Environmental Monitoring of Yunlin Offshore Wind Farm

Offshore Construction & Operation Phase 15th Quarter
Environmental Monitoring Report
(September-November 2023)
&
Onshore Construction& Operation Phase 20th Quarter
Environmental Monitoring Report
(October-December 2023)

Final

Developer	:	Yunneng Wind Power Co., Ltd.
Monitored By	:	Unitech New Energy Engineering Co., Ltd.
Submission Date	:	July 2024

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Preface

I. Regulatory

The environment monitoring project is in accordance with the environmental monitoring plan in the finalized version of the "Yunlin Offshore Wind Farm Development Project Environmental Impact Statement" approved by Environment Protection Administration (EPA) on 21 June 2018 (#official letter 1070046931), the "Yunlin Offshore Wind Farm Development Project Comparison Table of Content Changed (Changing Monitoring Plan)" approved on 11th December 2018 (#official letter 1070100406) and "Yunlin Offshore Wind Farm Development Project Environmental Impact Statement- 1st Differential Analysis Report" (Variation on earthwork handling plan) approved on 3rd January 2020.

The "Yunlin Offshore Wind Farm Development Project" (the Project) actively participates in the Directions for Allocating Installed Capacity of Offshore Wind Potential Zones promulgated by BOE on January18, 2018, and plans to begin offshore construction in March 2020 in response to the offshore wind power energy policy of 520MW in 2020 and 5.5GW in 2025. On May 17, 2018, BOE notified via official letter #10704602861 that Yunlin wind farm has been awarded a place in the 2020-completion grid connection plan.

According to the pre-construction monitoring plan added after the preliminary meeting of the EPA task force during review of EIS on 27th July 2017, the bird ecological radar monitoring survey must begin 2 years prior to offshore construction. Therefore, the bird ecological radar monitoring survey for this project began in March 2017. It is stated in the change of monitoring plan in December 2018 that monitoring schedule is decided depending on starting date of offshore construction. Offshore environmental monitoring in pre-construction 2 years before construction has been completed in February 2020. The project will continue to conduct monitoring surveys during construction phase in compliance with the EIA approved monitoring plan. As some of the turbines have obtained electricity enterprise license since July 2023, the project has officially entered construction and operation phase. The project will continue to conduct monitoring surveys during operation phase in compliance with the EIA approved monitoring plan.

In addition, marine bat recording surveys at pre-construction, construction and operation phases of Yunlin Offshore Windfarm are planned following "Yunlin Offshore Windfarm Bird and Bat Survey Protocol" in accordance with Environmental and Social Action Plan item number 20 and IFC standards.

II. Monitoring Duration

Following the matters written in the EIA documentation of the "Yunlin Offshore Wind Farm Development Project" and the environmental monitoring required in review

resolutions, Yunneng Wind Power Co., Ltd. started the environmental monitoring surveys of the began in January 2019; the environmental monitoring surveys for offshore construction in March 2020. The Project entered construction and operation phase since July 2023. The monitoring during operation phase is conducted from August 2023.

This environmental monitoring report is for the 15th quarter of offshore construction phase monitoring (September-November 2023) and the 20th quarter of onshore construction and operation phases monitoring (October-December 2023).

III. Monitoring Unit

This monitoring project is compiled by Unitech Engineering Co., Ltd., which is also responsible for the writing of monitoring report, and the management and coordination of certified institutes, academic researchers and experts to carry out the environmental monitoring works. The units for each monitoring item in this quarter are listed as follows:

i Water Quality, Air Quality, Noise Vibration and Construction Noise, electromagnetic field: SGS Group.

ii Bird Ecology, Marine Ecology (intertidal, plankton, benthic organisms, underwater filming), Terrestrial Ecology: Hong Yi Ecological Co. Ltd.

iii Marine Ecology (fish larva and fish egg, fish, fishery resource): Sci Mar Co. Ltd.

iv Cetacean Ecology (visual monitoring): Faith Future Co., Ltd.

v Piling Noise Monitoring of each turbine: SGS Co., Ltd.

vi Cetacean Ecology (underwater acoustic survey), Underwater noise: Yongyi Information Co., Ltd.

Chapter 1 Monitoring Overview

1.1 Construction Progress

Construction of the Project was divided into onshore and offshore portion; The onshore portion includes construction of onshore transmission facilities and the offshore portion includes construction of offshore wind farm and submarine cable.

