



**FORMOSA 2**

海能風力發電股份有限公司

## Formosa 2 Offshore Wind Farm Project

### Summary Environment & Social Impact Assessment

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## REVISION RECORD SHEET

Rev	Purpose	List of Updated/Modified sections
0	Issued for review	
1	Revision for internal review	Section 1.0 Introduction Section 2.0 Project description Section 3.0 Policy, legal and administrative framework Section 4.0 Description of the baseline Section 5.0 Anticipated E&S impacts and mitigation measures Section 6.0 E&S management plan Section 7.0 Information disclosure, consultation and participation Section 8.0 Grievance redress mechanism Section 9.0 Conclusion and recommendation

## HOLDS LIST

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**GLOSSARY**

<b>Aol</b>	Area of influence
<b>CESMP</b>	Construction environmental and social management plan
<b>COD</b>	Commercial Operation Date
<b>EHS</b>	Environmental, health and safety
<b>EIA</b>	Environmental impact assessment
<b>EPs</b>	Equator principles
<b>ESIA</b>	Environmental and social impact assessment
<b>ESMS</b>	Environmental and social management plan
<b>ETS</b>	Eastern Taiwanese Straits
<b>GIIP</b>	Good international industry practice
<b>HSE</b>	Health, safety and environmental
<b>IFC</b>	International Finance Corporation
<b>IUCN</b>	International Union for Conservation of Nature
<b>KBA</b>	Key Biodiversity Area
<b>MNOs</b>	Marine Mammal Observers
<b>OESMP</b>	Operation environmental and social management plan
<b>OSS</b>	Offshore Substation
<b>PSs</b>	Performance Standards
<b>SEP</b>	Stakeholder engagement plan
<b>WBG</b>	World Bank Group
<b>WMP</b>	Waste management plan
<b>WTG</b>	Wind turbine generator

## ESIA Summary

### 1.0 INTRODUCTION

#### 1.1 Overview

This Environmental and Social Impact Assessment (ESIA) Summary (also referred to as a Non-Technical Summary or NTS) presents the main findings and conclusions of the relevant environmental and social studies that have been undertaken for the proposed Formosa 2 Offshore Wind Farm (the “Project” or “FOW2”), which is being developed by Swancor Renewable Energy Co. and Macquarie Corporate Holdings Pty Limited (collectively referred to as the “Sponsors”) through special purpose vehicle Formosa 2 Wind Power Co., Ltd (“Formosa 2”).

The Project involves the development, construction, commissioning, ownership, operation and maintenance of an offshore wind power generation facility, with a capacity of 376MW which will include 47 units of wind turbine generators (WTGs) and its related infrastructure located off the north-western coast of Taiwan, near Zhunan Town, Miaoli County.

An overview of the Project is presented in Table 1.

**Table 1: Project Overview**

<b>Project name</b>	Formosa 2 Offshore Wind Farm
<b>Project sponsors</b>	Swancor Renewable Energy Co. and Macquarie Corporate Holdings Pty Limited
<b>Project company</b>	Formosa 2 Wind Power Co., Ltd
<b>Location</b>	North-western coast of Taiwan, near Zhunan Town, Miaoli County
<b>Project capacity</b>	376MW; 47 units of WTGs

#### 1.2 Purpose of the Project

Taiwan’s energy sector is faced with several long-term, on-going issues that the government is seeking to address including:

- Expected increase in demand for energy – Taiwan’s economic structure is based on international trade, with more than half of its electricity consumption attributed to trade-related production activities. Since trade is strongly reliant on energy-intensive industries, it is unlikely that there will be a meaningful reduction in energy consumption in the short-term
- Energy security – As a country, Taiwan does not have any significant source of local fuel. As of 2014, Taiwan imported 98% of all its fuel supply (for energy production)

through procurement of coal, oil, petrol and their related products as well as nuclear fuel<sup>1</sup>

- Decommissioning of nuclear power plants – In 2014, nuclear power accounted for 8.3% of Taiwan’s energy supply.<sup>1</sup> Progressively within the next 10 years, four of the six currently operational reactors<sup>2</sup> have been scheduled to be decommissioned.<sup>3</sup> In addition, the commissioning of the completed nuclear plant, Lungmen Nuclear Power Plant (龍門核能發電廠), was halted (pending decision via a proposed referendum) in April 2014 due to political and public opposition over safety concerns

Increasing supply from renewable energy sources has been recognised as a key component in resolving the aforementioned challenges. A renewable energy project such as the FOW2 would assist in addressing Taiwan’s dependency on imported energy sources, whilst increasing energy supply.

### 1.3 Relevant documentation

To fully assess the potential environmental and social impacts of the Project, several studies have been undertaken to date and have been referenced in this document. These studies as well as relevant management plans are listed in Table 2.

**Table 2: Environmental and social documentation completed as of August 2019**

Assessment or study	Date completed
環境影響說明書（定稿本）- Environmental Impact Assessment (Full)	16 May 2018
Draft Environmental social management system (ESMS)	13 February 2019
Draft Stakeholder Engagement Plan (SEP)	7 June 2019
Community Health and Safety Plan	3 December 2018
Integrated Bird Report (North)	September 2018
鳥類調查報告 - Birds investigation report	August 2018
Environmental Monitoring Report (April to June 2018)	July 2018
Other relevant documents:	As indicated
<ul style="list-style-type: none"> <li>• Acknowledgment of the EIA received by Taiwan EPA (30 May 2018)</li> <li>• Comments on permits application from Miao Li County (06 July 2018)</li> </ul>	

<sup>1</sup> As retrieved in May 2016, from Ministry of Economic Affairs at: <https://web3.moeaboe.gov.tw/>

<sup>2</sup> The four reactors have a total capacity of 3,178 MW, which is 60% of the total current nuclear power capacity (i.e. 5,080MW).

<sup>3</sup> Decommissioning schedule: Jinshan Nuclear Power Plant (金山核能發電廠) – Unit 1 in December 2018 and Unit 2 in July 2019; Kuosheng Nuclear Power Plant (國聖核能發電廠) – Unit 1 in 2021 and Unit 2 in 2023.



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| <ul style="list-style-type: none"> <li>• Approval of the project from Nanlong Fishery Association and Miao Li County, and comments on fishermen compensation from agriculture communities (04 September 2018)</li> <li>• Fishery Agency Consent – Conditions (2 November 2018)</li> <li>• Formosa 2 CAPEX Programme (30 November 2018)</li> <li>• Formosa 2 Organisational chart (5 December 2018)</li> <li>• Formosa 2 Environmental policy (21 January 2019)</li> </ul> |  |
|---|--|

The Project's Environmental Impact Assessment (EIA) has been approved by the Taiwan EPA as of 16 May 2018 as per EPA approval letter number 1070038491.<sup>4</sup>

### 1.4 Objective of the ESIA Summary

The primary objective of this ESIA Summary is to provide an outline of the information provided in the Project's approved EIA, dated May 2018 and supporting environmental and social (E&S) management plans such as:

- Environmental social management system (ESMS)
- Stakeholder engagement plan (SEP)
- Community health and safety plan
- First EIA Deviation Report
- Health and safety plan
- Management plans relating to E&S and biodiversity management

The supporting E&S management plans shall be subjected to regular review and updates as the Project progresses. This framework of documents will ensure that the Project is in line with the Applicable Standards of the Project as described in Section 3.0.

### 1.5 Project information

This ESIA Summary will be publicly disclosed in line with the requirements of the Project's Lenders. A full copy of the documents referred herein may be provided upon request. Public consultation and disclosure activities are ongoing and will continue to be conducted by the Project Company throughout the life of the Project as major changes or amendments are made to the project design that may result in new or additional potential impacts that have not been otherwise previously assessed and disclosed.

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<sup>4</sup> EPA approval letter number 1070038491 can be found on <https://www.epa.gov.tw/DisplayFile.aspx?FileID=78777BB3A994E9EC&P=79775a31-bb4e-4df5-bb24-4908a4c6374f>





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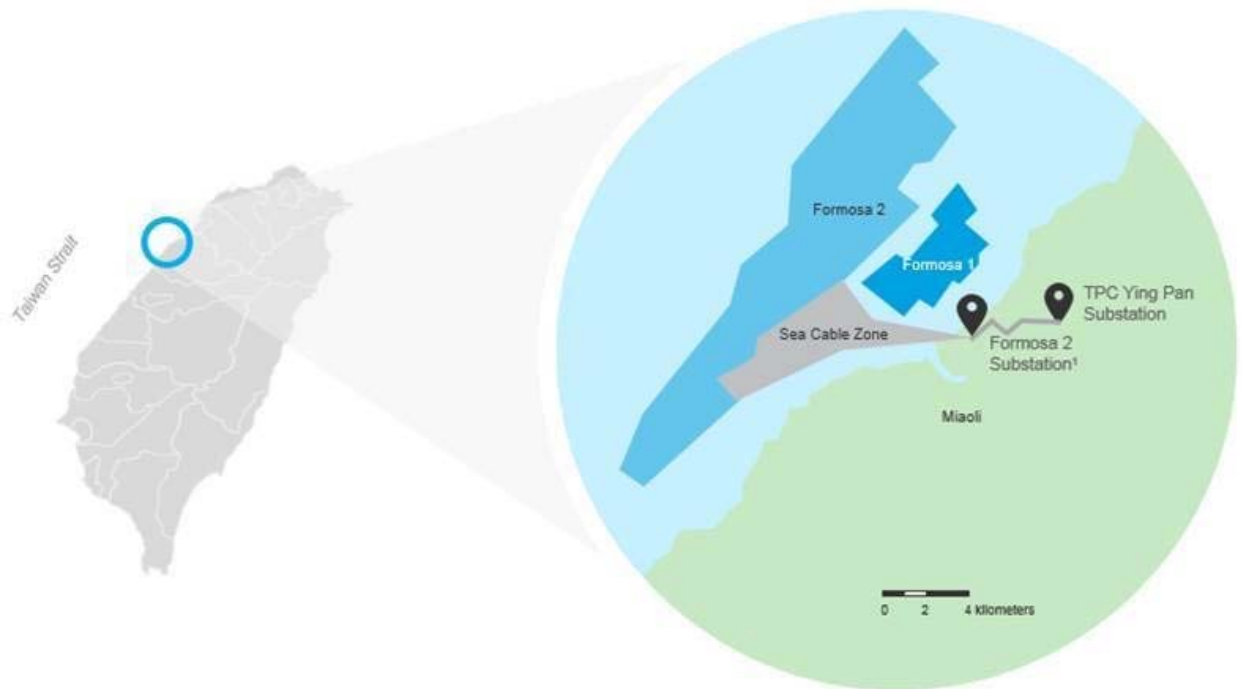
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## 2.0 PROJECT DESCRIPTION

The Formosa 2 Offshore Wind Farm Project is being developed by Swancor Renewable Energy Co. and Macquarie Capital (the “Sponsors”) through its special purpose company Formosa 2 Wind Power Co., Ltd. The Project is comprised of two zones (i.e. #5 and #6) from the 36 zones of identified potential concessions, as part of the government’s initiative known as the “Offshore Zonal Development Phase of Taiwan’s Thousand Turbines Project”. FOW2 is located near Formosa 1 Offshore Wind Farm Project (“Formosa 1”) as can be seen in Figure 1.

The Project is registered as the applicant of zone #5 & #6 with the Bureau of Energy (BOE) since November 2016 and has successfully passed the Environmental Impact Assessment (EIA) committee review in 2018. The Project has also successfully passed the system impact analysis (SIA) with Taipower YingPan substation for a total project capacity of 376 MW.

The location of the project is shown in Figure 1 below.



**Figure 1 : Map of FOW2 wind farm and onshore substation**

Project components in planning as listed as such:

- 47 units of offshore WTGs (with capacity 376MW)
- Project step-up substation (66 kV to 161kV)
- 66 kV sea cable (submarine) cables and land cables alignment

The water depth on site ranges from 30 to 55 metres, with the wind turbine generators (WTGs) to be set in the range of 35 to 55 meters. The total area of the offshore WTG area



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is 68.68 km<sup>2</sup> and located 3.8 to 9.5 km from the nearest shoreline. WTGs with capacity of 8 MW are chosen for FOW2, with 47 WTGs to be installed.

No Offshore Substation (OSS) planned to be installed on site. The WTGs will be connected via 66 kV submarine cables which will then be extended to shore for onshore grid connection.

An onshore substation with an estimated footprint of 600m<sup>2</sup> will be constructed to allow power to be transformed from 66kV to 161kV before being transported to the existing Yingpan substation. Land for the onshore substation was privately owned agricultural land but has been bought by the FOW2 to construct the onshore substation.

The planned land cable route has an estimated total length of 4.8km and will utilise publicly owned roads and open cut/cover burial construction methods.

The commercial operation date (COD) for the Project is end of 2021.

The Project seeks to be financed by Equator Principles Finance Institutions (EPFIs) and, as such, it is required to comply with the Equator Principles (EP). As per Principle 1: Review and Categorisation of EPs III (2013), the Project falls under Category A particularly "Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented".

### 3.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

FOW2 shall comply with the requirements of the laws and regulations of Taiwan and the requirements of the approved EIA, as well as the international standards and guidelines provided in Section 3.2.

#### 3.1 National legislation and policy framework

Taiwan's EIA Act (環境影響評估法), which was promulgated on 30 December 1994 and amended on 1 August 2018, governs the EIA process in Taiwan which requires a project proponent to undertake an EIA when it is to have the potential to cause potentially significant environmental and social impact. The administration of the EIA approval and related matters are under the purview of the Environmental Protection Administration (EPA). Detailed EPA procedures and implementation guidelines include:

- Implementation Rules for the EIA Act (環境影響評估法施行細則) (amended on 11 April 2018)
- Environmental Impact Assessment Items and Screening Criteria for Development Activities (開發行為應實施環境影響評估細目及範圍認定標準) (amended on 11 April 2018)
- Guidelines for Conducting Environmental Impact Assessment for Development Activities (開發行為環境影響評估作業準則) (amended 8 December 2017)

Under the screening criteria mentioned above, in terms of development type, offshore windfarms (風力發電離岸系統) are listed as an activity which requires the preparation and submission of an EIA. FOW2 has complied with the requirements of the laws and regulations of Taiwan and the requirements of the approved EIA.

The ecological surveys and assessment within the EIA were conducted in accordance with the below listed specifications as published by the Environmental Protection Administration Executive Yuan, R.O.C (Taiwan) (Taiwan EPA):

- Technical Specifications for Animal Ecology Assessment (動物生態評估技術規範)
- Technical Specifications for Plant Ecology Assessment (植物生態評估技術規範)
- Technical Specifications for Marine Ecology Assessment (海洋生態評估技術規範)

In addition to the overarching EIA act, national legislation in relation to biodiversity applicable to the purpose of this BMP includes the following key laws and regulation:

- Wetland Conservation Act of Taiwan (濕地保育法) (promulgated on 3 July 2013),
- Wildlife Conservation Act of Taiwan (野生動物保育法) (amended on 23 January 2013)
- Forestry Act (森林法) (amended on 30 November 2016)
- National Park Act (國家公園法) (amended on 8 December 2010)

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In addition, with regard to compensation to fishermen affected by the Project, FOW2 will organise symposium/discussion sessions with local fisherman to achieve mutual agreement. Fishery compensation will be in accordance with the Fisheries Right Compensation Benchmark for Offshore Windfarm (2016) of the Fishery Agency of Republic of China (Taiwan). This benchmark provides formulas to calculate compensation for loss of access to areas of exclusive fishing rights. It incorporates losses based on historical fish yields, additional fuel for accessing new areas, differentiated considerations for submarine cables and other similar factors. The calculated loss is then be used as a basis to commence negotiations with the fishing association, in this case the Nanlong Fishery Association (NFA).

### **3.2 International standards and guidelines**

FOW2 is committed to comply with the following Applicable Standards:

- Equator Principles (EP) III (2013)
- International Finance Corporation (IFC) Performance Standards (PS) (2012)
- World Bank Group (WBG) Environmental Health and Safety (EHS) General Guidelines (2007) and sector-specific EHS guidelines, which include:
  - WBG EHS Wind Energy Guidelines (2015)
  - WBG EHS Guidelines for Electric Power Transmission and Distribution Guidelines (2007)

#### 4.0 DESCRIPTION OF THE BASELINE

Baseline studies for various E&S aspects were conducted between 2015 to 2016 as part of the approved local EIA conducted for the Project. In addition to the approved EIA, an 1<sup>st</sup> EIA deviation report<sup>5</sup> was produced which included additional E&S baseline studies. A summary of the E&S baseline studies undertaken are presented in Appendix C.

#### 4.1 Environmental baseline

Baseline studies of various environmental parameters that are most relevant to the Project within the context of potential environmental impacts. These include studies on air quality, underwater noise, air-borne noise, low frequency noise, vibration, surface water quality groundwater quality and electromagnetic field, which were conducted between 2015 and 2016 as part of the EIA approval process and documented in the Project's EIA document. In addition, additional baseline surveys for selected environmental parameters were conducted in 2018 and reported within the 1<sup>st</sup> EIA deviation report.

Environmental baseline surveys conducted are summarized within Table 12 of Appendix C. A summary of general environmental baseline conditions is presented in Table 3.

