5	41.5	40.5	39.7	38.9	38.2
8/12/2021	01:00-02:00	39.5	40.9	40.5	39.4	38.2	37.8
8/12/2021	02:00-03:00	45.6	50.1	48.3	39.5	38.2	37.7
8/12/2021	03:00-04:00	46.1	51	48.1	43.8	41	40
8/12/2021	04:00-05:00	44.3	45.8	45.7	44	42.9	42.6
8/12/2021	05:00-06:00	41.8	45.1	43.3	41.6	37.1	36.5
8/12/2021	06:00-07:00	40.7	41.2	39.1	34.9	32.7	32.2
8/12/2021	07:00-08:00	37.5	42.4	40.3	33.9	31.3	31.3
8/12/2021	08:00-09:00	34.6	38.5	37.2	32.3	30.3	30.2
8/12/2021	09:00-10:00	37.1	43.3	41	33.6	31.2	30.8
8/12/2021	10:00-11:00	40.7	47.4	44.2	32.5	29.7	29.6
8/12/2021	11:00-12:00	45.6	48.8	44.4	32.1	29.5	29

Receptor

Geographic Coordinations

Geographic Coordination System WGS 1984 – UTM 48N

Coordinate [m]	X	Y
	742952	1710413

Measurement Description

Reference Time

Date 09-12/08/2021

Day time 72 hours

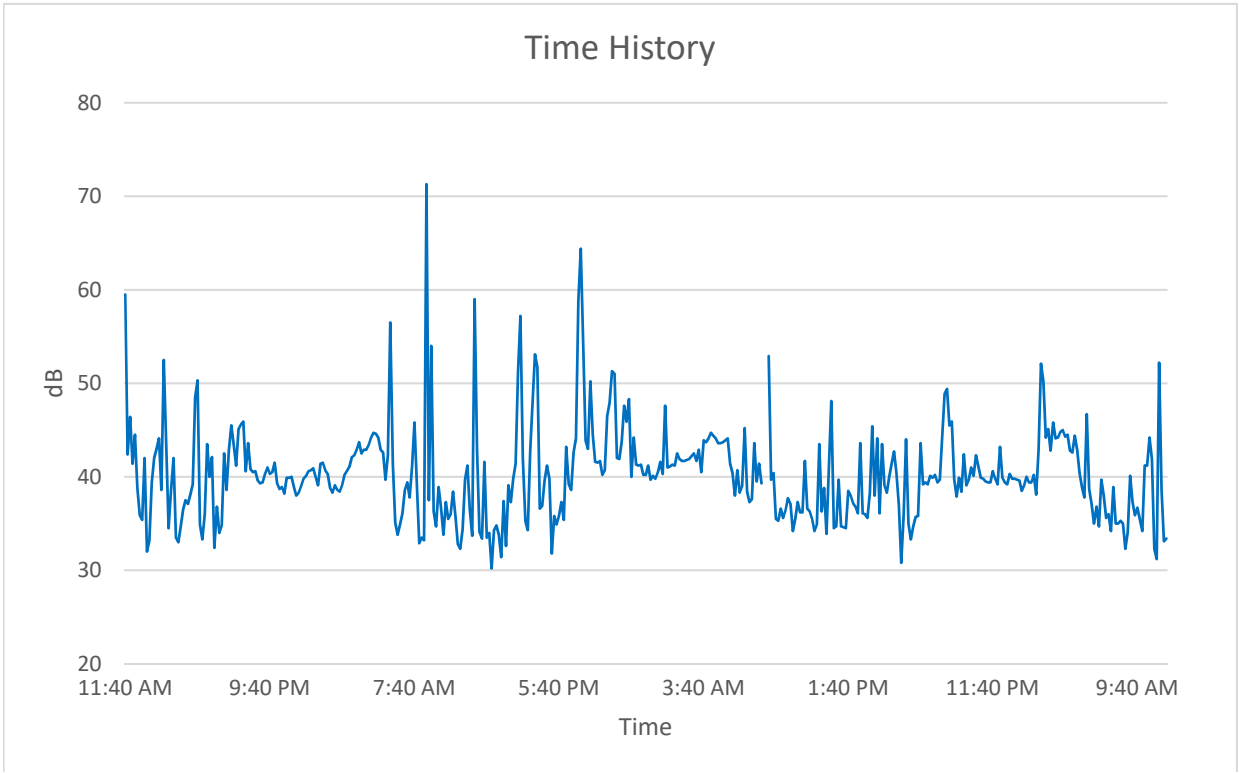
Instrumentation

Noise Measure Instrument: ST-107S Class 2 Integrating Sound Level Meter

Wind Speed Instrument: Davis Vantage PRO2

Metheorological Conditions

	u.m.		LeqA	L5	L10	L50	L90	L95
Temperature	[°C]	26.3	**41.6**	46.0	44	38	32	31.0
Wind Speed	[m/s]	2.32						
Pressure	[Hpa]	875.9						
Rainfall	[mm]	0						
(*) Average Values								