I. Onshore construction

i Onshore booster stations

The civil engineering of Taixi and Sihu booster station have been completed in June 2020; operation license of Sihu booster station was obtained in July 2020, and operation license of Taixi booster station was obtained in November 2022.

ii Onshore cable

Civil construction of the cable between Taixi booster station and Taixi substation, and between Sihu booster station and Sihu substation have been completed in June 2020.

iii Output cable connecting to the booster stations

Construction on connection conduits for submarine cables at Taixi booster stations and Sihu booster station have been completed in June 2020.

II. Offshore construction

A total of 80 turbines are planned in the Project. Pilings of wind turbine foundations started in November 2020. Piling of the foundations of 45 turbines were completed by end of November 2023 as shown in Table 1.1-1.

1.2 Monitoring Status

The environmental monitoring results of the 15th quarter of offshore construction phase (September-November 2023) and the 20th quarter of onshore construction and operation phase (October-December 2023) are summarized as Table 1.2-1.

Table 1.1-1 Piling Schedule of the Turbine Foundation (1/2)

NO.	Foundation No.	Month of Piling
1.	YUN53	2020 November
2.	YUN80	2021 February
3.	YUN38	2021 February
4.	YUN76	2021 March
5.	YUN51	2021 April- May
6.	YUN52	2021 May
7.	YUN64	2021 June
8.	YUN79	2021 June
9.	YUN42	2021 June
10.	YUN78	2021 June
11.	YUN37	2021 July
12.	YUN43	2021 September
13.	YUN49	2021 September
14.	YUN57	2021 September
15.	YUN45	2021 October
16.	YUN63	2022 July
17.	YUN50	2022 August
18.	YUN73	2022 August
19.	YUN74	2022 August
20.	YUN72	2022 August
21.	YUN71	2022 September
22.	YUN77	2022 October
23.	YUN13	2023 April
24.	YUN21	2023 May
25.	YUN20	2023 May
26.	YUN62	2023 May
27.	YUN12	2023 May
28.	YUN11	2023 May

Table 1.1-1 Piling Schedule of the Turbine Foundation (2/2)

NO.	Foundation No.	Month of Piling
29.	YUN70	2023 June
30.	YUN61	2023 June
31.	YUN68	2023 June
32.	YUN69	2023 June
33.	YUN66	2023 July
34.	YUN32	2023 July
35.	YUN65	2023 July
36.	YUN58	2023 July
37.	YUN30	2023 August
38.	YUN39	2023 August
39.	YUN28	2023 August
40.	YUN27	2023 August
41.	YUN23	2023 September
42.	YUN19	2023 September
43.	YUN06A	2023 September
44.	YUN35	2023 September
45.	YUN34	2023 September

Table 1.2-1 Environmental Monitoring Results (1/5)

Phase	Category	Monitoring Items	Summary of Monitoring Results	Response Action
Offshore Construction	Marine Water Quality	Water temperature, pH value, BOD, Salinity, Dissolved Oxygen, Ammonia-N, Nutrients, Suspended Solid, Chlorophyll a, Coliform group	All values are in normal range and comply with Water Quality Standard of Marine Waterbody.	No abnormal issues were found.
	Bird Ecology	Species, amount, habiting and flying activities, flying route, seasonal flock change etc. (including shore bird and water bird)	1.Offshore bird: 3 orders, 3 families, 4 species and 25 individuals were recorded. 1 Rare and Valuable Species was recorded, which was Greater crested tern. All species were recorded under 10m. Overall, average density of offshore bird is 0.275 individual/km². 2.Coastal bird survey: 12 orders, 31 families and 67 species of birds were recorded. 11 orders, 27 families and 60 species of birds were recorded at selected submarine cable landing route, 11 orders, 30 families and 59 species were recorded at non-selected submarine cable landing route. For the selected submarine cable landing route, 2 Rare and Valuable Species (Black-winged Kite and Common Kestrel) and 1 Other Wildlife that Deserves Protection (Brown Shrike) were recorded. For the non-selected submarine cable landing route, 2 Rare and Valuable Species (Black-winged kiten and Little tern) and 2 Other Wildlife that Deserves Protection (Oriental Pratincole and Brown Shrike) were recorded.	No abnormal issues were found.