**Table 3: Environmental baseline summary**

Environmental aspect	Summary of baseline conditions
Air quality	Baseline air pollutant concentrations and the background air quality within the area of influence of the Project are below the maximum limits based on national air quality standards.
Noise and vibration	<p><u>Air-borne noise</u> Baseline air-borne noise levels are within the local Taiwanese standards at potential residential receptors, major roads to be utilised by the Project and the vicinity of the proposed substation.</p> <p><u>Underwater noise</u> Baseline underwater noise levels are typically contributed by fishing activities and noise generated by fishing vessels. Another contributing noise source is from marine lifeforms. It is to be noted that there are no prescribed local Taiwanese standards for underwater noise levels.</p> <p><u>Low frequency noise</u> Baseline low frequency noise levels are within the local Taiwanese standards at potential impact receptors</p>
Surface water quality	Baseline surface water quality was determined at various waterbodies (eg Zhunan artificial wetlands, various river basin and discharge channels) around the Project. The results indicate compliance with local Taiwanese standards.

<sup>5</sup> Formosa 2 offshore wind farm 1<sup>st</sup> EIA deviation report F2-PER-DEV-UNI-CS-EN-00001 (海能離岸風力發電計畫環境影響差異分析報告 - 第一次變更) dated April 2019

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Groundwater quality	Baseline studies groundwater quality and water levels were mainly based on local Taiwanese historical records. Records indicated minimum fluctuations for groundwater water levels and groundwater quality are generally within local Taiwanese standards.
Electromagnetic field	Baseline EMF emissions were determined at potential residential receptors, various locations along the land cable alignment (including a nursery) and at the proposed substation. The results indicate compliance and are well below with local Taiwanese standards. The Project has not identified other sources of EMF during the Project baseline study.
Biodiversity	<p>The Project is not situated within any area gazetted as national important wetland, forest or marine conservation area, or any wildlife important habitat. However, there are nature conservation areas close to the Project area such as the following:</p> <ul style="list-style-type: none"> <li>• Xihu Important Wetland (西湖國家級重要濕地) which is situated approximately 3km south-east of the Project</li> <li>• Proposed “Major habitat area” (MHA) for the Eastern Taiwanese Straits (ETS) sub-population of Indo-pacific humpback dolphin, which is situated approximately 1.5km east of the Project, along the west coast.</li> </ul> <p>Field surveys conducted as part of the EIA includes terrestrial ecology, intertidal ecology and marine ecology. The surveys conducted to date have been summarized in Table 13 of Appendix C and survey routes are in Appendix A. Migratory birds and the ETS Indo-pacific humpback dolphins are likely to be species of conservation concern. Baseline bird survey results indicate that a variety of migratory bird species was observed within the offshore windfarm footprint. Migratory birds have been identified to be vulnerable to collision with WTG blades due to high nocturnal activity through southwest of the FOW2’s offshore WTG footprint towards land. The ETS Indo-pacific humpback dolphin has a confined habitat distribution east of the Project close to the coastline. Further details of migratory birds and the ETS Indo-pacific humpback dolphin can be referred to in the biodiversity related management plans.</p> <p>The site of the onshore substation has low diversity and has been mostly cleared due to works already done for the Formosa 1 project. Land use surrounding the planned land cable route is generally agricultural land, abandoned land and windbreaks with a considerable proportion of naturalised (exotic) species and cultivated species.</p>

## 4.2 Social baseline

Social baseline conditions for the Project are presented in Table 4. More details can be found in the Project’s Stakeholder Engagement Plan (SEP), which was prepared to comply with the requirements of EP and IFC PS.

**Table 4: Social baseline summary**

Social aspect	Summary of baseline conditions
Key stakeholders	<p>The main affected communities identified to be impacted by the Project are within Miaoli County (苗栗縣), where the nearest coastline is located, covering the following townships:</p> <ul style="list-style-type: none"> <li>• Zhunan Township (竹南鎮), where the land cables and onshore transformer substation are proposed</li> <li>• Houlong Township (後龍鎮), which is immediately south of Zhunan</li> </ul> <p>The offshore Project area is partially within the exclusive fishing grounds for the Nanlong Fishermen Association (南龍區漁會) (NFA) (which is made up of fishermen from both Zhunan and Houlong townships). In addition to the regulatory requirement to ensure that agreements are in place with the fishermen association in advance of the works, the Project team recognises that these fishermen will be the main affected group throughout the Project construction and operational life. It is important to the Project to establish and maintain a positive relationship with the fisherman and the</p>



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	fisheries association and to work with them to address impacts associated with the development as far as possible.
Involuntary resettlement	The implementation of the Project will not result in resettlement.
Indigenous people	This Project was not identified to pose particular risks or impacts to indigenous people. No stakeholder engagement activities specific to indigenous people were deemed to be required or have been undertaken.

### Stakeholder engagement

Several engagement activities have been undertaken with stakeholders as described and summarised in Table 14 in Appendix C. Stakeholder engagement activities regarding project changes as documented within the 1<sup>st</sup> EIA deviation report have also been summarised in





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Table 15 of Appendix C. Generally, the most significant concern raised during stakeholder engagement activities is related to the disturbance and disruption of fishing activities within the project area, as the area will no longer be accessible to fisherfolk when the Project is constructed.

### **Public disclosure**

Information about the Project has been disclosed via public consultation activities, meetings and the Taiwan EIA website. Table 14 in Appendix C provides an overview of the public and private meetings, interviews and focus group discussions to date conducted in relation to information disclosure about land acquisition procedures and the EIA process.

## 5.0 ANTICIPATED E&S IMPACTS AND MITIGATION MEASURES

In Section 5.1, key identified construction-related and operation-related impacts are presented. Following this, Section 5.2 summarises the key analyses and studies conducted in relation to the Project as part of the approved EIA and the 1<sup>st</sup> EIA deviation reports as well as to comply with EP and IFC PS, to assess key potential environmental and social impacts.

Additional details such as the source of impact, mitigation measures and monitoring frequency can be found in Table 16 of Appendix D.

### 5.1 Identification of impacts

Potential environmental and social impacts may arise throughout the project lifecycle, especially during the construction phase. Typical activities relevant to the construction phase that may impact the environment include land clearing for site preparation and access routes, excavation, construction activities, laying of land cables, transportation of materials and fuels for onshore activities. Offshore activities with environmental impacts may include piling (ie use of percussive piling equipment), laying of submarine cables alignments, installation of WTG foundations and WTG erection.

A brief summary of the Project's impacts had been provided below, a more detailed description of these impacts is provided in Table 16 of Appendix D which summarises the identified potential impacts, source of impact, mitigation, and monitoring mechanisms.

The main environmental and social impacts that could arise are presented in Table 5.

**Table 5: Predicted impacts**

Project activity	Predicted impacts
Onshore construction activities (ie laying of underground cables, and construction of project dedicated substation)	<ul style="list-style-type: none"> <li>• Dust-suspension due to onshore civil work or vehicular movement</li> <li>• Emissions from construction traffic</li> <li>• Contamination of surface water or groundwater from waste water run-off from construction sites</li> <li>• Increase in general traffic (cars and trucks) volumes</li> <li>• Community road safety</li> <li>• Nuisance (dust, noise and vibration) as a result of traffic</li> <li>• Onshore noise from construction vehicles and construction activities</li> <li>• Improper soil removal practices leading to erosion</li> <li>• Pollution caused by improper materials storage</li> <li>• Contaminated material generated from fuel spills and leaks</li> <li>• Improper disposal of domestic waste</li> <li>• Accidental spills of hazardous wastes</li> </ul>
Offshore construction activities (ie laying of submarine cables and erection of WTGs)	<ul style="list-style-type: none"> <li>• Suspended sediment in the marine environment from construction works</li> <li>• Disturbance to marine species</li> <li>• Underwater vibrations from piling and excavations of the seabed</li> <li>• Small scale spills of hazardous substances</li> <li>• Contaminated material generated from fuel spills and leaks</li> <li>• Improper disposal of domestic waste</li> <li>• Accidental spills of hazardous wastes</li> <li>• Reduction in fishing grounds for fishing activities</li> </ul>

Project activity	Predicted impacts
Operations	<ul style="list-style-type: none"> <li>• Impacts to marine biodiversity due to underwater noise generated from the WTG</li> <li>• Electromagnetic field emissions generated from electrical distribution components</li> <li>• Surface water contamination from operations around the Project substation and Zhunan artificial wetlands</li> </ul>

## 5.2 Impact assessment

### 5.2.1 Construction phase

In order to determine the potential impacts of the proposed Project during the construction phase, impact assessment using specific methodologies were carried out. These methodologies and corresponding results are summarized in Table 6 below for each E&S aspect relevant to the Project.

**Table 6: Impact assessment – Construction phase**

E&S aspect	Assessment	Conclusion
Air quality	Air quality modelling and simulation were conducted particularly on the following: <ul style="list-style-type: none"> <li>• Air quality impacts during simultaneous construction of substation and land cables</li> <li>• Air quality impacts to schools located nearshore during land cable construction</li> <li>• Air quality impacts to nearby residential areas (with various proposed land cable alignments)</li> <li>• Air quality impacts due to vehicular exhaust emissions and dust suspension from transport vehicles</li> </ul>	According to the air quality simulation results, the air pollutant concentrations and the background air quality of the site are lower than the air quality standards. FOW2 has formulated relevant air pollution prevention and mitigation measures to minimise potential impacts, hence the magnitude of impact is expected to be minor.
Noise and vibration	The noise and vibration simulation(s) conducted were as follows: <ul style="list-style-type: none"> <li>• Noise simulation on construction noise</li> <li>• Noise simulation on construction machinery and equipment noise</li> <li>• Noise simulation on construction traffic noise</li> <li>• Noise simulation on construction noise from land cable works (with various proposed land cable alignment)</li> <li>• Vibration simulation on construction machinery and equipment vibrations</li> <li>• Vibration simulation on construction traffic vibrations</li> </ul>	Various noise sources associated with construction works were considered. When these construction noise sources were simulated together with measured baseline values, the results suggest that the magnitude of impact is expected to be minor. Together with FOW2's prevention and mitigation measures for noise and vibration, impact can be further reduced.



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E&S aspect	Assessment	Conclusion
	<ul style="list-style-type: none"> <li>Underwater noise simulation on underwater noise from WTG foundation piling works</li> <li>Underwater noise simulation on cumulative underwater noise from WTG foundation piling works, together with neighboring offshore windfarms conducting piling works simultaneously</li> </ul>	
Surface water quality	<p>Surface runoff calculations (accounting for rainfall amount) were performed.</p> <p>A maximum of 30 workers on site during peak construction periods is expected. During construction, temporary mobile toilets will be installed to prevent improper disposal of domestic wastewater. Negligible impact to nearby water bodies is envisaged, considering the number of workers on site and proper sanitary facilities provided.</p>	<p>Construction of the onshore substation, submarine cable laying, land cable laying and construction of the WTG foundations are short-termed construction activities and their respective impacts to the environment are localised. Through numerical calculations and qualitative assessments, the impact on water quality is minor to negligible. Coupled with the FOW2's prevention and mitigation measures, the impact can be further reduced.</p>
Groundwater quality	<p>Exposure to groundwater are not expected during land cable laying works and the construction of the onshore substation due to relative shallow depth and area during earth excavations, hence negligible impact to groundwater is envisaged.</p>	<p>Negligible impact to the environmental is envisaged. However, mitigation measures and regular monitoring will be employed (more details in Section 5.3 and Section 5.4)</p>
Seawater quality	<ul style="list-style-type: none"> <li>Numerical analysis on impacts to seawater quality (suspended solids) during WTG foundation piling works</li> <li>Numerical analysis on impacts to seawater quality (suspended solids) during submarine cable laying works</li> <li>Numerical analysis on impacts to seawater quality (suspended solids) during WTG foundation piling works, together with WTG foundation piling works from neighboring offshore windfarms occurring concurrently</li> <li>Numerical analysis on impacts to seawater quality (suspended solids) during submarine cable laying works, together with submarine cable laying works from neighboring offshore windfarms occurring concurrently</li> </ul>	<p>There are potential changes to seawater quality as a result of offshore construction activities (eg piling works, turbines installation, laying of sea cables). Mitigation measures and regular monitoring will be employed (more details in Section 5.3 and Section 5.4)</p>
Electromagnetic field	<p>No electromagnetic field (EMF) emissions is envisaged during the construction phase of the Project.</p>	<p>No further comments</p>
Biodiversity - Terrestrial plants	<p>Permanent impact is expected through some clearance of vegetation at the site of the onshore substation, although there is low plant diversity in this area (and most of the vegetation had already been cleared during the construction phase of</p>	<p>FOW2 is committed to prevent the removal of trees during onshore construction. If tree removal cannot be avoided, transplanting or replanting activities will be conducted. Mitigation measures and regular monitoring will be</p>

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E&S aspect	Assessment	Conclusion
	<p>the neighbouring project, Formosa 1 Offshore Windfarm).</p> <p>For the land cable route, temporary impact in terms of some vegetation clearance and dust deposition on plants is expected during the construction phase.</p>	<p>employed (more details in Section 5.3 and Section 5.4)</p>
Biodiversity - Terrestrial animals	<p>No international or national protected species were identified for mammals, amphibians, reptiles, butterflies and dragonflies. In terms of terrestrial birds, two category II and one category III species were identified. These bird species tend to occur along the coastline.</p>	<p>Since the existing habitat is considered to be disturbed and altered (i.e. comprising of industrial area, secondary forest, fish ponds, farmlands and residential areas), it is expected that the existing animals are adapted to anthropogenic presence. Therefore, vegetation clearance during the construction phase is expected to have a temporary impact on all terrestrial animals. The movement of construction vehicles may also increase the risk of animal road kills as well as cause disturbance to animals in the vicinity.</p>
Biodiversity - Fish	<p>Noise from piling works may temporarily deter fish from the habitat and interfere with spawning activities. It has been suggested that August may be the breeding season for commercial tonguefish species (<i>Cynoglossus quadrilineatus</i>; 雙線舌鰻). Surveys also found the presence of croakers (Sciaenidae; 石首魚) in the project area, which are known to generate sounds during their breeding seasons.</p>	<p>Underwater noise generated from the installation of WTGs and submarine cables may interfere with the fish's communication and affect breeding patterns.</p> <p>Other potential impacts during the construction phase include habitat loss due to construction of WTG foundations and cable laying as well as decrease in water quality due to higher levels of suspended sediments. These impacts are expected to be temporary and/or minor.</p>
Biodiversity - Cetaceans	<p>Underwater noise during the Project's construction phase has been considered the most significant noise source derived from percussive piling on turbine foundations. Pile driving during construction may cause the following impacts on cetaceans:</p> <ul style="list-style-type: none"> <li>• Temporary/permanent hearing loss caused by pile driving - Cetaceans survival ability may be compromised</li> <li>• Behavioral change/reactions - Temporary loss of feeding/breeding habitats resulting in habitat displacement</li> <li>• Masking effects of pile driving noise - In the event of the pile driving noise from the construction of the offshore WTGs exceeds ambient noise in terms of audibility and coincides with the frequency band of the cetaceans, communication between the cetaceans may be affected.</li> </ul> <p>Impulsive-type noise from piling activities is the main source of underwater noise and can generally reach 200dB re 1µPa</p>	<p>The potential impacts to cetaceans might be significant due to the Project's construction activities. Extensive mitigation measures and regular monitoring are described in Section 5.3 and Section 5.4 to minimise and avoid the described potential impacts to cetaceans.</p> <p>With the adherence to StUK4 standards and mitigation measures in place, no temporary hearing loss in cetaceans is anticipated.</p> <p>With mitigation measure in place to limit vessel speeds, no temporary hearing loss in cetaceans is anticipated.</p> <p>Measures are necessary to mitigate high turbidity levels caused by cable laying, including the following:</p> <ul style="list-style-type: none"> <li>• Silt screens will be deployed around the intertidal area during the laying of submarine cables to minimise the spread of suspended sediments while also preventing the access of marine organisms into the construction boundary.</li> </ul>



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E&S aspect	Assessment	Conclusion
	<p>(RMS) at 100m from the noise source. In accordance with German standards (StUK4) (2013)<sup>6</sup>, underwater noise should be limited to SEL 160dB at 750m from the noise source to prevent temporary hearing loss or other more adverse damage to cetaceans.</p> <p>The utilisation of construction vessels may contribute to underwater noise resulting in behavioral change in cetaceans.</p> <p>In addition, laying of submarine cables can result in an increase turbidity levels in the water column and adversely affect water quality and fish communities, thereby indirectly impacting cetaceans.</p>	<ul style="list-style-type: none"> <li>Laying of the submarine cable will be conducted in sections; each section will be restored to its original condition before commencement on the construction of the next section.</li> <li>Laying of the submarine cables within the intertidal zone will utilise a horizontal directional drilling (HDD) method to minimise impact on the intertidal zone. Monitoring of water quality will be conducted throughout the construction phase.</li> </ul>
Biodiversity - Birds	No significant impacts on birds is expected during the construction phase of the Project.	No further comments
Social	<p>The offshore Project area is partially within the exclusive fishing grounds for the Nanlong Fishermen Association (南龍區漁會) (NFA). The Project team recognises that these fishermen will be the main affected group throughout the Project construction life.</p> <p>This Project was not identified to pose particular risks or impacts to indigenous people. No stakeholder engagement activities specific to indigenous people were deemed to be required or have been undertaken.</p>	<p>The productivity of the fishermen might be affected by the developments of the Project. The Project shall compensate this through livelihood restoration efforts to aid fishermen to acquire new skills in addition to monetary compensation.</p> <p>It is important to the Project to establish and maintain a positive relationship with the fisherman and the fisheries association and to work with them to address impacts associated with the development as far as possible.</p>

### 5.2.2 Operation phase

Similar to construction phase, an assessment was carried out for predicted impacts during the Project's operation phase. The relevant aspects, methodologies and conclusions are presented below.