Recording activities surrounding at Noise measurement and Wind Speed.
Sampling Point: N4 (R4)

Recording activities surrounding at Noise measurement and Wind speed point N4 (R4). This point installs Urban Dakchueng Nearly the household around 25 m, Hospital is about 180-meter distance. Currently, there are building activities in hospital area. Sometimes we heard a faint sound hammer, drilling tools from worker. The point is nearly access road to farming and Normally the sound impact from motorbike, Tractor. After that noise from dogs barking in nearly household, noise from kid in community and pets (Cow, Buffalo).

Wind Speed Measurement at Noise Sampling Point 4

(Represent as **R4** in the report)

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/9/2021 11:40	0:10:00	59.5	37.2	2.2
8/9/2021 11:50	0:10:00	42.4	38.0	2.2
8/9/2021 12:00	0:10:00	46.4	30.4	3.1
8/9/2021 12:10	0:10:00	41.4	31.3	3.6
8/9/2021 12:20	0:10:00	44.5	30.3	3.6
8/9/2021 12:30	0:10:00	38.8	32.5	3.6
8/9/2021 12:40	0:10:00	35.9	31.2	4
8/9/2021 12:50	0:10:00	35.4	30.2	2.7
8/9/2021 13:00	0:10:00	42	28.5	3.1
8/9/2021 13:10	0:10:00	32	29.6	3.1
8/9/2021 13:20	0:10:00	33.2	29.7	3.6
8/9/2021 13:30	0:10:00	39.4	31.5	3.6
8/9/2021 13:40	0:10:00	42	34.0	3.1
8/9/2021 13:50	0:10:00	43	34.7	2.7
8/9/2021 14:00	0:10:00	44.1	34.0	2.2
8/9/2021 14:10	0:10:00	38.6	32.9	2.2
8/9/2021 14:20	0:10:00	52.5	34.8	3.6
8/9/2021 14:30	0:10:00	43.6	34.9	2.2
8/9/2021 14:40	0:10:00	34.5	32.5	4
8/9/2021 14:50	0:10:00	38.5	34.1	4
8/9/2021 15:00	0:10:00	42	30.9	3.1
8/9/2021 15:10	0:10:00	33.5	32.1	4.5
8/9/2021 15:20	0:10:00	33	30.9	2.7
8/9/2021 15:30	0:10:00	34.7	31.1	2.7
8/9/2021 15:40	0:10:00	36.5	33.6	2.2
8/9/2021 15:50	0:10:00	37.5	32.9	2.7
8/9/2021 16:00	0:10:00	37.1	34.7	2.7
8/9/2021 16:10	0:10:00	38.1	35.9	1.8
8/9/2021 16:20	0:10:00	39.2	32.0	2.7
8/9/2021 16:30	0:10:00	48.5	39.9	1.8
8/9/2021 16:40	0:10:00	50.3	30.8	1.8
8/9/2021 16:50	0:10:00	34.9	30.7	1.3
8/9/2021 17:00	0:10:00	33.3	30.4	1.3
8/9/2021 17:10	0:10:00	36	31.3	2.2
8/9/2021 17:20	0:10:00	43.5	30.6	2.2
8/9/2021 17:30	0:10:00	40	30.9	1.8
8/9/2021 17:40	0:10:00	42.1	32.0	1.3
8/9/2021 17:50	0:10:00	32.4	29.0	1.8
8/9/2021 18:00	0:10:00	36.8	32.6	1.3
8/9/2021 18:10	0:10:00	34	31.5	1.8
8/9/2021 18:20	0:10:00	34.8	34.0	0.9
8/9/2021 18:30	0:10:00	42.5	34.4	0
8/9/2021 18:40	0:10:00	38.6	34.8	0.4
8/9/2021 18:50	0:10:00	42.9	40.3	0.4
8/9/2021 19:00	0:10:00	45.5	42.9	0.4
8/9/2021 19:10	0:10:00	43.4	41.6	0
8/9/2021 19:20	0:10:00	41.2	39.9	0
8/9/2021 19:30	0:10:00	45.1	41.5	0
8/9/2021 19:40	0:10:00	45.6	41.0	0.9

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/9/2021 19:50	0:10:00	45.9	40.0	0.9
8/9/2021 20:00	0:10:00	40.6	39.7	1.8
8/9/2021 20:10	0:10:00	43.6	39.8	1.3
8/9/2021 20:20	0:10:00	40.8	40.2	1.3
8/9/2021 20:30	0:10:00	40.5	39.8	1.3
8/9/2021 20:40	0:10:00	40.6	39.5	2.2
8/9/2021 20:50	0:10:00	39.6	39.1	2.2
8/9/2021 21:00	0:10:00	39.3	38.5	2.7
8/9/2021 21:10	0:10:00	39.4	38.6	2.2
8/9/2021 21:20	0:10:00	40.3	39.2	1.8
8/9/2021 21:30	0:10:00	41	38.9	0.4
8/9/2021 21:40	0:10:00	40.3	39.2	0.4
8/9/2021 21:50	0:10:00	40.5	39.0	0.4
8/9/2021 22:00	0:10:00	41.5	39.6	0.9
8/9/2021 22:10	0:10:00	39.3	38.8	2.2
8/9/2021 22:20	0:10:00	38.7	38.3	2.2
8/9/2021 22:30	0:10:00	38.9	37.7	1.3
8/9/2021 22:40	0:10:00	38.2	37.6	1.3
8/9/2021 22:50	0:10:00	39.9	38.2	1.3
8/9/2021 23:00	0:10:00	39.9	39.5	0.4
8/9/2021 23:10	0:10:00	40	39.1	0.4
8/9/2021 23:20	0:10:00	38.9	38.5	0.9
8/9/2021 23:30	0:10:00	38	37.8	1.3
8/9/2021 23:40	0:10:00	38.3	38.2	0.9
8/9/2021 23:50	0:10:00	39	38.3	0.9
8/10/2021 0:00	0:10:00	39.8	38.8	2.2
8/10/2021 0:10	0:10:00	40.1	39.2	2.2
8/10/2021 0:20	0:10:00	40.6	39.3	2.2
8/10/2021 0:30	0:10:00	40.7	39.3	1.3
8/10/2021 0:40	0:10:00	40.9	38.5	2.7
8/10/2021 0:50	0:10:00	40	38.5	2.2
8/10/2021 1:00	0:10:00	39.1	38.3	1.8
8/10/2021 1:10	0:10:00	41.4	38.7	0.9
8/10/2021 1:20	0:10:00	41.5	39.7	1.3
8/10/2021 1:30	0:10:00	40.7	38.1	1.3
8/10/2021 1:40	0:10:00	40.3	38.1	0.9
8/10/2021 1:50	0:10:00	38.8	38.2	2.2
8/10/2021 2:00	0:10:00	38.3	37.7	2.7
8/10/2021 2:10	0:10:00	39.1	37.9	2.2
8/10/2021 2:20	0:10:00	38.6	37.7	2.7
8/10/2021 2:30	0:10:00	38.4	37.2	3.1
8/10/2021 2:40	0:10:00	39.1	38.6	2.7
8/10/2021 2:50	0:10:00	40.2	39.3	1.3
8/10/2021 3:00	0:10:00	40.6	39.8	1.3
8/10/2021 3:10	0:10:00	41.1	39.9	1.8
8/10/2021 3:20	0:10:00	42.1	40.3	2.2
8/10/2021 3:30	0:10:00	42.3	40.8	2.2
8/10/2021 3:40	0:10:00	42.9	42.0	1.8
8/10/2021 3:50	0:10:00	43.7	42.1	0.9