<sup>6</sup> Bundesamt für Seeschifffahrt und Hydrographie (BSH), 2013. Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment (StUK4). <http://www.oddzialywaniawiatrakow.pl/upload/File/7003eng.pdf>

**Table 7: Impact assessment – Operation phase**

<b>E&amp;S aspect</b>	<b>Assessment</b>	<b>Conclusion</b>
Air quality	<p>The air quality simulation(s) conducted were as follows:</p> <ul style="list-style-type: none"> <li>Air quality impacts due to emissions from emergency generator set</li> </ul>	No significant impacts to air quality are expected during the operational phase of the Project.
Noise and vibration	<p>The noise and vibration simulation(s) conducted were as follows:</p> <ul style="list-style-type: none"> <li>Noise simulation on operation noise produced by WTGs</li> <li>Noise simulation on cumulative operation noise produced by WTGs, together with operation noise produced from neighboring offshore windfarms</li> <li>Underwater noise simulation on operation noise produced by WTGs</li> </ul>	According to the noise and vibration simulation results during operation phase, the impact of operation noise and vibration is considered negligible.
Surface water quality	A maximum of 10 workers on site during peak operation periods is expected. During the operation phase, there will be no project staff stationed at the onshore substation. In addition, the onshore substation will be fitted with proper toilet facilities, hence preventing improper disposal of domestic wastewater.	Negligible impact to nearby water bodies is envisaged during the operation phase.
Groundwater quality	During the operation phase, no earthmoving or groundwater extraction works are expected.	no impact to the groundwater quality during operation phase is envisaged.
Seawater quality	During the operation phase, no impact to the seawater quality is envisaged due to the nature of the Project.	No further comments
Electromagnetic field	Potential EMF emissions were calculated and analysed during the operation phase. The locations of consideration include the cable landing point, the onshore substation and various points along the land cable alignment (ie residential area, preschool and the existing Yinpan substation).	Results from the analysis are within Taiwanese local standards for EMF emissions and suggest that impacts of EMF emissions to the public and school children to be minor.
Biodiversity - Terrestrial plants	In the longer term, strong winds in the project area may pose a challenge for afforestation. Vegetation clearance during the construction phase may have potential to cause fragmentation effects in the longer term.	No further comments
Biodiversity - Terrestrial animals	No significant impacts on terrestrial animal ecology is expected during the operational phase of the Project.	No further comments



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E&S aspect	Assessment	Conclusion
Biodiversity -Fish	Noise from the operation of WTGs may also affect fish communities, particularly in terms of masking effect on bioacoustics. Operational noise from a windfarm is expected to occur within 1–400Hz and range from 80–110dB. Operational noise for the Project is not expected to have a significant impact on background noise as typical background noise in the marine environment tends to occur around 1,000Hz. Other effects from electromagnetic field and collision with WTGs are expected to be insignificant.	Operational noise for the Project is not expected to have a significant impact on background noise as typical background noise in the marine environment tends to occur around 1,000Hz. Other effects from electromagnetic field and collision with WTGs are expected to be insignificant.  It is anticipated that there may be positive impacts in the long term. The Project may have a deterrence effect on bottom trawling <sup>7</sup> as the WTGs will act as obstruction for this activity, while there will also be fishing exclusion zones defined around each WTG foundation. The exact distance of the buffer zone to be confirmed through negotiations with government and fishing association.  The offshore WTG foundations may also act as artificial substrates to facilitate habitat creation which may provide food sources and shelter for fish communities as well as attract commercial fishery species known to occur in Miaoli's reefs such as grunts (Haemulidae; 石鱸科), snappers (Lutjanidae; 笛鯛科), knifejaws (Oplegnathidae; 石鯛科), groupers (Serranidae; 鮨科(石斑類)) and rabbitfish (Siganidae; 臭肚魚科).
Biodiversity - Cetaceans	During operations, the rotation of wings, gears and generator produces noise that vibrates down the turbine tower and radiates into the surrounding waters. The moving gears within each gearbox of the WTGs have been known as the primary source of noise.  Maintenance vessels may also contribute to underwater noise. No temporary hearing loss in cetaceans is expected if mitigation measures are in place to limit vessel speeds.	Underwater sound modelling showed that operational noise from the windfarm will reach 40dB at 200m from the project area. There is little known on the cumulative impact of underwater noise from multiple WTGs on cetaceans. However, it has been reported <sup>8</sup> that it is impossible to raise combined noise levels above the hearing thresholds of cetaceans as they will never be able to hear more than one turbine. Combined noise effects can be expected only when turbines are considerably closer (less than 100m distance between turbines). In the case of the Project, the minimum distance between two WTGs is likely to be at least 770m, dependent on configuration). Therefore, no temporary

<sup>7</sup> Although it is noted that according to the Fisheries Act, bottom trawling is prohibited within 3 nautical miles from the coast  
<sup>8</sup> Tougaard, J. and Mikaelson, M. (2017). Taiwanese white dolphins and offshore wind farms. Report by Aarhus University and NIRAS.



E&S aspect	Assessment	Conclusion
		<p>and permanent hearing loss in cetaceans is anticipated.</p> <p>Offshore wind turbines are known to provide marine organisms with a new hard substrate for colonization, thus acting as an artificial reef. The rough surface area of the seabed protection blocks (scour protection) provides attachment areas for the colonisation of organisms such as barnacles, sea sponges and corals that provide hiding spaces for fish or a nursery for fish fry. New habitats for fish and other marine organisms are therefore established within the artificial reefs. This is expected to increase the production of cetacean's prey food (fishes) which contributes as a positive impact on cetacean.</p>
Biodiversity -Birds	<p>90% of the observed bird flight altitudes were below the lowest point of the rotating wind turbine (ie &lt;25m).</p> <p>Bird collision modelling have suggested that geese (Anserinae; 雁鴨類) and herons (Ardeidae; 鷺科鳥) have been identified as the most vulnerable species to blade collisions, due to overlaps of average flight altitudes and the height of rotating wind turbines.</p>	<p>Based on the worst-case scenario (ie 6.0MW WTG, 98% avoidance rate of birds), the number of birds predicted to collide with rotating wind turbines have been estimated at 95 birds/year. The months of September and October have been predicted to have the highest bird collisions rates as compared to the rest of the year.</p>
Social	<p>Similar to what was mentioned in Table 6, the offshore Project area is partially within the exclusive fishing grounds for the Nanlong Fishermen Association (NFA). The Project team recognises that these fishermen will be the main affected group throughout the Project operational life.</p>	<p>The productivity of the fishermen might be affected by the developments of the Project. The Project shall compensate this through livelihood restoration efforts to aid fishermen to acquire new skills in addition to monetary compensation.</p> <p>It is important to the Project to establish and maintain a positive relationship with the fisherman and the fisheries association and to work with them to address impacts associated with the development as far as possible.</p>

### 5.3 Mitigation

A summary of the Project's potential construction and operation impacts and corresponding mitigating measures is provided Table 8 below. During construction, all mitigation measures will be carried out by contractors overseen by the FOW2 HSE manager, while during operations the owner and operator FOW2 will take full responsibility for implementing mitigating measures.

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**Table 8: Project key impacts and mitigation**

Aspect	Key impacts	Mitigating measures
<b>ONSHORE PROJECT AREA</b>		
<b>Construction</b>		
Air quality	<b>Fugitive dust</b> Dust generation from on-shore civil/earth works or vehicular movement	<ul style="list-style-type: none"> <li>Employ dust suppression techniques such as water sprinkling to damp down of exposed surfaces (such as roads). Cleaning and maintenance of roads in the vicinity of construction sites shall also be done.</li> <li>From the landing point to the Project substation, the Horizontal Direction Drilling (HDD) method will be adopted. The land cable will pass under highway 3 and the drainage canal, using the HDD or pipe jacking method. The remaining cables will mainly be along the existing road.</li> <li>During cable laying, the excavated spoil will be transported away from the site promptly hence, no temporary storage area will be set up to avoid dust suspension due to stockpiling of earth.</li> <li>During construction (except on raining days), 50m of road before and after each construction section will be cleaned to reduce dust suspension (due to dust deposition) around moving vehicles.</li> <li>Enforce speed limits to minimise dust suspension due to vehicle movement, especially when travelling within densely populated areas</li> <li>When transporting earth, it shall be covered with a dust-proof cloth or other airtight coverings to avoid dust suspension caused by construction vehicles</li> <li>All construction vehicles should be washed before leaving the construction site</li> </ul>
	<b>Vehicle emissions</b> On-site equipment and construction vehicles emissions	<ul style="list-style-type: none"> <li>Utilising construction equipment and transport vehicles of good conditions to reduce vehicular air emissions. Regular and irregular maintenance work will be done with proper maintenance records</li> <li>All subcontractors shall be requested within their contract to use fuel that is in compliance with Taiwanese standards for transportation/construction vehicles and construction machinery</li> <li>High-grade diesel/fuel such as fuel with low-sulphur oxides and particulate pollutants ratings shall be prioritised for engines used during construction</li> <li>All construction vehicles shall abide to the latest vehicular emission standards</li> <li>The construction vehicle to use diesel fuel (including biodiesel) with a sulphur content of 10ppmw or less</li> </ul>
Noise and vibration	<b>Vehicular noise due to construction traffic</b> <ul style="list-style-type: none"> <li>Near Project facilities (eg substation, land cable alignment)</li> </ul>	<ul style="list-style-type: none"> <li>Project vehicles will adhere to speed limits and transportation load limits</li> <li>When travelling through sensitive locations such as schools, residential areas, sudden acceleration, deceleration and honking of the construction vehicles are forbidden, to minimise sudden</li> </ul>



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Aspect	Key impacts	Mitigating measures
	<ul style="list-style-type: none"> <li>Near sensitive receptors (eg places of worship)</li> </ul>	<ul style="list-style-type: none"> <li>increase in noise</li> </ul>
	<p><b>Construction noise due to construction works</b></p> <ul style="list-style-type: none"> <li>Construction of substation</li> <li>Construction of transmission lines</li> <li>Transport of materials, people and equipment to site</li> <li>Use of heavy/percussive equipment</li> </ul>	<ul style="list-style-type: none"> <li>The operating rate of the concrete mixer will be reduced when idling within construction areas to minimise noise produced</li> <li>Sources of noise and vibration should be placed as far away as possible from sensitive receptors (eg schools, hospitals). If the source for noise and vibration is directional, the noise source shall be placed away from sensitive receptors</li> <li>Construction machinery and vehicles shall be regularly maintained to reduce unnecessary noise and vibrations emitted due to old or loose parts of the machinery</li> <li>During land excavation for the land cables, excavators should be placed close to the dump trucks to reduce unnecessary noise emitted from the movements of the excavator</li> <li>Construction schedule should be designed to avoid high levels of noise emissions during night time or dawn</li> <li>Maintain the Project's grievance mechanism to receive, respond, investigate and address noise related complaints</li> </ul>
Surface water quality	Surface runoff during onshore constructions (eg construction of Project substations, land cables alignment)	<ul style="list-style-type: none"> <li>The wastewater generated by the construction shall be collected by the contractor at the designated point</li> <li>The construction materials should be stored at a designated point, and the mechanical maintenance area should be covered with canvas to reduce the chance of contact with rainwater and avoid surface runoff pollution</li> <li>Construction machinery maintenance waste (eg oil) will be collected at the designated point, in the pre-set collection bucket</li> <li>The domestic wastewater of construction workers shall be disposed through the rental of mobile toilets</li> <li>Licensed cleaning and disposal services will be used for treatment of runoff</li> </ul>
Plants and habitat	Temporary impacts to habitat destruction and plant species	<ul style="list-style-type: none"> <li>Utilisation of HDD method when laying of land cables within the Zhunan artificial wetlands</li> <li>Route of cable laying will utilise existing roads where possible to minimise direct impacts to existing habitats and avoid removing any trees where possible.</li> <li>Native plant species will be replanted where removed during construction.</li> <li>Water will be used to suppress dust generated on exposed excavated land and excavated materials on transporting vehicles</li> </ul>



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Aspect	Key impacts	Mitigating measures
Terrestrial animals	Risk of wildlife collision with construction vehicles	<ul style="list-style-type: none"> <li>Vehicle speeds within the construction zone will be limited to prevent road kills</li> <li>Training will be conducted for Project staff and contractors on habitats and enforcement of no poaching of wildlife.</li> </ul>
	Temporary disturbance and alteration of wildlife habitat	<ul style="list-style-type: none"> <li>Utilisation of HDD method when laying of land cables within the Zhunan artificial wetlands</li> <li>Low-noise construction machinery will be used to reduce disturbances to wildlife</li> </ul>
<b>Operations</b>		
Surface water quality	Potential surface water quality pollution due to operations around Project substation and Zhunan artificial wetlands	<ul style="list-style-type: none"> <li>Wastewater and sewage will not be directly discharged into the farmland water irrigation system (eg ditches and channels), and the Zhunan artificial wetland. Wastewater and sewage will be discharged into proper discharge system after treatment</li> </ul>
Electromagnetic Field (EMF)	Electrical distribution components (eg submarine cable alignment, land cable alignment, onshore substation)	<ul style="list-style-type: none"> <li>No significant EMF emission impacts are envisaged however regular quarterly monitoring will be conducted.</li> </ul>
<b>OFFSHORE PROJECT AREA</b>		
<b>Construction</b>		
Seawater quality	Potential changes to seawater quality as a result of offshore construction activities (eg piling works, turbines installation, laying of sea cables)	<ul style="list-style-type: none"> <li>Construction progress will be monitored closely to reduce the disturbance of the seabed sediment</li> <li>Carry out environmental monitoring of sea water quality during offshore works (ie WTG foundation, and submarine cable laying)</li> </ul>
Marine organisms (fish, corals, benthic organisms)	Noise from pile driving may temporarily deter fish from the habitat and interfere with spawning activities	<ul style="list-style-type: none"> <li>The piling of only one WTG will be conducted at any one time.</li> <li>If construction works coincides with the breeding season of fishery species, FOW2 will adopt a soft start (ramp-up) method for piling works</li> <li>Jacket foundation will be used to minimise underwater noise during piling.</li> </ul>
	Habitat loss and decrease in water quality	<ul style="list-style-type: none"> <li>Avoidance of offshore WTGs and submarine cables on any reefs.</li> <li>Silt screens will be deployed around the intertidal area during the laying of submarine cables to minimise the spread of suspended sediments while preventing the access of marine organisms into the construction boundary.</li> <li>Sequential laying of submarine cables will be conducted in sections.</li> <li>Utilisation of HDD method when laying of submarine cables to minimise impact to intertidal habitat.</li> </ul>



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Aspect	Key impacts	Mitigating measures
		<ul style="list-style-type: none"> <li>Coordination of offshore construction activities will be coordinated with surrounding windfarms to ensure pile driving of one WTG will be conducted at any one time.</li> <li>Wastewater and excavated material will not be discharged to the intertidal zone. Wastewater is to be collected on-site and disposed by a licensed third-party water waste disposal company.</li> </ul>
Cetaceans (ETS Indo-pacific humpback dolphins)	<p>Offshore piling has the potential to affect cetaceans by excessive underwater noise generated by drive piling. The adverse impacts on the cetaceans are:</p> <ul style="list-style-type: none"> <li>Temporary/permanent hearing loss caused by pile driving</li> <li>Behavioural change/reactions</li> <li>Masking effects of pile driving noise</li> </ul>	<ul style="list-style-type: none"> <li>Acoustic and visual monitoring will be conducted pre-construction and throughout the construction phase</li> <li>The Project's offshore WTG footprint have been located at least 1km outside the proposed MWH of the ETS Indo-pacific humpback dolphins to avoid direct impacts.</li> <li>The design of the submarine cable will employ the shortest distance from the shoreline to minimise disturbance to the BTS Indo-pacific humpback dolphin habitat.</li> <li>A warning zone of 750m and pre-warning zone of 750-1500m radius from pile driving location will be established.</li> <li>Continuous acoustic and visual cetacean monitoring will be conducted during piling to monitor cetacean activity as well as monitor sound exposure levels to ensure sound levels do not exceed 160 dB [(dB) re. 1µPa2s]. A stop work notice will be implemented when cetaceans enter the warning zone (ie 750m radius from piling location). Pile driving works will only recommence 30 minutes after ensuring no cetacean activity within the warning zone</li> <li>Pile driving works will be conducted during day; no piling will commence two hours prior to sunset and sunrise unless required and with safety considerations in place.</li> <li>Where piling needs to be conducted at night, thermal imagers will be deployed from two vessels to monitor a 750m radius from the piling location</li> <li>"Jacket" piling will be used to minimise underwater noise.</li> <li>Soft start (ramp-up) method over a duration of at least 30 minutes will used.</li> <li>Deployment of bubble curtains will be used to minimise underwater noise during pile driving works</li> <li>FOW2 will coordinate with surrounding wind farms to mitigate cumulative impacts of underwater noise from pile driving to ensure only one WTG to be installed at any one time</li> <li>In addition to mitigation measures to be implemented within the Project area, measures have also been proposed around the proposed MWH of the ETS Indo-pacific humpback dolphins to monitor Project impact (ie transmission of underwater noise) at the sensitive receptor (ie Indo-pacific humpback dolphin). These include the</li> </ul>