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/10/2021 4:00	0:10:00	42.5	41.6	1.3
8/10/2021 4:10	0:10:00	42.9	42.2	2.2
8/10/2021 4:20	0:10:00	42.9	41.7	1.8
8/10/2021 4:30	0:10:00	43.4	42.6	2.2
8/10/2021 4:40	0:10:00	44.2	43.1	2.2
8/10/2021 4:50	0:10:00	44.7	44.1	1.8
8/10/2021 5:00	0:10:00	44.6	43.6	1.8
8/10/2021 5:10	0:10:00	44.2	43.1	1.8
8/10/2021 5:20	0:10:00	42.9	41.1	2.2
8/10/2021 5:30	0:10:00	42.6	40.5	1.8
8/10/2021 5:40	0:10:00	39.7	36.3	2.2
8/10/2021 5:50	0:10:00	42.3	37.0	2.7
8/10/2021 6:00	0:10:00	56.5	33.3	1.8
8/10/2021 6:10	0:10:00	41.4	33.6	2.2
8/10/2021 6:20	0:10:00	35.1	32.9	2.2
8/10/2021 6:30	0:10:00	33.8	32.4	2.2
8/10/2021 6:40	0:10:00	34.9	32.2	1.8
8/10/2021 6:50	0:10:00	36.1	34.1	2.2
8/10/2021 7:00	0:10:00	38.6	32.6	2.7
8/10/2021 7:10	0:10:00	39.4	32.8	2.7
8/10/2021 7:20	0:10:00	37.8	34.8	3.1
8/10/2021 7:30	0:10:00	41.1	33.4	3.6
8/10/2021 7:40	0:10:00	45.8	35.8	3.6
8/10/2021 7:50	0:10:00	39.2	33.9	3.6
8/10/2021 8:00	0:10:00	32.9	31.7	3.1
8/10/2021 8:10	0:10:00	33.5	31.4	3.1
8/10/2021 8:20	0:10:00	33.2	30.4	1.8
8/10/2021 8:30	0:10:00	71.3	44.7	2.7
8/10/2021 8:40	0:10:00	37.5	31.5	2.7
8/10/2021 8:50	0:10:00	54	34.6	4
8/10/2021 9:00	0:10:00	36.3	33.3	3.6
8/10/2021 9:10	0:10:00	34.7	32.5	2.2
8/10/2021 9:20	0:10:00	38.9	34.5	2.2
8/10/2021 9:30	0:10:00	36.7	30.7	3.1
8/10/2021 9:40	0:10:00	33.8	30.2	3.6
8/10/2021 9:50	0:10:00	37.3	30.5	4
8/10/2021 10:00	0:10:00	35.5	30.6	3.6
8/10/2021 10:10	0:10:00	36	31.8	2.7
8/10/2021 10:20	0:10:00	38.4	30.2	2.7
8/10/2021 10:30	0:10:00	35.8	30.2	3.1
8/10/2021 10:40	0:10:00	32.8	30.1	2.7
8/10/2021 10:50	0:10:00	32.3	30.2	2.2
8/10/2021 11:00	0:10:00	34.4	30.5	3.1
8/10/2021 11:10	0:10:00	39.7	31.1	3.1
8/10/2021 11:20	0:10:00	41.2	32.7	3.1
8/10/2021 11:30	0:10:00	36.4	33.4	4
8/10/2021 11:40	0:10:00	33.7	31.9	3.1
8/10/2021 11:50	0:10:00	59	33.6	2.7
8/10/2021 12:00	0:10:00	42.9	34.6	2.2

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/10/2021 12:10	0:10:00	34.1	30.3	1.3
8/10/2021 12:20	0:10:00	33.4	30.5	1.8
8/10/2021 12:30	0:10:00	41.6	30.2	2.2
8/10/2021 12:40	0:10:00	33.5	31.2	1.8
8/10/2021 12:50	0:10:00	34	29.9	2.7
8/10/2021 13:00	0:10:00	30.2	29.5	2.7
8/10/2021 13:10	0:10:00	34.3	28.7	2.7
8/10/2021 13:20	0:10:00	34.8	31.0	4
8/10/2021 13:30	0:10:00	33.8	31.0	3.1
8/10/2021 13:40	0:10:00	31.4	30.0	3.6
8/10/2021 13:50	0:10:00	37.4	30.4	3.6
8/10/2021 14:00	0:10:00	32.6	29.5	2.7
8/10/2021 14:10	0:10:00	39.1	30.7	4
8/10/2021 14:20	0:10:00	37.3	30.7	4
8/10/2021 14:30	0:10:00	39.8	32.3	4
8/10/2021 14:40	0:10:00	41.4	33.4	3.6
8/10/2021 14:50	0:10:00	51.2	43.3	3.6
8/10/2021 15:00	0:10:00	57.2	43.1	2.2
8/10/2021 15:10	0:10:00	42	33.8	1.8
8/10/2021 15:20	0:10:00	35.3	32.0	2.2
8/10/2021 15:30	0:10:00	34.3	31.5	3.1
8/10/2021 15:40	0:10:00	42.7	34.7	2.2
8/10/2021 15:50	0:10:00	48	36.3	3.1
8/10/2021 16:00	0:10:00	53.1	34.6	3.1
8/10/2021 16:10	0:10:00	51.7	35.9	2.7
8/10/2021 16:20	0:10:00	36.6	32.9	1.3
8/10/2021 16:30	0:10:00	36.9	32.9	1.8
8/10/2021 16:40	0:10:00	39.6	32.5	2.2
8/10/2021 16:50	0:10:00	41.2	33.0	2.2
8/10/2021 17:00	0:10:00	39.8	32.2	2.2
8/10/2021 17:10	0:10:00	31.8	30.5	1.8
8/10/2021 17:20	0:10:00	35.8	31.2	2.2
8/10/2021 17:30	0:10:00	34.9	30.9	1.8
8/10/2021 17:40	0:10:00	35.8	32.6	1.3
8/10/2021 17:50	0:10:00	37.3	33.2	2.2
8/10/2021 18:00	0:10:00	35.4	33.1	2.2
8/10/2021 18:10	0:10:00	43.2	34.9	3.6
8/10/2021 18:20	0:10:00	39.2	35.6	3.1
8/10/2021 18:30	0:10:00	38.6	35.2	1.8
8/10/2021 18:40	0:10:00	42.6	36.0	0.9
8/10/2021 18:50	0:10:00	44.1	38.3	1.8
8/10/2021 19:00	0:10:00	58.9	40.4	2.2
8/10/2021 19:10	0:10:00	64.4	41.2	1.8
8/10/2021 19:20	0:10:00	54.3	40.7	2.7
8/10/2021 19:30	0:10:00	43.9	40.6	1.8
8/10/2021 19:40	0:10:00	43	40.5	1.3
8/10/2021 19:50	0:10:00	50.2	46.8	1.8
8/10/2021 20:00	0:10:00	44.5	40.5	1.8
8/10/2021 20:10	0:10:00	41.6	39.2	2.2