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Aspect	Key impacts	Mitigating measures
		<p>following:</p> <ul style="list-style-type: none"> <li>○ One monitoring station will be set up at the boundary of the proposed MWH of the Indo-pacific humpback dolphins during piling works to monitor cetacean activity as well as sound exposure levels</li> <li>○ Vessel speeds will be limited to a maximum of 6 knots within 1.5km from the proposed MWH of the ETS Indo-pacific humpback dolphins</li> </ul>
Birds (coastal and sea)	No impacts anticipated	<ul style="list-style-type: none"> <li>• Cable laying within intertidal area will avoid peak bird migratory season</li> <li>• Utilisation of HDD method when laying of submarine cables to minimise impact to intertidal habitat.</li> <li>• Proper waste disposal of wastewater and excavated material will be undertaken as per the waste management plan</li> <li>• Biodiversity monitoring will be conducted to monitor behaviour changes (refer to Section 5.4 for details)</li> </ul>
<b>Operations</b>		
Underwater noise	Underwater noise generated from the operations of the WTGs might have an impact to marine lifeforms	<ul style="list-style-type: none"> <li>• No significant underwater impacts are envisaged however quarterly monitoring will be conducted</li> </ul>
Marine organisms (fish, corals, benthic organisms)	No significant negative impact. However, a positive impact has been anticipated due to the creation of artificial reefs and reduction of commercial fishing activities	<ul style="list-style-type: none"> <li>• Biodiversity monitoring (refer to Section 5.4 for details)</li> </ul>
Cetaceans (ETS Indo-pacific humpback dolphins)	No significant negative impact anticipated. However, positive impact has been anticipated due to creation of artificial reef which may increase cetacean food source	<ul style="list-style-type: none"> <li>• Biodiversity monitoring (refer to Section 5.4 for details)</li> </ul>
Birds (coastal and sea)	Collision with WTG blades	<ul style="list-style-type: none"> <li>• WTGs placement will be designed to ensure sufficient distance between to allow for birds flying through Project's offshore WTG footprint</li> <li>• "A flight corridor" of at least 2km within the Project's offshore WTG footprint will be set aside for birds flying into Xihu Important Wetland.</li> <li>• Narrow-banded spotlights will be installed on all WTGs in accordance to national regulations and this serves as a visual indication of an obstruction for birds flying at night.</li> <li>• Surveillance devices (ie thermal imaging, acoustic microphone, radar) will be installed on WTGs to</li> </ul>

Aspect	Key impacts	Mitigating measures
		monitor bird activities. (refer to Section 5.4 for details)

## 5.4 Monitoring

As per WBG EHS guidelines for wind energy, where multiple wind farm facilities are located in the same geographical area and near areas of high biodiversity value, a coordinated approach between the wind farms for surveys and monitoring has been recommended (IFC WBG, 2015).

### 5.4.1 Construction monitoring

Construction phase monitoring will consist of a minimum of two years prior to construction commencing, followed by the construction period.

Monitoring plans and parameters can be referred to in Table 9 Project impacts on biodiversity will be assess through on-going monitoring results to ensure the mitigation strategy is appropriate to the magnitude of impacts. The methodology has been deemed scientifically robust and will use the Before-After-Control-Impact (BACI) approach.

**Table 9: Construction phase monitoring**

Monitoring Parameter	Monitoring locations	Frequency
Noise and vibration (onshore works) - Vehicular noise due to construction traffic	<ul style="list-style-type: none"> <li>One location at residence near the Project substation</li> <li>One location at residence near the land cable alignment</li> <li>Zhonggang Cihyu Temple (中港慈裕宮)</li> </ul>	Quarterly One 24-hour session of continuous monitoring for each quarter
Noise and vibration (onshore works) - Construction noise due to construction works	One location at 1m from Project substation boundary	Monthly One session of, at least 2 minutes of continuous monitoring for each month
Underwater noise (offshore piling work)	<ul style="list-style-type: none"> <li>Four monitoring locations 750m away from each WTG piling location</li> <li>One monitoring location at the boundary of the pre-warning zone of the Indo-pacific humpback dolphin MWH</li> </ul>	During piling works of each WTG Deployment of underwater acoustic monitoring devices for the piling duration
Air quality – Fugitive dust and vehicle emissions	One location at residence near the Project substation	Quarterly One 24-hour session of continuous monitoring for each quarter
Terrestrial flora and fauna,	Terrestrial electrical distribution	Quarterly (ie once for every

## ESIA Summary

Monitoring Parameter	Monitoring locations	Frequency
including invasive species (as per EIA requirements)	system (substation, land cables and their surroundings)	season) during construction
Intertidal ecology (as per EIA requirements)		
Marine ecology (as per EIA requirements): <ul style="list-style-type: none"> <li>Phytoplankton</li> <li>Zooplankton</li> <li>Fish larvae and eggs</li> <li>Macrobenthos</li> <li>Fish</li> </ul>	At least 10 monitoring stations around Project's offshore WTG footprint	Quarterly (i.e. once for every season) during construction
	Underwater photography (location as per prescribed in the EIA)	Monthly for two years before construction and after each completion of pile driving during construction
Cetaceans	<b>Visual monitoring:</b> <ul style="list-style-type: none"> <li>At the Project vicinity (as prescribed in the EIA)</li> </ul>	30 visual survey trips a year
	<b>Acoustic monitoring:</b> <ul style="list-style-type: none"> <li>Deploying four underwater microphones at 750m radius around pile driving location</li> </ul>	With each installation of a WTG
	<ul style="list-style-type: none"> <li>Deployment of 5 underwater microphones (at locations prescribed in the EIA)</li> </ul>	Quarterly during no pile driving months
Birds Ecology <ul style="list-style-type: none"> <li>Terrestrial birds</li> <li>Coastal birds</li> <li>Intertidal birds</li> <li>Seabirds</li> </ul>	<ul style="list-style-type: none"> <li>Xihu Important Wetland</li> <li>Along Houlong coastal area</li> <li>Vicinity of Project's offshore WTG footprint</li> </ul>	Monthly throughout construction with the exception of additional monthly seabird surveys will be conducted monthly two years before construction
	<ul style="list-style-type: none"> <li>Radar survey to monitor night bird activity at Project's offshore WTG footprint area (placement of radar system along Zhunan Houlong coastal area)</li> </ul>	Monthly (two years before construction and throughout construction)
Wetland (aquatic) ecology <ul style="list-style-type: none"> <li>Aquatic plants</li> <li>Fish</li> <li>Crustaceans</li> <li>Aquatic insects</li> <li>Snails</li> </ul>	<ul style="list-style-type: none"> <li>Zhunan artificial wetlands</li> </ul>	Quarterly

### 5.4.2 Operations monitoring

Operation phase monitoring will be undertaken following the same survey methods used for the construction phase monitoring to allow for direct comparison of the data and to identify any changes in species distribution and abundance. The operation phase monitoring will be undertaken and implemented for the entire lifespan of the Project (ie envisaged for over a minimum period of twenty years).



Operation phase monitoring is to be conducted during operations as elaborated in the environmental monitoring plan within the local EIA. Monitoring Target species and frequency of each type of monitoring is reflected in Table 10. The overall coordination and reporting will be undertaken by an external ecological consultant and trained MMO for marine mammals

**Table 10: Operation phase monitoring**

Monitoring Parameter	Monitoring locations	Frequency
Underwater noise	Two monitoring points around WTGs vicinity	Quarterly
Electromagnetic Field (EMF)	<ul style="list-style-type: none"> <li>Project substation</li> <li>One monitoring point at a residential area near Kaiyuan Road</li> </ul>	Quarterly
Surface water quality	<ul style="list-style-type: none"> <li>Project substation</li> <li>Zhunán artificial wetlands</li> </ul>	Quarterly
Intertidal ecology	Xihu Important Wetland	Quarterly during operations
Marine ecology: <ul style="list-style-type: none"> <li>Phytoplankton</li> <li>Zooplankton</li> <li>Fish larvae and eggs</li> <li>Macrobenthos</li> <li>Fish</li> </ul>	At least 10 monitoring stations around Project's offshore WTG footprint	Quarterly
	Underwater photography (location as per prescribed in the EIA)	
Cetaceans	<b>Visual monitoring:</b> At the Project vicinity (as prescribed in the EIA)	30 visual survey trips a year
	<b>Acoustic monitoring:</b> Deployment of 5 underwater microphones	Quarterly
Birds Ecology <ul style="list-style-type: none"> <li>Terrestrial birds</li> <li>Coastal birds</li> <li>Intertidal birds</li> <li>Seabirds</li> </ul>	<ul style="list-style-type: none"> <li>Xihu Important Wetland</li> <li>Along Houlong coastal area</li> <li>Vicinity of offshore Project's offshore WTG</li> </ul>	Monthly
	<ul style="list-style-type: none"> <li>Radar survey to monitor bird migratory flightpaths</li> </ul>	Monthly (May to August)
	<ul style="list-style-type: none"> <li>Bird surveillance system (thermal imaging, acoustic microphone, radar) installed on WTGs to monitor bird activities</li> </ul>	Continuous monitoring
Wetland (terrestrial) Ecology <ul style="list-style-type: none"> <li>Flora</li> <li>Mammals (including bats)</li> <li>Birds</li> </ul>	<ul style="list-style-type: none"> <li>Zhunán artificial wetlands</li> </ul>	Quarterly



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Monitoring Parameter	Monitoring locations	Frequency
<ul style="list-style-type: none"><li>• Amphibians</li><li>• Insects</li><li>• Butterflies</li></ul>		
Wetland (aquatic) ecology <ul style="list-style-type: none"><li>• Aquatic plants</li><li>• Fish</li><li>• Crustaceans</li><li>• Aquatic insects</li><li>• Snails</li></ul>	<ul style="list-style-type: none"><li>• Zhunan artificial wetlands</li></ul>	Quarterly



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## 6.0 E&S MANAGEMENT PLAN

### 6.1 Key management plans

The Project has developed additional E&S management plans in addition to local requirements to meet the requirements of EP and IFC PS, presented below as a list:

- Environmental social management system (ESMS)
- Stakeholder engagement plan (SEP)
- Health and safety plan
- Management plans relating to E&S and biodiversity management

The following are additional E&S management plans planned to be produced in the near future:

- Critical habitat assessment (CHA)
- Cumulative impact assessment (CIA)
- Emergency preparedness and response plans
- Waste management plan

### 6.2 Contractor requirements

Contractors are required to demonstrate their commitment to the management and incorporation of environmental factors such as environmental constraints, site sensitivities and mitigation of impacts.

The Contractor shall ensure familiarity and maintain compliance with Formosa's environmental and social requirements as set out in the conditions of relevant consents permits and licenses.

The Contractor shall ensure the protection of environmental aspects throughout the duration of the works through commitment to:

- The operation of a Contractor's Environmental Management System proportionate to the level of work and associated environmental and social risks;
- Implementation of a site-specific Contractor's Environmental Management Plan, as appropriate, to the level of work to be undertaken.
- The application of best available techniques at all sites to minimize the environmental impact of their activities on the environment.
- Fulfilling the mitigation measures or requirements set out in license/permitting information and associated documentation, measures identified through the design and project planning process and environmental guidance and best practice documentation available from external stakeholders such as regulators and government bodies.

Compliance with FOW2's environmental and social requirements is the responsibility of FOW2 and its contractors. The Construction Site Manager will be responsible for the monitoring and reporting of the overall status of the Project's compliance with the environmental and social requirements. To achieve continual improvement, Project



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specific objectives and performance targets will be reviewed and established at least annually by the construction manager or as necessary, upon any major change in Project activities or identification of any major non-compliances.

### 6.3 Internal audits

In addition to regular monitoring, periodic internal system audits will be conducted to ensure that the environmental and social requirements are properly implemented and maintained, that operations are being performed in accordance with planned arrangements and that the management plans and controls are effective.

Internal audits will be undertaken by the FOW2 Health, Safety and Environment (HSE) officer and will ensure that audit findings (including both non-conformances and also positive audit results) are documented in an Audit Report. Insofar as any non-conformances are identified as a result of an audit, the incident reporting procedure will be followed. In addition, and where appropriate, corrective action will be undertaken as soon as reasonably possible to address any issues identified pursuant to audit activities.

As part of the internal audit, FOW2 will conduct:

- Regular audits of the construction areas, including construction equipment camps, laydown areas and worker's accommodation
- Monthly audits of compliance with the management plans and monitoring programme
- During the operational phase, regular audits of the site to ensure compliance with the management plans and monitoring programme

## 7.0 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

### 7.1 Overview of stakeholder engagement plan

The Project has developed a Stakeholder Engagement Plan (SEP) which sets out how the Project has identified stakeholders relevant to the Project and how information disclosure, consultation and grievances with the main external stakeholders and the general public shall be managed during the planning and the execution of the Formosa 2 Offshore Wind Farm project.

The SEP provides details on how the project has met the consultation requirements of the national EIA process and to reflect on how the project will comply with the Applicable Standards in the future. This SEP provides details of how the Project will ensure a consultation and participation strategy which:

- Identifies stakeholder groups that could be affected or may have an interest in this Project
- Ensures that such stakeholders are appropriately engaged through a process of information disclosure and meaningful consultation on environmental, social and other issues that could potentially affect them
- Maintain a constructive relationship with stakeholders on an on-going basis through meaningful engagement during Project implementation
- Establishes a grievance mechanism to allow communities and other stakeholders to register complaints, queries or comments that are addressed in a timely manner by the Project

### 7.2 Key consultation and public participation

The Project has engaged and will continue to engage with the township and village representatives and local residents in order to provide information about the Project, to inform, identify concerns and introduce any additional mitigation measures required to address that.

#### **Nanlong Fishermen Association**

The offshore Project area is partially within the exclusive fishing grounds for the Nanlong Fishermen Association (NFA) (which is made up of fishermen from both Zhunan and Houlong townships). In addition to the regulatory requirement to ensure that agreements are in place with the fishermen association in advance of the works, the Project team recognises that these fishermen will be the main affected group throughout the Project construction and operational life. It is important to the Project to establish and maintain a positive relationship with the fisherman and the fisheries association and to work with them to address impacts associated with the development as far as possible.

The Project already has an established relationship with the fishermen and the NFA through the work that has been undertaken for Formosa 1 Offshore Wind Farm and have been engaging regularly with them for the development of the current Project. This work will continue as the Project moves into construction and operation.



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The Project is supported in their engagement activities by a fisheries consultant (台灣漁業及海洋技術社) who assisted to determine the appropriate fishery compensation<sup>9</sup> for the Project. Engagement between Formosa 2 and the Formosa 1 Project Company, ensures that any cumulative economic impact are dealt with appropriately.

### Environment Protection Supervision Committee

An Environment Protection Supervision Committee (環境保護監督委員會) is to be set up to monitor the implementation of the prescribed measures/conditions within the EIA and EIA review findings. The conditions stipulate that the committee shall:

- Be made up of no less than 15 members
- Have at least one third of the committee be made up of technical experts or related academia
- Have at least one third of the committee be made up of members from local groups (e.g. NGOs, residents; or fishermen
- Publicly disclose an appropriate meeting time and place prior to the committee meetings, so as to invite the general public to attend and/or participate

In the event where monitoring results exceed the regulatory standards, further investigations will be performed to establish the cause of the exceedance. If the cause of the exceedance is deemed to be due to the construction of the Project, the committee shall immediately request FOW2 to make improvements to existing measures and plans. Improvements results will be verified by the committee in the next monitoring period. Furthermore, during the annual monitoring meeting, the FOW2 shall report annual monitoring results and the handling of abnormal events to the committee.

### 7.3 Information disclosure

A communication plan is laid out within the SEP that defines a clear communication strategy including assigning the responsibility for communication activities related to the Project. The Project's Stakeholder Manager has the responsibility to support management of FOW2's Communication Strategy. The main communication tools will be via the Project's website, Taiwan EPA's website and fact sheets. Press releases will be issued when / if applicable and appropriate.

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<sup>9</sup> The fisheries association agreement is required to secure the fisheries agency approval in order to obtain the construction permit

## 8.0 GRIEVANCE REDRESS MECHANISM

A grievance can be defined as an actual or perceived problem that might give grounds for complaint. Grievances will be logged in a formal logging system for which the Community Liaison Officer (CLO) and Local Communications Resource (LCR) will be responsible. People may register grievances using the form in Appendix E or by contacting the CLO or LCR, or reporting to their community leader, or other community representative. The status of any associated actions relating to that grievance will be tracked and reported to the Stakeholder Manager and to the Project Management Team at monthly meetings (or more regularly where required).

The CLO and LCR will classify grievances according to Table 11 below. Where investigations are required, Project staff and outside authorities as appropriate, will assist with the process. The CLO and LCR will collaborate with FOW2's Project Management team to identify an appropriate investigation team with the correct skills to review the issue raised. The investigation will also aim to identify whether the incident leading to the grievance is a singular occurrence or likely to reoccur. Identifying and implementing activities, procedures, equipment and training to address and prevent reoccurrence will be part of the investigation activities.

**Table 11: Grievance classification criteria**

Classification	Risk Level (to health, safety or environment)	Response
Low	No or low	CLO will conduct investigation, document findings and provide a response.
Medium	Possible risk and likely a one-off event	CLO and an appropriate investigation team will conduct investigation. The Site Manager or Occupational Health and Safety Manager may decide to stop work during the investigation to allow the corrective preventive actions to be determined. The CLO will provide a response.
High	Probable risk and could reoccur	CLO will get the contractor to organise a Major Investigation Team for prompt investigation and resolution. Work may be stopped in the affected area. The CLO will provide a response.

The CLO will explain in writing to the complainant (or where literacy is an issue, verbally) the review process, the results, and any changes to activities that will be undertaken to address the grievance. In some cases, it will be appropriate for the CLO to follow up at a later date to see if the person or organisation is satisfied with the resolution or remedial actions.

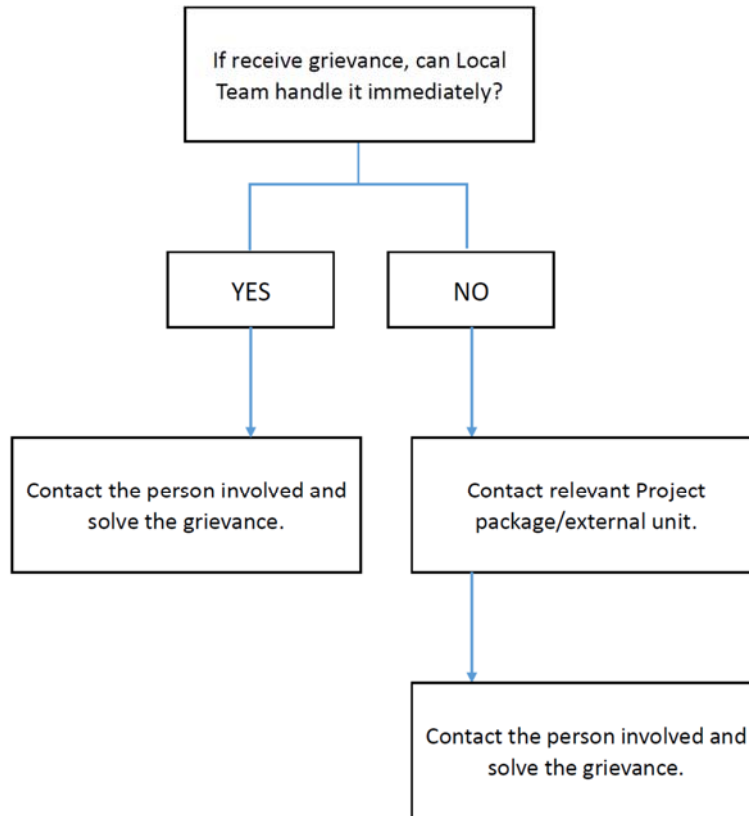
The CLO will summarise grievances weekly during construction and bi-annually during operation removing identifying information to protect the confidentiality of the complainant and guarantee anonymity. The procedure will be at no cost and without retribution to Project affected persons and stakeholders. The procedure for processing grievances is depicted in Figure 2. A grievance log will be produced and maintained, this log will record all grievances (both closed and ongoing open grievances).

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**Grievance Mechanism**

1. Provide Project contact person information (phone number, email address) during public consultation.
- 2.

**Grievance management procedure**



**Figure 2: Flowchart for processing grievances**

For further information on the grievance mechanism or to raise concerns due to Project development, please visit Formosa 2 website at <https://formosa2windpower.com> to contact the Project.



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## 9.0 CONCLUSION AND RECOMMENDATION

The Formosa 2 Offshore Wind Farm Project aims to tackle Taiwan's dependency on imported energy sources by increasing the supply of renewable energy. Despite the its primary benefits, the Project may have various potential environmental and social impacts on its surrounding environment, that must be addressed by appropriate mitigating measures and management approaches. Key impacts that need to be addressed include impacts on the marine environment and the community.

The Project will implement an environmental and social management system (ESMS) and adopt an approach that enables continual improvement throughout the lifecycle of the Project. This approach will entail the creation and implementation of various management plans, which are fluid and underpinned by specific management objectives and performance indicators tailored to the current design and objectives of the Project. The management plans utilise, to the extent possible, existing Project knowledge to fully address the actual E&S impacts of the Project at the time and allow flexibility in environmental and social management decisions made on the Project.

To ensure continual improvement the following actions are recommended:

- Various E&S management plans should be periodically reviewed and amended in accordance with the Project as it evolves. Key information about any changes to project description should be regularly reviewed and, during construction, site visits should be undertaken by the FOW2 staff to identify the true impacts of the Project.
- Evaluation of the effectiveness of measures introduced by FOW2 should be undertaken on a regular basis. Evaluation can be undertaken through on-going communication with the contractors, sub-contractors, stakeholders and lenders, supplemented by site audits and monitoring data review to identify weaknesses and/or gaps in plan. The various management plans should be changed and/or updated accordingly to ensure appropriate, robust and effective environmental and social management commensurate to the scale of the Project through its lifetime.

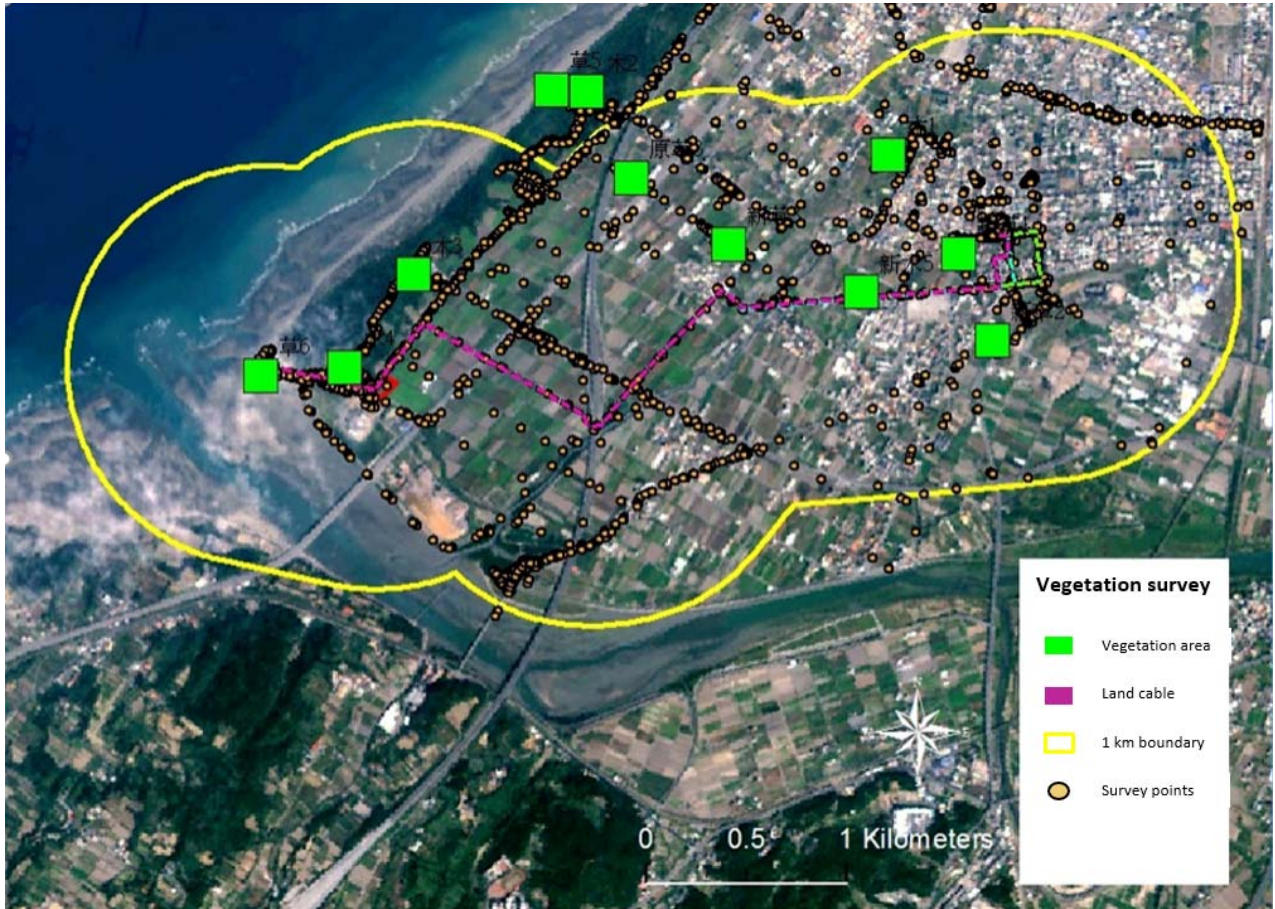


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- A Survey routes for biodiversity baseline surveys conducted
- B Cetacean and sound level monitoring stations and warning zones
- C E&S baseline studies conducted
- D E&S mitigation measures and monitoring requirements
- E Grievance form

**A SURVEY ROUTES FOR BIODIVERSITY BASELINE SURVEYS CONDUCTED**



**Figure 3: Vegetation transect survey**

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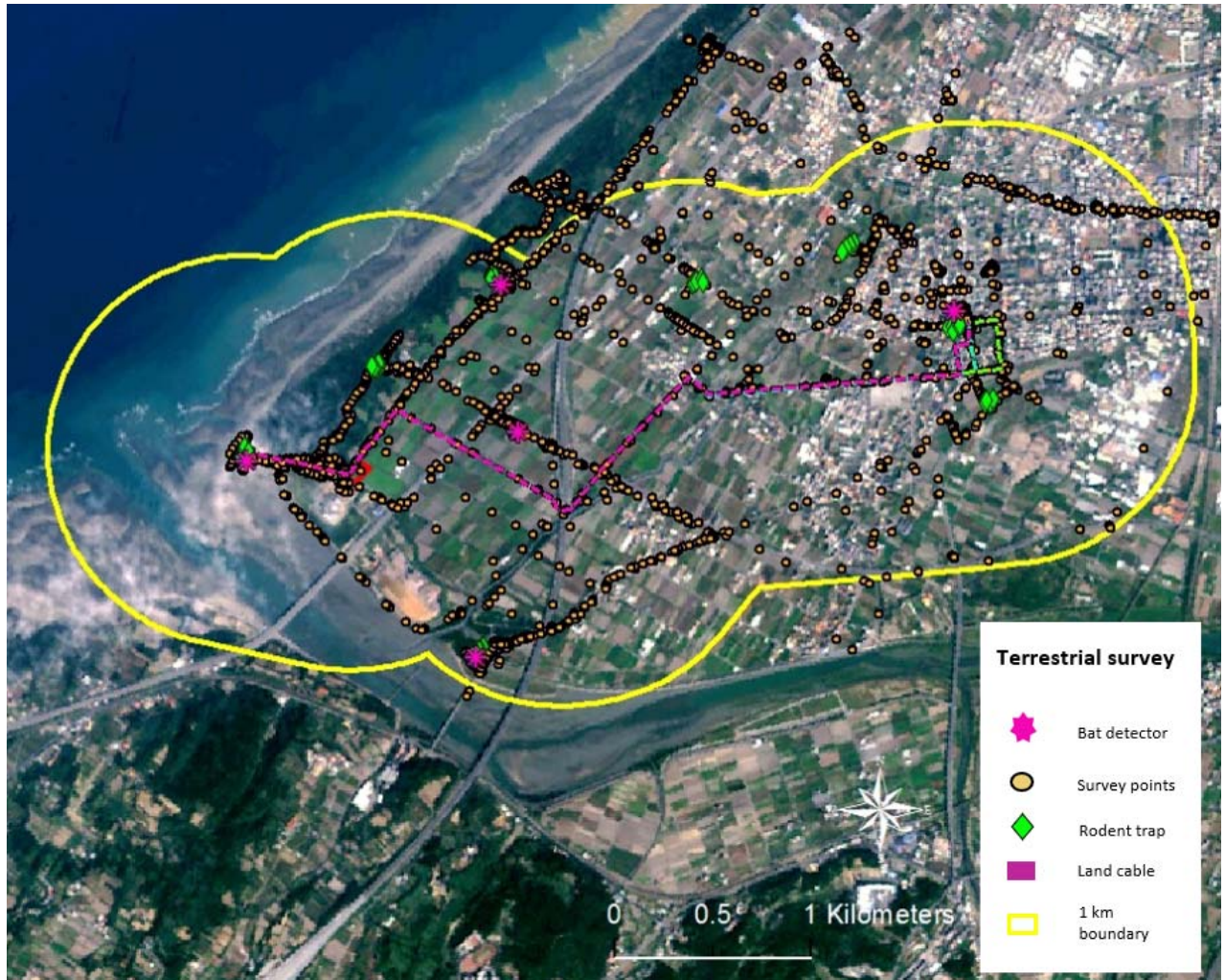


Figure 4: Terrestrial transect survey

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Figure 5: Aquatic survey areas

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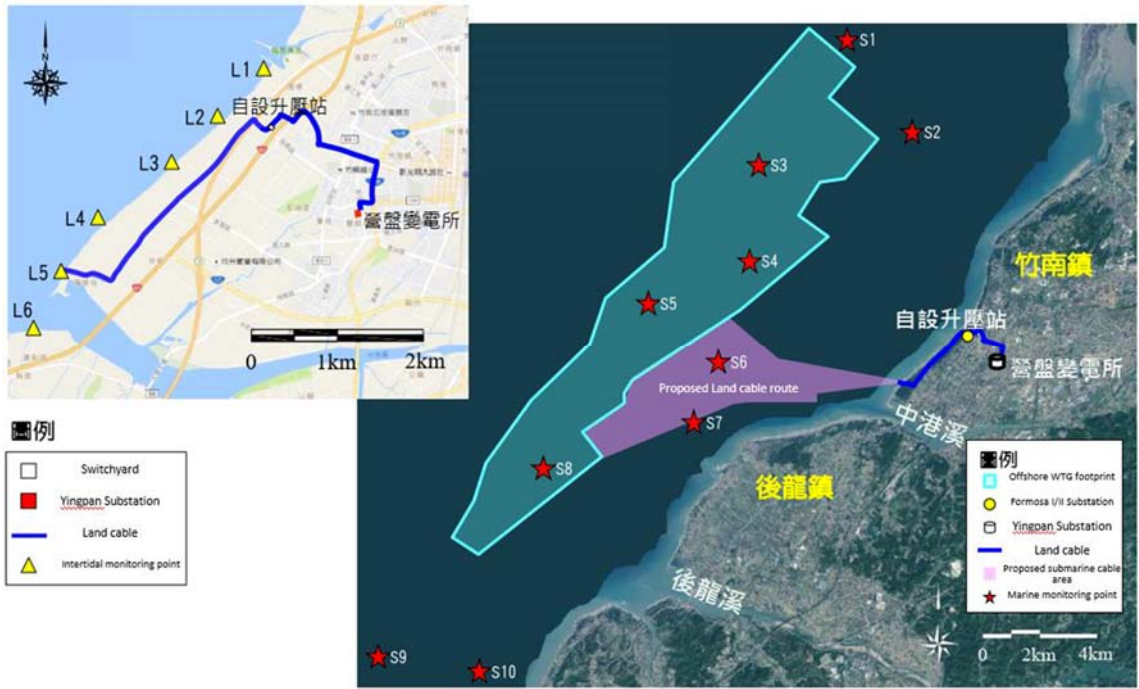


Figure 6: Marine survey

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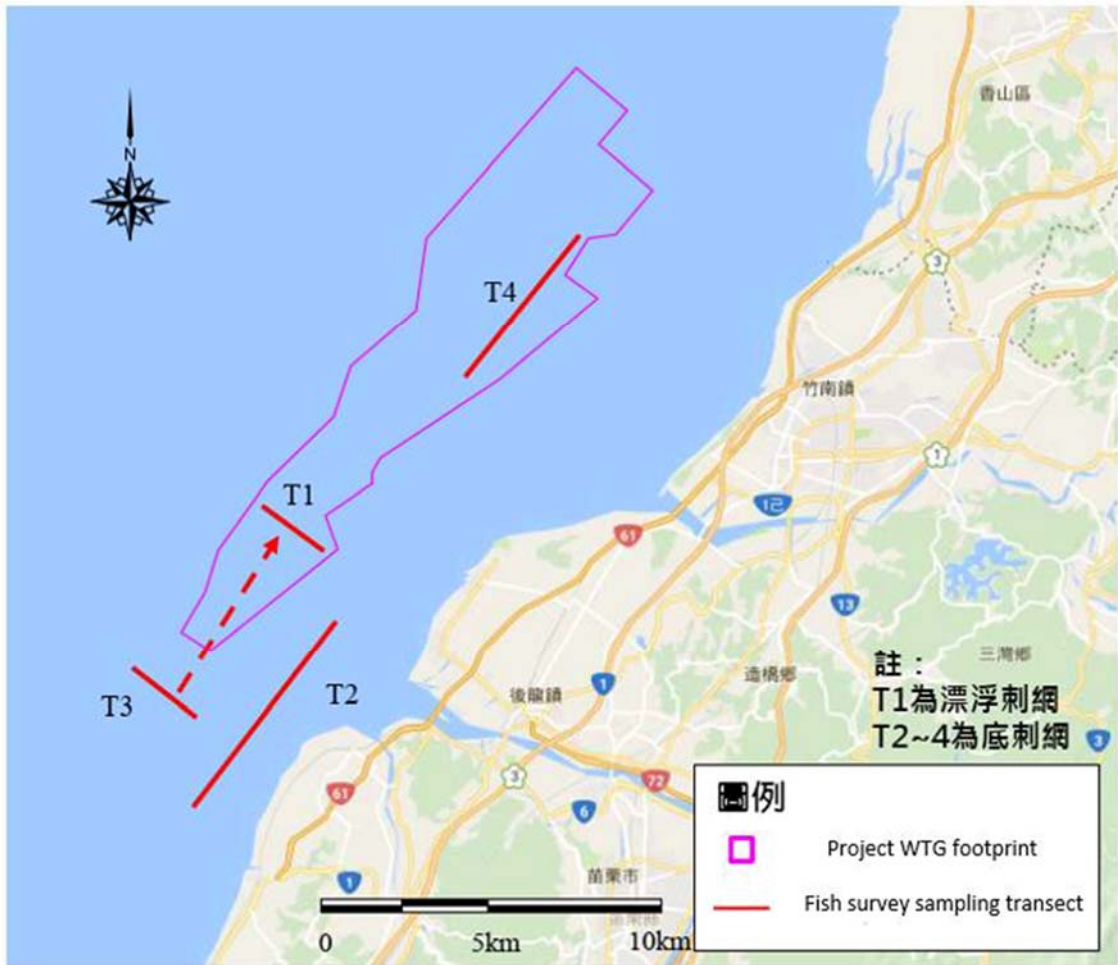