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/10/2021 20:20	0:10:00	41.5	40.3	0.9
8/10/2021 20:30	0:10:00	41.7	40.3	1.3
8/10/2021 20:40	0:10:00	40.2	39.6	1.3
8/10/2021 20:50	0:10:00	40.7	40.0	1.3
8/10/2021 21:00	0:10:00	46.5	39.8	1.3
8/10/2021 21:10	0:10:00	47.9	40.7	1.3
8/10/2021 21:20	0:10:00	51.3	40.3	1.3
8/10/2021 21:30	0:10:00	51	40.2	1.8
8/10/2021 21:40	0:10:00	42	41.1	1.3
8/10/2021 21:50	0:10:00	41.9	41.1	1.3
8/10/2021 22:00	0:10:00	43.8	40.6	0.9
8/10/2021 22:10	0:10:00	47.6	40.7	2.7
8/10/2021 22:20	0:10:00	45.9	40.6	2.7
8/10/2021 22:30	0:10:00	48.3	40.0	3.1
8/10/2021 22:40	0:10:00	40	39.1	2.2
8/10/2021 22:50	0:10:00	44.2	39.1	3.1
8/10/2021 23:00	0:10:00	41.3	39.6	3.1
8/10/2021 23:10	0:10:00	41.2	40.1	2.2
8/10/2021 23:20	0:10:00	41.3	40.4	2.7
8/10/2021 23:30	0:10:00	40.2	39.6	2.7
8/10/2021 23:40	0:10:00	40.2	39.7	3.1
8/10/2021 23:50	0:10:00	41.2	39.0	2.7
8/11/2021 0:00	0:10:00	39.7	39.1	3.1
8/11/2021 0:10	0:10:00	40.1	39.5	3.1
8/11/2021 0:20	0:10:00	39.8	39.4	3.1
8/11/2021 0:30	0:10:00	40.5	39.8	2.7
8/11/2021 0:40	0:10:00	41.6	40.3	1.8
8/11/2021 0:50	0:10:00	40.3	39.8	1.8
8/11/2021 1:00	0:10:00	47.6	40.1	3.6
8/11/2021 1:10	0:10:00	41	39.7	3.1
8/11/2021 1:20	0:10:00	41.1	40.2	4.5
8/11/2021 1:30	0:10:00	41.3	40.4	3.6
8/11/2021 1:40	0:10:00	41.2	39.7	3.1
8/11/2021 1:50	0:10:00	42.5	41.0	2.7
8/11/2021 2:00	0:10:00	41.9	41.1	2.7
8/11/2021 2:10	0:10:00	41.7	40.7	2.7
8/11/2021 2:20	0:10:00	41.7	40.8	3.1
8/11/2021 2:30	0:10:00	41.8	40.7	4
8/11/2021 2:40	0:10:00	41.9	41.1	3.1
8/11/2021 2:50	0:10:00	42.2	41.1	2.7
8/11/2021 3:00	0:10:00	42.5	41.1	1.8
8/11/2021 3:10	0:10:00	41.7	40.8	1.8
8/11/2021 3:20	0:10:00	42.9	40.8	1.8
8/11/2021 3:30	0:10:00	40.5	39.0	3.1
8/11/2021 3:40	0:10:00	43.9	41.9	3.1
8/11/2021 3:50	0:10:00	43.7	42.6	3.1
8/11/2021 4:00	0:10:00	44.1	43.3	2.2
8/11/2021 4:10	0:10:00	44.7	44.1	1.3
8/11/2021 4:20	0:10:00	44.4	44.0	2.7