Figure 7: Fish survey sampling points

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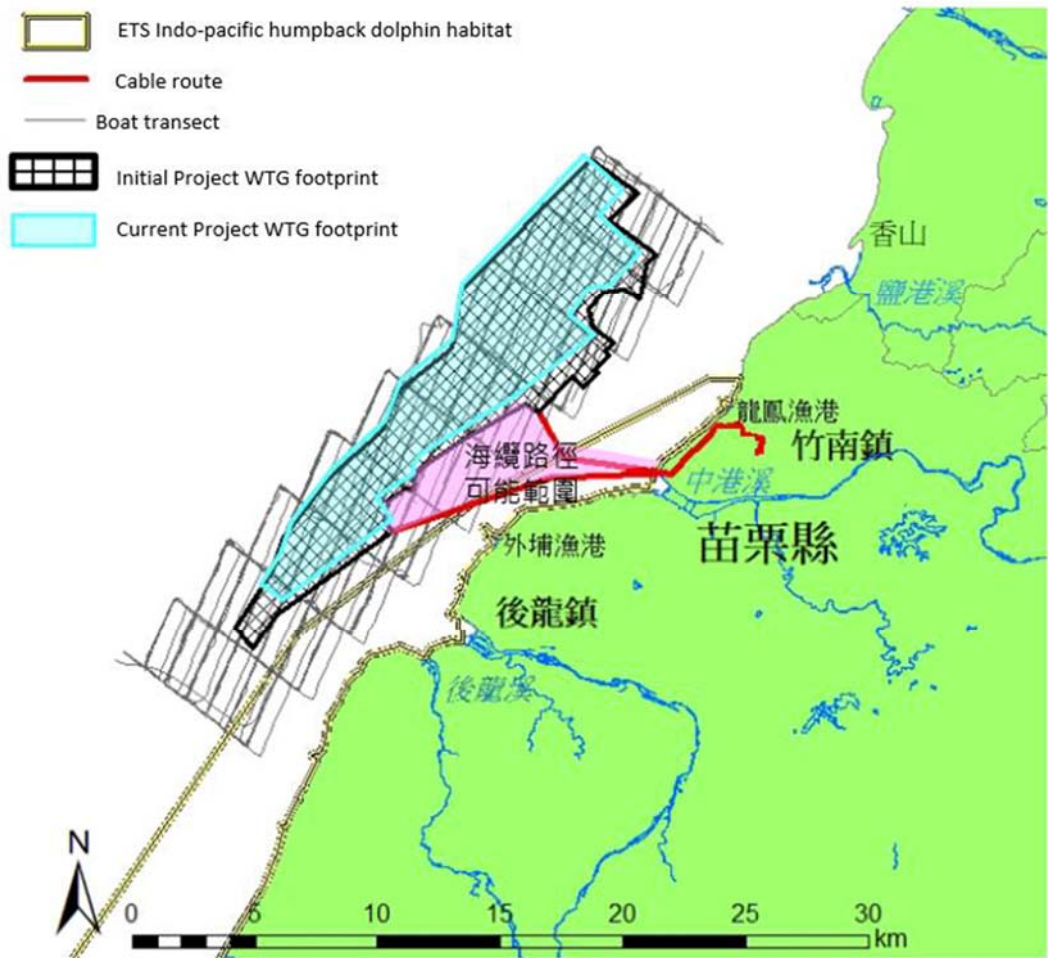
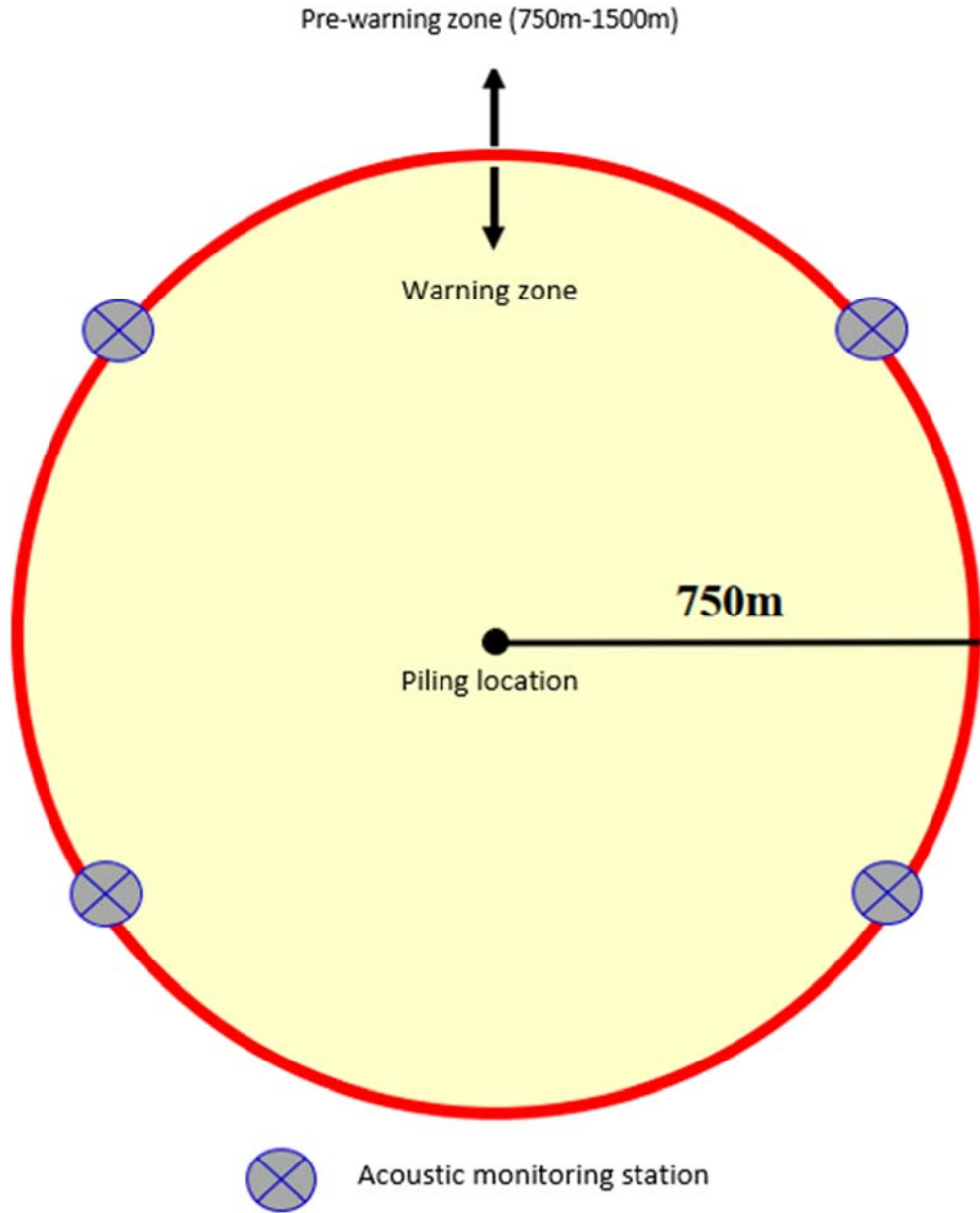


Figure 8: Cetacean boat survey



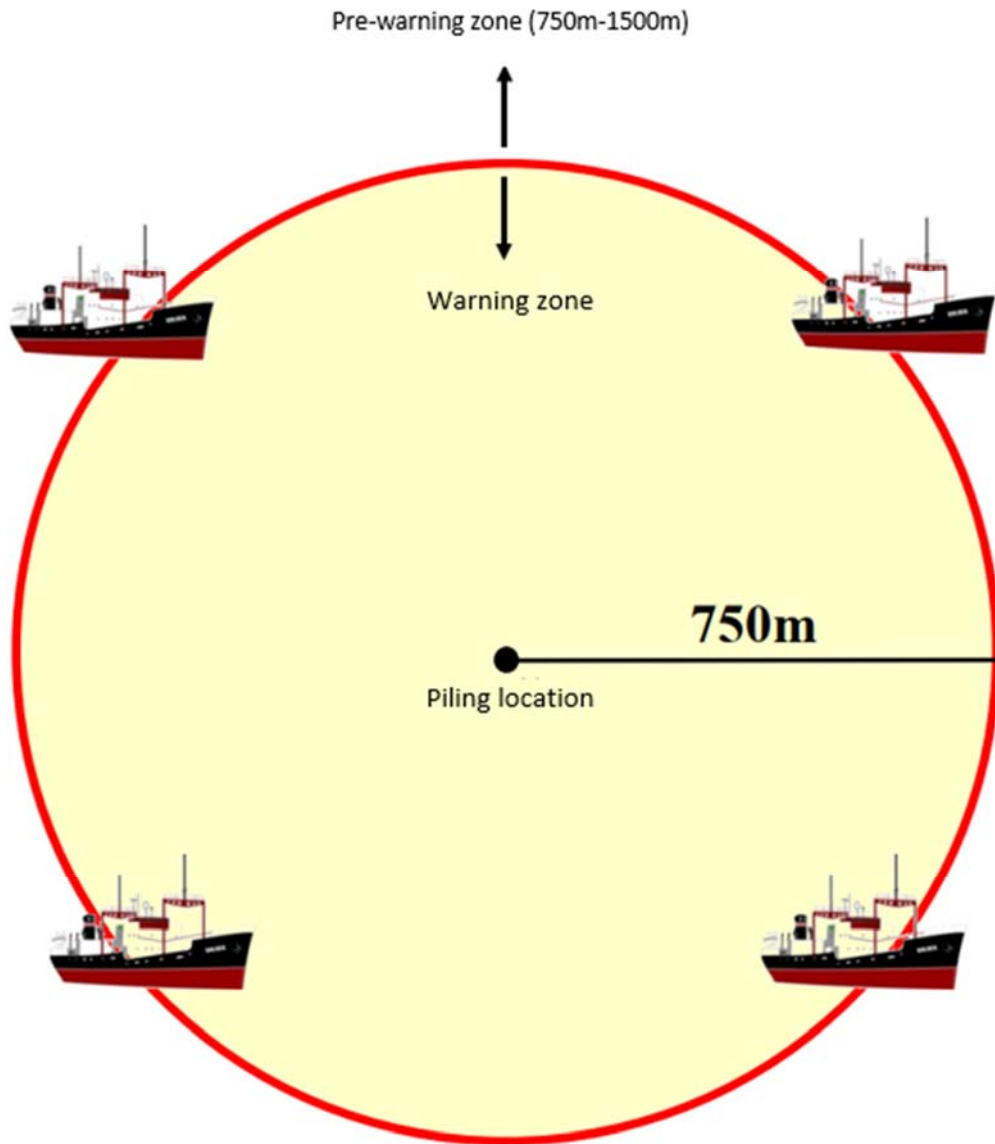
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**B CETACEAN AND SOUND LEVEL MONITORING STATIONS AND WARNING ZONES**



**Figure 9: Acoustic monitoring stations**

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**Figure 10: Boat locations for visual cetacean monitoring during piling**

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### C E&S BASELINE STUDIES CONDUCTED

#### C.1 ENVIRONMENTAL BASELINE STUDIES

**Table 12: Environmental baseline studies conducted**

Parameter	Period of survey conducted	Location of survey	Remarks (eg Source / accuracy / reliability)
Air quality	Year 2013 to 2016 (approved EIA)	Monthly Air Quality monitoring results at Miaoli County by the Environmental Protection Agency (EPA)	1. EPA's air quality monitoring website <a href="http://taqm.epa.gov.tw/taqm/tw/default.aspx">http://taqm.epa.gov.tw/taqm/tw/default.aspx</a> 2. EPA's statistical database <a href="http://statis91.epa.gov.tw/epa/stmain.jsp?sys=100">http://statis91.epa.gov.tw/epa/stmain.jsp?sys=100</a>  <i>Table 6.2.3-2 Monthly Air Quality monitoring results at Miaoli County by the EPA of the approved EIA</i>
	18 February 2016 to 29 April 2016 (approved EIA)	<ul style="list-style-type: none"> <li>Original proposed Project substation</li> </ul>	<i>Table 6.2.3-3 Project site air quality supplementary monitoring results of the approved EIA</i>
	July 2018 (1 <sup>st</sup> EIA deviation report)	<ul style="list-style-type: none"> <li>Residential areas situated near Baishatun Fishing Port</li> <li>Haishan Fishing Port</li> <li>Proposed Project substation after the 1<sup>st</sup> EIA deviation</li> </ul>	<i>Table 6.2.1-1 Supplementary air quality monitoring results of the 1<sup>st</sup> EIA deviation report</i>
	July to September 2016 (approved EIA)	<ul style="list-style-type: none"> <li>Original proposed Project substation</li> <li>Along the land cable alignment</li> </ul>	Air quality monitoring results from the Formosa 1 Offshore Wind Farm Project environmental monitoring report (July to September 2016) which was presented in <i>Table 6.2.3-4 Formosa 1 Offshore Wind Farm Project air quality monitoring results of the approved EIA</i>
Underwater Noise	October 2015 to March 2016 (approved EIA)	Six monitoring locations around the WTG area	<i>Table 6.2.4-1 Underwater noise monitoring results of the approved EIA</i>
Air-borne Noise	February 2016 to March 2016 (approved EIA)	<ul style="list-style-type: none"> <li>Original proposed Project substation</li> </ul>	<i>Table 6.2.4-18 Supplementary ambient noise monitoring data of the approved EIA</i>
	July 2018 (1 <sup>st</sup> EIA deviation report)	<ul style="list-style-type: none"> <li>Intersection of Gongming Street and Fuxing Road</li> <li>Taichung Harbor</li> <li>Proposed Project substation after the 1<sup>st</sup> EIA deviation</li> <li>Residential area near Kaiyuan road (added after the 1<sup>st</sup> EIA deviation report)</li> </ul>	<i>Table 6.3.1-1 Supplementary ambient noise monitoring results of the 1<sup>st</sup> EIA deviation report</i>

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Parameter	Period of survey conducted	Location of survey	Remarks (eg Source / accuracy / reliability)
	July to September 2016 (approved EIA)	<ul style="list-style-type: none"> <li>Intersection of Zhuwei Street and Fuxing Road</li> <li>Intersection of the second section of Bo'ai Street and Huanshi Road</li> </ul>	Air-borne noise monitoring results from the Formosa 1 Offshore Wind Farm Project environmental monitoring report (July to September 2016) which was presented in <i>Table 6.2.4-19 Formosa 1 Offshore Wind Farm Project noise monitoring results</i> of the approved EIA
Low frequency noise	February 2016 to April 2016 (approved EIA)	<ul style="list-style-type: none"> <li>Qiding adventure park</li> <li>Residential areas situated near Baishatun Fishing Port</li> <li>Waipu Fishing Port</li> <li>Original proposed Project substation</li> </ul>	<i>Table 6.2.4-21 Low frequency noise monitoring results</i> of the approved EIA
Vibration	February 2016 to March 2016 (approved EIA) July 2018 (1 <sup>st</sup> EIA deviation report)	<ul style="list-style-type: none"> <li>Original proposed Project substation</li> <li>Intersection of Gongming Street and Fuxing Road</li> <li>Taichung Harbor</li> <li>Proposed Project substation after the 1<sup>st</sup> EIA deviation</li> <li>Residential area near Kaiyuan road (added after the 1<sup>st</sup> EIA deviation report)</li> </ul>	<i>Table 6.2.4-23 Vibration monitoring data</i> of the approved EIA <i>Table 6.3.1-2 Supplementary vibration monitoring results</i> of the 1 <sup>st</sup> EIA deviation report
	July to September 2016 (approved EIA)	<ul style="list-style-type: none"> <li>Intersection of Zhuwei Street and Fuxing Road</li> <li>Intersection of the second section of Bo'ai Street and Huanshi Road</li> </ul>	Vibration monitoring results from the Formosa 1 Offshore Wind Farm Project environmental monitoring report (July to September 2016) which was presented in <i>Table 6.2.4-24 Formosa 1 Offshore Wind Farm Project noise monitoring results</i> of the approved EIA
Surface water quality	Year 2013 to year 2016 (approved EIA)	<ul style="list-style-type: none"> <li>Zhonggang River Basin</li> <li>Houxi River Basin</li> <li>West Lake Stream Basin</li> </ul>	EPA's Water Quality Monitoring Information: <a href="http://wgshow.epa.gov.tw/">http://wgshow.epa.gov.tw/</a>  <i>Table 6.2.5-1 Historical water quality analysis result</i> from the EPA of the approved EIA
	February to April 2016 (approved EIA) July 2018 (1 <sup>st</sup> EIA deviation report)	<ul style="list-style-type: none"> <li>Zhunan artificial wetland</li> <li>Taliu ditch (discharge from Longfeng harbour)</li> </ul>	<i>Table 6.2.5-2 Supplementary monitoring result</i> of nearby surface water body of the approved EIA  <i>Table 6.1.1-3 Supplementary monitoring result</i> of surface water quality of the 1 <sup>st</sup> EIA deviation report
	April 2018 to October 2018 (1 <sup>st</sup> EIA deviation report)	Zhonggang River Basin: Wufu Bridge	<i>Table 6.1.1-1 EPA 2018 water quality survey results at Wufu Bridge water quality station</i> of the 1 <sup>st</sup> EIA deviation report
	Year 2016 to Year 2018 (1 <sup>st</sup> EIA deviation report)	Zhonggang River Basin: Jianshan Bridge	<i>Table 6.1.1-2 EPA 2018 water quality survey results at Jianshan Bridge Water Quality Station</i> of the 1 <sup>st</sup> EIA deviation report

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Parameter	Period of survey conducted	Location of survey	Remarks (eg Source / accuracy / reliability)
Groundwater quality	Year 2014 (approved EIA)	Ground water distribution around Project site and land cable alignment	Water Resources Agency, Taiwan Hydrology Annual Report 2014 which was presented in <i>Table 6.2.5-3 Project site groundwater level changes</i> of the approved EIA
	Year 2012 to 2016 (approved EIA)	<ul style="list-style-type: none"> <li>• Waipu Elementary School</li> <li>• Chenggong Elementary School</li> <li>• Tongguang Elementary School</li> <li>• Zhonghe Elementary School</li> <li>• Qiming Elementary School</li> <li>• Tongyu Fine Salt Factory</li> </ul>	National Environmental Water Quality Monitoring Information: <a href="http://wq.epa.gov.tw/WQEPACode/">http://wq.epa.gov.tw/WQEPACode/</a> which was presented in <i>Table 6.2.5-4 Project site groundwater and water quality monitoring results</i> of the approved EIA
Electromagnetic Field (EMF)	August 2016 (approved EIA)	<ul style="list-style-type: none"> <li>• Residential at the port</li> <li>• Zhaoxing Road protected forest residence</li> <li>• 548 Lane, Zhaoxing Road</li> <li>• Dajing residence</li> <li>• Zhonggang Yufeng Palace</li> <li>• Zhonggang Police Station</li> </ul>	<i>Table 6.2.10-3 Electromagnetic field baseline data along the land cable alignment</i> of the approved EIA
	July 2018 (1 <sup>st</sup> EIA deviation report)	<ul style="list-style-type: none"> <li>• Cable landing point</li> <li>• Proposed Project substation</li> <li>• Various point along the land cable alignment</li> <li>• Residence 1</li> <li>• Opposite nursery school</li> <li>• Yingpan Substation</li> </ul>	<i>Table 6.14.1-2 Supplementary electromagnetic field baseline data</i> of the 1 <sup>st</sup> EIA deviation report

## C.2 BIODIVERSITY BASELINE STUDIES

**Table 13: Summary of ecological surveys conducted**

Surveys conducted	Summary of results
<b>Terrestrial habitat and flora survey</b>	<ul style="list-style-type: none"> <li>Main habitats identified were of agricultural land, abandoned land and windbreak forests. No natural forests observed. No habitats of conservation value were identified.</li> <li>Eight endemic and 159 native and 90 cultivated plants were observed. Common invasive grass species have been observed throughout the survey sites.</li> <li>Out of eight endemic plants observed, six were artificially planted. All five rare plants recorded were also artificially planted.</li> </ul>
<b>Terrestrial fauna survey</b>	
<ul style="list-style-type: none"> <li>Mammal survey</li> </ul>	<ul style="list-style-type: none"> <li>Total of nine species of mammals observed. None of which are of conservation status.</li> </ul>
<ul style="list-style-type: none"> <li>Terrestrial bird survey</li> </ul>	<ul style="list-style-type: none"> <li>Total of 61 bird species observed during terrestrial bird survey; 22 migratory species, 15 endemic species/sub-species of birds. Only 5 of out 16 of previously recorded conservation status species were observed during the survey. 11 of the historical recorded species belongs to species that can be found during the coastal bird survey. Two protected species of nationally protected category II species was observed, the Greater painted snipe and the Black-winged kite.</li> </ul>
<ul style="list-style-type: none"> <li>Herpetofauna (Reptiles and amphibians)</li> </ul>	<ul style="list-style-type: none"> <li>A total of four endemic amphibian/reptiles observed: Stejneger's glass lizard (<i>Takydromus stejnegeri</i>), Swinhoe's japalura (<i>Japalura swinhonis</i>), Formosan Chinese skink (<i>Eumeces chinensis formosensis</i>) and Temple tree frog (<i>Kurixalus idiotocous</i>)</li> </ul>
<ul style="list-style-type: none"> <li>Bat survey</li> </ul>	<ul style="list-style-type: none"> <li>Total of four species of bat observed of which two species were endemic. No bats of national or international conservation status were observed.</li> </ul>
<ul style="list-style-type: none"> <li>Invertebrate survey (Butterflies and Odonates)</li> </ul>	<ul style="list-style-type: none"> <li>13 endemic subspecies of butterflies found within areas of high disturbance.</li> </ul>
<b>Aquatic survey</b>	
<b>Aquatic plant survey</b>	<ul style="list-style-type: none"> <li>Low biodiversity was observed in the ponds. There is a total of eight species of plant species with the lotus identified as covering high percentage of the ponds. Majority of the species observed were exotic with only two species that were native. No endemic or rare plants were observed.</li> </ul>
<b>Aquatic fauna survey</b>	<ul style="list-style-type: none"> <li>A total of 10 species of fish, seven species of crabs, five species of snails and shellfish fish and 11 species of aquatic insects observed.</li> <li>All species observed were common with some exotic species. No species of conservation status were recorded.</li> </ul>
<b>Coastal and marine bird/bat survey</b>	
<ul style="list-style-type: none"> <li>Coastal bird survey</li> <li>Intertidal bird survey</li> <li>Seabird survey</li> </ul>	<ul style="list-style-type: none"> <li>27 migratory species observed during coastal and intertidal bird survey, two endemic subspecies (<i>Spilornis cheela</i> and <i>Acridotheres cristatellus</i>).</li> </ul>



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Surveys conducted	Summary of results
<ul style="list-style-type: none"> <li>Raptor survey<sup>10</sup></li> </ul>	<ul style="list-style-type: none"> <li>Raptor survey identified several bird species that have been assessed for a potential risk collision with WTG blades:               <ul style="list-style-type: none"> <li>- Chinese sparrowhawk (<i>Accipiter soloensis</i>): o Taiwan protected species (Cat II), Migratory species                   <ul style="list-style-type: none"> <li>o Estimated migratory numbers of 17,217 in three groups.</li> <li>o Flight altitude averages 259-333m</li> <li>o EIA assessed that the WTG operation have no direct impact on species</li> </ul> </li> <li>- Grey-faced Buzzard (<i>Batastur indicus</i>):                   <ul style="list-style-type: none"> <li>o Taiwan protected species (Cat II), Migratory species</li> <li>o Four groups of a total 1,066 numbers estimated. Flight altitude average 259-400m (WTG assessed to have no direct impact on species)</li> </ul> </li> <li>- Terns:                   <ul style="list-style-type: none"> <li>o Six species of Terns observed and assessed not to pass through the Project area. However, some species of terns that were not recorded during the survey are known to breed on islands north of Taiwan such as the International Union for Conservation of Nature (IUCN) Endangered Black-bellied Tern (<i>Sterna acuticauda</i>) require further monitoring to assess if the terns do pass through the Project area.</li> </ul> </li> <li>- Black-faced Spoonbill (<i>Platalea minor</i>):                   <ul style="list-style-type: none"> <li>o Endangered in the IUCN Red List and locally protected (Cat I) species.</li> <li>o Mapping of the Black-faced spoonbill migratory route has been assessed to fly near or through the Project area.</li> <li>o Flight altitude of black-faced spoonbill not established.</li> <li>o Estimated average flight altitude is 190.25m.</li> </ul> </li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Bat coastal survey</li> </ul>	<ul style="list-style-type: none"> <li>Total of 8 species of bats recorded with seasonal occurrence of each species during winter and spring. No bats of conservation status indicated.</li> </ul>
<ul style="list-style-type: none"> <li>Night avian survey (radar)</li> </ul>	<ul style="list-style-type: none"> <li>58 records of flightpaths observed in August, majority was situated in the southwest section of the Project. Most sighting occurred within 1-5km from the coastline. This has been identified as high risk of bird collision)</li> <li>272 records of flight paths with 8 records of flight attitudes observed in September and November surveys.</li> <li>Flight altitude survey: Lowest attitude recorded was 13m and highest was 157m. There were no records within 200-500m range. Four visual observations of the Grey-faced buzzard were made.</li> <li>Peak nocturnal activity was between 2200-0000 and 0500-0700hr.</li> <li>Majority of the avian flight directions are towards the south and southwest during summer, southeast and west during autumn, northeast during winter and northeast and north during spring.</li> </ul>
<b>Intertidal survey</b>	
<ul style="list-style-type: none"> <li>Intertidal ecological survey</li> </ul>	<ul style="list-style-type: none"> <li>Generally low biodiversity (0.52 -2.72) observed based on Shannon-Weiner index which is typically between 1.5-3.5 in most ecological studies.</li> </ul>

<sup>10</sup> Flight altitude of birds were compared against the height of the WTG blades movement. However, exact length of the WTG blade cannot be determined as the capacity of the WTF has not be decided. However, EIA states that the highest operating range of the WTG blade would be from 182m to 197m above mean sea level (MSL).



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Surveys conducted	Summary of results
<p><b>Marine survey</b></p> <ul style="list-style-type: none"> <li>• Phytoplankton survey</li> <li>• Zooplankton survey</li> <li>• Marine ichthyoplankton, fish larvae and post-larvae survey</li> <li>• Marine benthos survey</li> </ul>	<ul style="list-style-type: none"> <li>• Five surveys were conducted from July 2015 to April 2017 with 10 sampling points for each survey.</li> <li>• Total of 173 species of phytoplankton and 29 species of zooplankton recorded with varying degrees of biodiversity recorded in different sampling stations</li> <li>• No species of conservation concern observed. Fish within Project area mainly composed of species found within shallow waters of Western coast of Taiwan.</li> </ul>
<p><b>Cetacean survey</b></p> <ul style="list-style-type: none"> <li>• Indo-pacific humpback dolphin (Vu)</li> <li>• Indo-pacific bottlenose dolphin</li> <li>• Dwarf sperm whale</li> <li>• Indo-pacific finless porpoise (Vu)</li> </ul>	<ul style="list-style-type: none"> <li>• No ETS Indo-pacific humpback dolphins were observed in the northern area of the Project area, but desktop study showed high occurrence within the eastern side of the Project where the suitable habitat of the ETS Indo-pacific humpback dolphins is situated</li> <li>• Low observations of Indo-Pacific bottlenose dolphins northeast of Project</li> <li>• Desktop studies showed occurrence of dwarf sperm whale and Indo-Pacific finless porpoise.</li> </ul>



### C.3 SOCIAL BASELINE STUDIES

**Table 14: Information disclosure and stakeholder engagement activities related to land use permission, EIA approval and permitting purposes**

Details / Date	Stakeholders engaged	Issues captured
<b>Stakeholder engagement and consultation activities for the local EIA process</b>		
Public opinion survey, dated 30 September 2016	<ul style="list-style-type: none"> <li>Local community (700 residents)</li> <li>Fisherman (111)</li> <li>Opinion leaders</li> </ul>	<ul style="list-style-type: none"> <li>General knowledge on power generation in Taiwan</li> <li>Understanding and attitude towards the Project</li> <li>Area of concern and expectations regarding the Project</li> <li>Personal background information</li> </ul>
Public disclosure meeting held on 18 August 2016	<p>Non-government organisation (NGOs):</p> <ul style="list-style-type: none"> <li>Taiwan Wild Hearts Ecological Association</li> </ul> <p>Political representatives:</p> <ul style="list-style-type: none"> <li>Executive Committee Member of the DPP County Party</li> <li>Times Power Hsinchu Party Department Miaoli Office</li> <li>Village heads within Miaoli County head</li> </ul> <p>Local community groups:</p> <ul style="list-style-type: none"> <li>Zhunan Town People's Congress</li> <li>Nanlong District Fisheries Association</li> <li>Houlong Town People's Congress</li> <li>Zhunan Town People's Congress</li> <li>Local community</li> <li>Taiwan Mazu Fish Conservation Alliance</li> </ul> <p>Authorities:</p> <ul style="list-style-type: none"> <li>Miaoli County Government Environmental Protection Bureau</li> <li>Legislative Council Member, Chung Kong-chao Office</li> </ul>	<ul style="list-style-type: none"> <li>Project information disseminated to the stakeholders                             <ul style="list-style-type: none"> <li>Aims and objectives</li> <li>The need for the Project</li> <li>Project location</li> <li>Project scale</li> <li>Infrastructure involved</li> <li>Construction duration</li> <li>Environmental impact results</li> <li>Environmental management plan</li> <li>Environmental impact mitigations and improvement mechanisms</li> <li>Stakeholder compensation</li> </ul> </li> <li>Gathered feedback and sentiments from various stakeholders</li> </ul>
Online public disclosure – Document dated 20 January 2017	Executive Yuan Agricultural Committee Fisheries Department	Comments / recommendations on fishery rights by Executive Yuan Agricultural Committee Fisheries Department
Online public disclosure – Document dated 2 February 2017	Executive Yuan Agricultural Committee Forestry Bureau	Comments / recommendations on biodiversity issues by Executive Yuan Agricultural Committee Forestry Bureau
Online public disclosure – Document dated 25 January 2017	Executive Yuan Environmental Protection Agency	Request for Project Company to address Nanlong District Fisheries Association's request to relocate the Project area outside of fishery rights zones
Online public disclosure – Document dated 17 January 2017	Nanlong District Fisheries Association's	Request for Project Company to relocate the Project area outside of fishery rights zones
Public disclosure – Document dated 16 May 2018	Executive Yuan Environmental Protection Agency	Public disclosure of the EIA review and approval conditions issued by Executive Yuan Environmental Protection Agency on 16 May 2018.