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/11/2021 4:30	0:10:00	44.1	42.4	2.7
8/11/2021 4:40	0:10:00	43.6	42.9	3.6
8/11/2021 4:50	0:10:00	43.6	42.7	2.7
8/11/2021 5:00	0:10:00	43.7	42.7	0.9
8/11/2021 5:10	0:10:00	43.9	42.9	0.9
8/11/2021 5:20	0:10:00	44.1	42.0	1.3
8/11/2021 5:30	0:10:00	41.4	39.8	0.9
8/11/2021 5:40	0:10:00	40.4	38.8	2.7
8/11/2021 5:50	0:10:00	38	36.0	3.1
8/11/2021 6:00	0:10:00	40.7	35.0	3.1
8/11/2021 6:10	0:10:00	38.3	34.2	3.1
8/11/2021 6:20	0:10:00	39	34.0	4
8/11/2021 6:30	0:10:00	45.2	35.7	4.5
8/11/2021 6:40	0:10:00	38.4	34.9	4
8/11/2021 6:50	0:10:00	37.3	35.5	4.5
8/11/2021 7:00	0:10:00	37.6	34.6	4
8/11/2021 7:10	0:10:00	43.6	46.4	4.9
8/11/2021 7:20	0:10:00	39.5	34.9	4
8/11/2021 7:30	0:10:00	41.4	35.3	3.1
8/11/2021 7:40	0:10:00	39.3	35.3	3.1
8/11/2021 7:50	Change battery and set a new record			3.1
8/11/2021 8:00				3.1
8/11/2021 8:10	0:10:00	52.9	38.2	3.1
8/11/2021 8:20	0:10:00	39.7	33.0	2.2
8/11/2021 8:30	0:10:00	40.4	32.4	2.7
8/11/2021 8:40	0:10:00	35.5	33.2	2.7
8/11/2021 8:50	0:10:00	35.3	32.0	3.1
8/11/2021 9:00	0:10:00	36.6	32.4	2.7
8/11/2021 9:10	0:10:00	35.6	32.6	2.7
8/11/2021 9:20	0:10:00	36.4	30.8	3.1
8/11/2021 9:30	0:10:00	37.7	31.5	3.1
8/11/2021 9:40	0:10:00	37.1	32.2	2.7
8/11/2021 9:50	0:10:00	34.2	33.2	3.6
8/11/2021 10:00	0:10:00	35.5	34.0	2.7
8/11/2021 10:10	0:10:00	37.3	34.5	2.2
8/11/2021 10:20	0:10:00	36.2	34.2	3.1
8/11/2021 10:30	0:10:00	36.2	33.6	3.1
8/11/2021 10:40	0:10:00	41.7	33.0	2.2
8/11/2021 10:50	0:10:00	36.6	33.2	1.8
8/11/2021 11:00	0:10:00	36.3	33.8	2.2
8/11/2021 11:10	0:10:00	35.5	32.9	2.7
8/11/2021 11:20	0:10:00	34.2	32.5	1.3
8/11/2021 11:30	0:10:00	34.9	31.6	2.7
8/11/2021 11:40	0:10:00	43.5	34.5	2.2
8/11/2021 11:50	0:10:00	36.3	32.8	3.6
8/11/2021 12:00	0:10:00	38.8	32.2	1.8
8/11/2021 12:10	0:10:00	33.9	31.9	1.8
8/11/2021 12:20	0:10:00	41	33.5	3.1
8/11/2021 12:30	0:10:00	48.1	34.1	3.6