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Details / Date	Stakeholders engaged	Issues captured
		<ul style="list-style-type: none"> <li>• Stated nation-level plans and neighbouring Projects plans that might have an impact on the Project or might be impacted by the Project</li> <li>• Low level of environmental impact from the Project was determined based on environmental impact assessment, mitigation and prevention measures that were described in the EIA</li> <li>• Environmental baseline studies performed during the EIA studies</li> <li>• Comments on the impact on various environmental parameters. Generally stated that the Project does not exceed local environmental quality standards and environmental tolerance capacity.</li> <li>• Stated that visuals amenities will mostly revert back to conditions pre-construction after laying of sea and land cables and proper land acquisitions will be obtained, thus there will be no community resettlement and rights / lifestyles of indigenous people will not be affected.</li> <li>• As the Project relies on naturally occurring wind energy during operations, the Project is deemed to have low to negligible chemical risks towards public health and safety.</li> <li>• The area of influence of the Project is limited to the Project area hence, there is low to negligible risks towards neighbouring countries.</li> <li>• As the Project relies on naturally occurring wind energy during operations, there are no concerns from other local governmental agencies</li> </ul>

**Stakeholder engagement and consultation activities for Project changes (1<sup>st</sup> EIA deviation)**

- Refer to Table 15 of Appendix C



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**Table 15: Stakeholder engagement and consultation activities for Project changes (1<sup>st</sup> EIA deviation)**

<b>Stakeholder engagement and consultation activities for Project changes (1<sup>st</sup> EIA deviation)</b>		
May 2018	<ul style="list-style-type: none"> <li>Local community</li> <li>Fishermen</li> <li>Local officials</li> <li>NFA</li> <li>Members of parliament and Taiwan President Tsai Ing-wen</li> </ul>	<ul style="list-style-type: none"> <li>Consultation and feedback gathering on Project changes / deviation (mainly changes in online cable alignment and addition of onshore substation) from the original EIA</li> <li>Discussions between stakeholders on collaboration specifics</li> </ul>
June 2018	<ul style="list-style-type: none"> <li>Local community</li> <li>Fishermen</li> <li>Local officials</li> <li>NFA</li> <li>Town office</li> </ul>	
July 2018	<ul style="list-style-type: none"> <li>Local community</li> <li>County head</li> <li>Members of parliament</li> <li>Town office</li> <li>County government</li> </ul>	
September 2018	<ul style="list-style-type: none"> <li>Local community</li> <li>County head</li> <li>NFA</li> <li>Members of parliament</li> </ul>	
October 2018	<ul style="list-style-type: none"> <li>Local community</li> <li>Fishermen</li> <li>Local officials</li> <li>NFA</li> </ul>	
November 2018	<ul style="list-style-type: none"> <li>Local community</li> <li>Fishermen</li> <li>Local officials</li> <li>NFA</li> <li>County government</li> </ul>	
December 2018	<ul style="list-style-type: none"> <li>Local community</li> <li>Fishermen</li> <li>NFA</li> <li>County government</li> <li>National United University</li> </ul>	
January 2019	<ul style="list-style-type: none"> <li>Local community</li> <li>Fishermen</li> <li>NFA</li> <li>Town office</li> </ul>	
February 2019	<ul style="list-style-type: none"> <li>Local community</li> <li>County heads</li> <li>NFA</li> <li>County governments</li> </ul>	

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## D E&S MITIGATION MEASURES AND MONITORING REQUIREMENTS

**Table 16: Construction environmental and social management plan**

Impact parameter and source	Source(s) of impact/activity	Mitigation/enhancement measures	Type & frequency of monitoring
<b>Construction phase</b>			
<b>Environmental</b>			
Noise and vibration (onshore works)	<b>Vehicular noise due to construction traffic</b> <ul style="list-style-type: none"> <li>Near Project facilities (eg substation, land cable alignment)</li> <li>Near sensitive receptors (eg places of worship)</li> </ul>	<ul style="list-style-type: none"> <li>Project vehicles will adhere to speed limits and transportation load limits</li> <li>When travelling through sensitive locations such as schools, residential areas, sudden acceleration, deceleration and honking of the construction vehicles are forbidden, to minimise sudden increase in noise</li> </ul>	Quarterly One 24-hour session of continuous monitoring for each quarter
	<b>Construction noise due to construction works</b> <ul style="list-style-type: none"> <li>Construction of substation</li> <li>Construction of transmission lines</li> <li>Transport of materials, people and equipment to site</li> <li>Use of heavy/percussive equipment</li> </ul>	<ul style="list-style-type: none"> <li>The operating rate of the concrete mixer will be reduced when idling within construction areas to minimise noise produced</li> <li>Sources of noise and vibration should be placed as far away as possible from sensitive receptors (eg schools, hospitals). If the source for noise and vibration is directional, the noise source shall be placed away from sensitive receptors</li> <li>Construction machinery and vehicles shall be regularly maintained to reduce unnecessary noise and vibrations emitted due to old or loose parts of the machinery</li> <li>During land excavation for the land cables, excavators should be placed close to the dump trucks to reduce unnecessary noise emitted from the movements of the excavator</li> <li>Construction schedule should be designed to avoid high levels of noise emissions during night time or dawn</li> <li>Maintain the Project's grievance mechanism to receive, respond, investigate and address noise related complaints</li> </ul>	Monthly One session of, at least 2 minutes of continuous monitoring for each month
Underwater noise (offshore piling work)	Underwater noise generated from offshore construction activities (eg piling works, turbines installation, laying of sea cables)	<ul style="list-style-type: none"> <li>The main impacts (and the corresponding mitigations) of underwater noise pertains to marine mammals (ie cetaceans, including the Indo-pacific humpback dolphin) during offshore piling.</li> <li>Key mitigations to address this aspect, include:                             <ul style="list-style-type: none"> <li>'Jacket piling' will be used to minimise underwater noise</li> <li>Soft start (ramp-up) method over a duration of at least 30 minutes will be used to allow dispersion of marine mammals</li> </ul> </li> </ul>	During piling works of each WTG Deployment of underwater acoustic monitoring devices for the piling duration

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Impact parameter and source	Source(s) of impact/activity	Mitigation/enhancement measures	Type & frequency of monitoring
Air quality and emissions to air	Fugitive dust	<ul style="list-style-type: none"> <li>• No acoustic warning systems will be used to deter cetaceans during piling works</li> <li>• Industry best practice underwater noise prevention measures will be used to reduce underwater noise propagation. Such measures may include bubble curtains</li> <li>• Vessel speeds will be limited to a maximum of six knots within 1.5km from the proposed MWH of the ETS Indo-pacific humpback dolphins</li> <li>• The entire piling process will be recorded from construction vessels. Records will be kept for at least five years</li> <li>• FOW2 will coordinate with surrounding wind farms to mitigate cumulative impacts of underwater noise from pile driving. Coordination of pile driving with other surrounding windfarm Projects will be conducted to ensure that piling of only one WTG is conducted at any point in time. Coordination of work schedules will be conducted with neighbouring windfarms prior to construction</li> <li>• Establishment of a warning zone of 750m and pre-warning zone of 750-1500m radius from pile driving location.</li> <li>• Acoustic and visual cetacean monitoring will be conducted during piling to monitor cetacean activity. A stop work notice will be implemented when cetaceans enter the warning zone. Details to acoustic and visual monitoring for cetacean presence during drive piling are as follows:                         <ul style="list-style-type: none"> <li>– Acoustic monitoring: Four underwater acoustic monitoring devices will be set up within 750m of the piling position for continuous monitoring of cetacean (acoustic) activity and to monitor sound exposure level (SEL) at the 750m station to ensure sound levels do not exceed 160 dB [(dB) re. 1µPa2s]. One monitoring station will be set up at the boundary of the proposed MWH of the Indo-pacific humpback dolphins to monitor cetacean activity as well as sound exposure levels.</li> <li>– Visual cetacean monitoring with assistance of trained marine mammal observers (MMOs): Four vessels will be deployed to circumnavigate the warning zone of 750m radius from the piling location. Each vessel will have at least two trained marine mammal observers (or at least three if the monitoring period is expected to exceed six hours).</li> <li>– No night time piling is expected to be undertaken currently. Pile driving works will be conducted during day; no piling will commence two hours prior to sunset and sunrise unless required and with safety considerations in place. However, in the event that piling is needed to be conducted at night, thermal imagers will be deployed from two vessels to monitor a 750m radius from the piling location</li> </ul> </li> </ul>	Quarterly

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Impact parameter and source	Source(s) of impact/activity	Mitigation/enhancement measures	Type & frequency of monitoring
	Dust generation from on-shore civil/earth works or vehicular movement	<ul style="list-style-type: none"> <li>From the landing point to the Project substation, the Horizontal Direction Drilling (HDD) method will be adopted. The land cable will pass under highway 3 (國 3) and the drainage canal, using the HDD or pipe jacking method. The remaining cables will mainly be along the existing road.</li> <li>During cable laying, the excavated spoil will be transported away from the site promptly hence, no temporary storage area will be set up to avoid dust suspension due to stockpiling of earth.</li> <li>During construction (except on raining days), 50m of road before and after each construction section will be cleaned to reduce dust suspension (due to dust deposition) around moving vehicles.</li> <li>Enforce speed limits to minimise dust suspension due to vehicle movement, especially when travelling within densely populated areas</li> <li>When transporting earth, it shall be covered with a dust-proof cloth or other airtight coverings to avoid dust suspension caused by construction vehicles</li> <li>All construction vehicles should be washed before leaving the construction site</li> </ul>	One 24-hour session of continuous monitoring for each quarter
	<b>Vehicle emissions</b> On-site equipment and construction vehicles emissions	<ul style="list-style-type: none"> <li>Utilising construction equipment and transport vehicles of good conditions to reduce vehicular air emissions. Regular and irregular maintenance work will be done with proper maintenance records</li> <li>All subcontractors shall be requested within their contract to use fuel that is in compliance with Taiwanese standards for transportation/construction vehicles and construction machinery</li> <li>High-grade diesel/fuel such as fuel with low-sulphur oxides and particulate pollutants ratings shall be prioritised for engines used during construction</li> <li>All construction vehicles shall abide to the latest vehicular emission standards</li> <li>The construction vehicle to use diesel fuel (including biodiesel) with a sulphur content of 10ppmw or less</li> </ul>	
Seawater quality	Potential changes to seawater quality as a result of offshore construction activities (eg piling works, turbines installation, laying of sea cables)	<ul style="list-style-type: none"> <li>Construction progress will be monitored closely to reduce the disturbance of the seabed sediment</li> <li>Carry out environmental monitoring of sea water quality during offshore works (ie WTG foundation, and submarine cable laying)</li> </ul>	Quarterly
Surface water quality	Surface runoff during onshore constructions (eg construction of Project substations, land cables alignment)	<ul style="list-style-type: none"> <li>The wastewater generated by the construction shall be collected by the contractor at the designated point</li> <li>The construction materials should be stored at a designated point, and the mechanical maintenance area should be covered with canvas to reduce the chance of contact with rainwater and avoid surface runoff pollution</li> <li>Construction machinery maintenance waste (eg oil) will be collected at the designated point, in the pre-set collection bucket</li> </ul>	Monthly

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Impact parameter and source	Source(s) of impact/activity	Mitigation/enhancement measures	Type & frequency of monitoring
Waste	Domestic waste	<ul style="list-style-type: none"> <li>The domestic wastewater of construction workers shall be disposed through the rental of mobile toilets</li> <li>Licensed cleaning and disposal services will be used for treatment of runoff</li> <li>Domestic waste generated by the Project shall be collected in a covered storage container to prevent pollution via displacement of waste and odour emissions</li> <li>A licensed waste disposal agency or the local authorities shall be engaged / coordinated with to transport the waste to an appropriate waste disposal site</li> <li>Recyclable domestic waste generated by the Project shall be collected and separated by type before transferring to the local relevant waste handling agency for appropriate processing</li> </ul>	Waste manifest or waste disposal records
	<ul style="list-style-type: none"> <li>Construction waste</li> <li>Hazardous waste</li> </ul>	<ul style="list-style-type: none"> <li>Construction and industrial waste generated by the Project shall be collected and separated by type</li> <li>Non-recyclable construction and industrial waste shall be transferred to and disposed by a licensed waste disposal agency</li> <li>Recyclable construction and industrial waste shall be transferred to the local relevant waste handling agency for appropriate processing</li> <li>Overload of transportation vehicles carrying excavated spoils or other waste materials shall be avoided. These transportation vehicles shall also be appropriately covered to avoid potential pollution along transportation routes.</li> </ul>	Waste manifest or waste disposal records
<b>Social</b>			
Stakeholder engagement and grievance mechanism	Impacts to stakeholders (eg fishermen, residents) due to onshore and offshore construction works	<ul style="list-style-type: none"> <li>A Community Liaison Officer (CLO) will be appointed for managing stakeholder engagement and other social commitments). The CLO will be responsible for community liaison and arranging communications and will be constant throughout the delivery of the Project. A record of the stakeholder engagement activities (eg minutes of meeting and photographic evidence) and lines of communication with directly affected community leaders will be maintained by the CLO.</li> <li>The CLO will be responsible for the management of the grievance mechanism and maintenance of a grievance log. This grievance log will record all grievances (both closed and ongoing open grievances).</li> <li>Periodic (ie weekly, quarterly, semi-annual and annual) reporting and review of stakeholder engagement activities and grievances were established</li> </ul>	<p>Sporadic stakeholder engagement activities shall be conducted depending on the development of the Project</p> <p>The grievance mechanism will be made available to the stakeholders throughout the construction period</p>
Fishermen compensation	Reduction of fishing space which will directly affect the livelihood of the fishermen.	<ul style="list-style-type: none"> <li>FOW2 to organise symposium/discussion sessions with local fisherman</li> <li>FOW2 will continue to communicate with fisheries and fishermen regarding corporate responsibility, to achieving mutual agreement as soon as possible</li> <li>FOW2 will handle the fishery compensation in accordance with the Fisheries Department's "Fisheries Right Compensation Benchmark for Offshore Windfarm" and will reach a fishery compensation cooperation agreement with the Fisheries Association.</li> </ul>	Documentation as relating to communications and compensation issues pertaining to the fishermen

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Impact parameter and source	Source(s) of impact/activity	Mitigation/enhancement measures	Type & frequency of monitoring
Labour grievance	Potential grievances from labour workforce with regard to working conditions and other relevant matters	<ul style="list-style-type: none"> <li>• Human resource policies in procedures must be communicated to workers, and implemented</li> <li>• Working conditions and terms of employment must be clearly stipulated and communicated to workers</li> <li>• A workers' grievance mechanism will be developed and implemented for the Project</li> <li>• The Project's provisions for labour and working conditions are to cover contractors, subcontractors, non-employee workers and workers engaged by third parties</li> </ul>	Workers' grievance log
Cultural assets - Archaeological surveillance	Potential damage to cultural heritage elements in the event of unexpected discovery within the Project's area of activities	<ul style="list-style-type: none"> <li>• Archaeological professionals to be engaged to monitor the entire construction process. An archaeological monitoring plan will be submitted to the Miaoli County Government for approval and shall be implemented by the Project upon approval</li> <li>• Onshore works:                             <ul style="list-style-type: none"> <li>– In the event of discoveries of objects with cultural / historical values, there will be an immediate stoppage of work and the relevant local authorities shall be notified.</li> <li>– Construction works shall not destroy the integrity of historic sites, historical buildings, memorial buildings and settlement buildings, nor shall the appearances of said findings be concealed or their passage of views be obstructed. If said findings were damaged, relevant authorities shall be notified and a review meeting shall be held. Construction works shall only recommence upon approval from the review meeting.</li> <li>– Construction works shall be temporarily suspended during the religious event – "Cleansing of the harbour and praying to the rivers", organised by Zhonggang Cihyu Temple</li> </ul> </li> <li>• Offshore work:                             <ul style="list-style-type: none"> <li>– When a suspected underwater cultural asset is discovered, work shall be stopped, the integrity of the site shall be maintained, relevant local authorities shall be notified</li> <li>– If the suspected underwater cultural assets are found in the results of the investigation, they will be confirmed by underwater professional archaeologists.</li> <li>– If there is a suspected underwater cultural asset target within the area of the Project wind farm and cannot be confirmed, the WTG position will be adjusted to avoid the underwater cultural assets.</li> </ul> </li> </ul>	To be monitored by the archaeologist throughout the construction period; documented through chance find reports or records
Visual aesthetics	Potential impact to the character of the surrounding landscape, affecting the visual amenity (if any) of the broader area	<ul style="list-style-type: none"> <li>• The construction equipment and materials of the transmission and distribution system and the stacking of waste materials must be considered during the construction period to ensure that items are not scattered and stacked</li> </ul>	Not applicable



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		inappropriately, avoiding disturbance to the original visual aesthetics of the landscape.	
<b>Health and Safety</b>			
Traffic safety	Traffic volume around Project components will increase during construction due to usage of Project vehicles for transportation purposes	<ul style="list-style-type: none"> <li>During construction of the land cables alignment, traffic guides will be deployed to coordinate traffic flows</li> <li>Construction of the land cables alignment will be undertaken in sections. Only upon completion of a section of the land cables alignment, can the construction of the next section commence.</li> <li>Alternative routes shall be introduced should existing routes be made unavailable to the public due to construction works. Signages shall be erected and traffic guides shall be deployed to facilitate the public in their navigation of these alternate routes.</li> <li>Condition of roads utilized by the Project shall be irregularly inspected</li> <li>A traffic maintenance plan shall be developed</li> <li>To avoid affecting the serviceability of other roads, Project transportation vehicles shall only adhere to predetermined transportation routes</li> <li>Transportation of excavated spoils shall avoid peak hour traffics (eg children going to school and returning from school)</li> </ul>	Not applicable
Marine traffic safety	Project vessels utilised for offshore construction works has the potential of colliding with Project components, other Project vessels, fishing vessels or other vessels within the offshore Project area or shipping routes.	<ul style="list-style-type: none"> <li>All types of Project vessels shall adhere to ship safety management procedures and emergency response plans</li> <li>All vessels shall slow down when approaching working sites</li> <li>A safety control area will be demarcated within the construction area</li> <li>WTG components shall be preassembled onshore (as much as possible within practical means) to reduce potential accidents and noise emissions offshore</li> <li>Feasibility of offshore construction works should be assessed or potentially avoided during monsoon and typhoon periods</li> <li>Signages around offshore construction areas will be erected to deter non-Project vessels from entering work areas</li> </ul>	Records of marine traffic accidents or incidents
Health and safety	Occupational health and safety hazards associated with the Project's activities, potentially resulting in worker's injuries or accidents	<ul style="list-style-type: none"> <li>Implement the good practice and risk management system/procedures as described in the EIA, and FOW2's Health and Safety Plan. Track health and safety statistics (eg lost-time injuries, near miss, safe working hours) in order to monitor the health and safety performance of the Project, to identify the need for intervention or improvement</li> </ul>	Lost time injuries (LTI) statistics  Incidents, near-miss log and investigation reports
<b>Operation phase</b>			
Underwater noise (during operation)	Operations of the wind farm	<ul style="list-style-type: none"> <li>No significant underwater impacts are envisaged however regular monitoring will be conducted</li> </ul>	Quarterly
Electromagnetic Field (EMF)	Electrical distribution components (eg submarine cable alignment, land cable alignment, onshore substation)	<ul style="list-style-type: none"> <li>No significant EMF emission impacts are envisaged however regular monitoring will be conducted</li> </ul>	Quarterly

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Surface water quality	Operations around Project substation and Zhunan artificial wetlands	<ul style="list-style-type: none"> <li>Wastewater and sewage will not be directly discharged into the farmland water irrigation system (eg ditches and channels), and the Zhunan artificial wetland. Wastewater and sewage will be discharged into proper discharge system after treatment</li> </ul>	Quarterly