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/11/2021 12:40	0:10:00	34.5	30.7	2.7
8/11/2021 12:50	0:10:00	34.7	33.5	1.8
8/11/2021 13:00	0:10:00	39.7	30.4	2.7
8/11/2021 13:10	0:10:00	34.7	32.1	2.7
8/11/2021 13:20	0:10:00	34.6	30.6	2.2
8/11/2021 13:30	0:10:00	34.5	32.2	2.7
8/11/2021 13:40	0:10:00	38.5	33.9	2.7
8/11/2021 13:50	0:10:00	38	33.2	3.6
8/11/2021 14:00	0:10:00	37.2	31.4	4
8/11/2021 14:10	0:10:00	36.8	33.6	3.1
8/11/2021 14:20	0:10:00	36.1	33.9	4
8/11/2021 14:30	0:10:00	43.6	34.3	3.6
8/11/2021 14:40	0:10:00	36.1	34.8	3.1
8/11/2021 14:50	0:10:00	36	34.1	2.7
8/11/2021 15:00	0:10:00	35.6	33.4	3.6
8/11/2021 15:10	0:10:00	38.3	35.4	3.1
8/11/2021 15:20	0:10:00	45.4	35.0	3.1
8/11/2021 15:30	0:10:00	38	34.6	2.2
8/11/2021 15:40	0:10:00	44.1	36.1	2.7
8/11/2021 15:50	0:10:00	36.1	33.5	3.1
8/11/2021 16:00	0:10:00	43.5	33.4	2.2
8/11/2021 16:10	0:10:00	39.1	33.6	2.2
8/11/2021 16:20	0:10:00	38.3	33.6	3.1
8/11/2021 16:30	0:10:00	40	33.3	2.2
8/11/2021 16:40	0:10:00	41.4	33.9	1.8
8/11/2021 16:50	0:10:00	42.7	33.1	0.9
8/11/2021 17:00	0:10:00	40.4	32.4	1.8
8/11/2021 17:10	0:10:00	37	29.9	2.2
8/11/2021 17:20	0:10:00	30.8	29.0	2.7
8/11/2021 17:30	0:10:00	35.9	31.6	2.2
8/11/2021 17:40	0:10:00	44	33.4	2.7
8/11/2021 17:50	0:10:00	35	31.6	2.7
8/11/2021 18:00	0:10:00	33.3	30.6	2.7
8/11/2021 18:10	0:10:00	34.7	33.6	1.8
8/11/2021 18:20	0:10:00	35.7	34.3	1.3
8/11/2021 18:30	0:10:00	35.8	34.6	0.9
8/11/2021 18:40	0:10:00	43.6	33.8	0.9
8/11/2021 18:50	0:10:00	39.2	36.9	1.3
8/11/2021 19:00	0:10:00	39.4	36.3	1.8
8/11/2021 19:10	0:10:00	39.2	37.8	0.9
8/11/2021 19:20	0:10:00	40.1	39.3	1.3
8/11/2021 19:30	0:10:00	39.9	38.6	2.7
8/11/2021 19:40	0:10:00	40.2	39.0	2.2
8/11/2021 19:50	0:10:00	39.4	38.7	2.2
8/11/2021 20:00	0:10:00	39.7	38.4	1.3
8/11/2021 20:10	0:10:00	44.3	38.8	2.2
8/11/2021 20:20	0:10:00	48.9	48.1	2.7
8/11/2021 20:30	0:10:00	49.4	38.7	1.8
8/11/2021 20:40	0:10:00	45.5	37.1	2.2

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/11/2021 20:50	0:10:00	45.9	37.4	1.8
8/11/2021 21:00	0:10:00	39.7	37.4	2.2
8/11/2021 21:10	0:10:00	37.9	37.4	2.7
8/11/2021 21:20	0:10:00	39.9	38.5	2.7
8/11/2021 21:30	0:10:00	38.4	37.8	2.7
8/11/2021 21:40	0:10:00	42.4	38.7	2.7
8/11/2021 21:50	0:10:00	39.1	38.7	2.7
8/11/2021 22:00	0:10:00	39.7	38.5	1.8
8/11/2021 22:10	0:10:00	41	39.1	2.7
8/11/2021 22:20	0:10:00	40.1	39.7	2.2
8/11/2021 22:30	0:10:00	42.3	39.3	0.9
8/11/2021 22:40	0:10:00	41.1	39.2	1.3
8/11/2021 22:50	0:10:00	39.9	39.3	1.3
8/11/2021 23:00	0:10:00	39.8	39.3	1.3
8/11/2021 23:10	0:10:00	39.5	39.1	1.3
8/11/2021 23:20	0:10:00	39.4	38.9	0.9
8/11/2021 23:30	0:10:00	39.4	39.1	0.4
8/11/2021 23:40	0:10:00	40.6	39.2	1.3
8/11/2021 23:50	0:10:00	39.8	39.2	0.9
8/12/2021 0:00	0:10:00	39.2	38.6	1.3
8/12/2021 0:10	0:10:00	43.2	39.5	1.3
8/12/2021 0:20	0:10:00	39.9	38.7	1.3
8/12/2021 0:30	0:10:00	39.4	38.9	1.8
8/12/2021 0:40	0:10:00	39.2	37.9	1.8
8/12/2021 0:50	0:10:00	40.3	39.5	2.7
8/12/2021 1:00	0:10:00	39.8	39.1	2.2
8/12/2021 1:10	0:10:00	39.8	39.1	1.8
8/12/2021 1:20	0:10:00	39.7	38.7	1.8
8/12/2021 1:30	0:10:00	39.6	38.3	1.8
8/12/2021 1:40	0:10:00	38.5	37.5	2.2
8/12/2021 1:50	0:10:00	39.1	38.2	1.8
8/12/2021 2:00	0:10:00	40	39.1	2.2
8/12/2021 2:10	0:10:00	39.4	38.9	3.1
8/12/2021 2:20	0:10:00	39.4	38.6	2.7
8/12/2021 2:30	0:10:00	40.2	38.3	2.2
8/12/2021 2:40	0:10:00	38.1	37.3	1.8
8/12/2021 2:50	0:10:00	42.9	38.8	1.3
8/12/2021 3:00	0:10:00	52.1	44.9	2.2
8/12/2021 3:10	0:10:00	50.2	40.4	2.2
8/12/2021 3:20	0:10:00	44.2	41.5	1.8
8/12/2021 3:30	0:10:00	45.1	40.8	2.2
8/12/2021 3:40	0:10:00	42.8	39.9	3.1
8/12/2021 3:50	0:10:00	45.8	42.4	4.9
8/12/2021 4:00	0:10:00	44.1	43.0	4.5
8/12/2021 4:10	0:10:00	44.2	43.6	4
8/12/2021 4:20	0:10:00	44.8	43.7	3.1
8/12/2021 4:30	0:10:00	45	43.8	3.6
8/12/2021 4:40	0:10:00	44.3	43.7	2.2
8/12/2021 4:50	0:10:00	44.5	42.9	1.8

Start Time	Elapsed Time	LAeq	LA 90	Wind Speed H=10m
8/12/2021 5:00	0:10:00	42.8	42.5	1.3
8/12/2021 5:10	0:10:00	42.6	42.0	1.8
8/12/2021 5:20	0:10:00	44.4	42.5	1.8
8/12/2021 5:30	0:10:00	42.9	41.2	0.4
8/12/2021 5:40	0:10:00	40.4	38.8	0.4
8/12/2021 5:50	0:10:00	38.9	36.8	0.9
8/12/2021 6:00	0:10:00	37.8	33.9	1.3
8/12/2021 6:10	0:10:00	46.7	33.9	0.4
8/12/2021 6:20	0:10:00	38.7	31.4	0.4
8/12/2021 6:30	0:10:00	37.1	33.2	1.3
8/12/2021 6:40	0:10:00	35	33.0	1.3
8/12/2021 6:50	0:10:00	36.8	32.5	1.3
8/12/2021 7:00	0:10:00	34.7	32.7	2.2
8/12/2021 7:10	0:10:00	39.7	31.0	2.7
8/12/2021 7:20	0:10:00	38	32.0	3.1
8/12/2021 7:30	0:10:00	35.6	32.1	2.2
8/12/2021 7:40	0:10:00	36	31.6	1.8
8/12/2021 7:50	0:10:00	34.2	32.6	2.7
8/12/2021 8:00	0:10:00	38.9	33.0	3.1
8/12/2021 8:10	0:10:00	35	31.5	2.7
8/12/2021 8:20	0:10:00	35	30.8	3.1
8/12/2021 8:30	0:10:00	35.3	30.2	2.2
8/12/2021 8:40	0:10:00	35	31.3	2.7
8/12/2021 8:50	0:10:00	32.3	30.1	2.2
8/12/2021 9:00	0:10:00	34.1	31.4	3.6
8/12/2021 9:10	0:10:00	40.1	32.6	3.6
8/12/2021 9:20	0:10:00	37.3	32.1	2.7
8/12/2021 9:30	0:10:00	35.9	31.5	2.7
8/12/2021 9:40	0:10:00	36.7	30.9	2.7
8/12/2021 9:50	0:10:00	35.5	31.4	3.1
8/12/2021 10:00	0:10:00	34.2	30.8	3.6
8/12/2021 10:10	0:10:00	41.2	30.1	3.1
8/12/2021 10:20	0:10:00	41.2	31.8	3.1
8/12/2021 10:30	0:10:00	44.2	30.3	4
8/12/2021 10:40	0:10:00	41.9	35.4	1.8
8/12/2021 10:50	0:10:00	32.3	29.0	2.2
8/12/2021 11:00	0:10:00	31.2	29.7	2.2
8/12/2021 11:10	0:10:00	52.2	30.7	2.7
8/12/2021 11:20	0:10:00	38.7	29.0	3.1
8/12/2021 11:30	0:10:00	33.1	29.7	1.8
8/12/2021 11:40	0:10:00	33.4	30.9	2.2