Table 1.2-1 Environmental Monitoring Results (2/5)

Phase	Category	Monitoring Items	Summary of Monitoring Results	Response Action
Offshore Construction	Marine Ecology	Intertidal Ecology	1. Sessile marine algae Since sediment of all stations are sand, there is no spots for sessile marine algae to stick on, such as reef and huge rocks. No large sessile marine algae was recorded in this quarter. 2. Intertidal benthic organism 14 orders, 25 families and 35 species were recorded. 8~30 species are found in each sampling station, with most species found in C3 stations. As for abundance, 80~278 individuals are found in each station, with C4 observing the most individuals. *Amphibalanus amphitrite* (301 individuals) contributes to 28.13% of the overall creatures, followed by *Austruca lactea* (99 individuals, 9.25%) and *Thais clavigera* (91 individuals, 8.50%).	No abnormal issues were found.
	Marine Ecology	Plankton, Zooplankton Juvenile Fish Egg and Fish Larva, Benthic Organism	1.Plankton 6 phylum, 87 genus and 160 species were recorded. Species of algae in each water layer are between 21~63, with 10m under water surface in S1 station observing the most species. Abundance in each station/water layer is between 730~12,510 Cells/L, with water surface in S2 station obtaining the most abundance and bottom layer of S3 obtaining the most species . 2.Zooplankton 7 phylum and 12 genres were recorded. 5~11 genre are observed in each sampling station. Abundance in each station is between 10,846~47,159 inds./1,000 m^3, with S3 recorded the most genres, and S1 recording the highest abundance. 3.Marine benthic organism 5 order, 9 families, 11 species, 35 individuals were recorded. 2-5 species. S1 recorded 3 species, and the rest of the stations recorded 4 species. 3-11 individuals were observed in each sampling station. S3 recorded the most species and the highest abundance. 4.Fish larva and fish egg 489 eggs and 3 fish larva were captured in this quarter. 3 families and 3 genre of fish egg were identified, which ar Cynoglossidae sp., *Stolephorus commersonnii* and *Pennahia macrocephalus*. 3 families and 3 genre of fish larva were identified, which are Clupeidae sp., *Photopectoralis aureus and Trichiurus* sp..	No abnormal issues were found.

Table 1.2-1 Environmental Monitoring Results (3/5)

Phase	Category	Monitoring Items	Summary of Monitoring Results	Response Action
Offshore Construction	Marine Ecology	Fish	9 families, 14 species and 54 individuals are captured, with a total of 16.93 kg. 3 species (*Arius maculatus*, *Netuma thalassina and Pennahia macrocephalus*) were recorded in all three stations this quarter, indicating the species have the widest range of distribution. *Arius maculatus* had the most individuals (21 individuals), accounting for 38.9% of total individuals.	No abnormal issues were found.
		Underwater filming	During this season, the underwater photography survey of five turbines, namely YUN12, YUN20, YUN21, YUN62, and YUN74, was conducted on September 19th to 20th, 2023. The survey documented a total of 1 order, 4 families, and 4 species. Specifically, in the middle layer of YUN20, 1 *Plectorhinchus cinctus,* 6 *Abudefduf vaigiensis*, 8 *Pterocaesio digramma,* and 1 bottom-dwelling Apogonidae were recorded. In the middle layer of YUN62, 7 *Pterocaesio digramma* were observed. No species were recorded in YUN12, YUN21, and YUN74.	No abnormal issues were found.
	Cetacean Ecology	Underwater Acoustic Survey	The underwater acoustic device was deployed on September 19-20, 2023 (YW-3, YW-4, YW-5) and September 20-21, 2023 (YW-1,YW-2). Measuring time is 1 day (24 hours). 1. Whistles 1 whistles were detected in YW-5. Whistles were detected in 1 hours, contact rate is 1 times/hour. No whistles were detected from YW-1 to YW-4. 2. Clicks 1 clicks were detected in YW-5. Whistles were detected in 1 hours, contact rate is 1 times/hour. No whistles were detected from YW-1 to YW-4.	No abnormal issues were found.
		Visual Monitoring	6 survey trips were completed this quarter. On-effort record is 682.0 hours and 21.77 km. 1 herd of Yangtze Finless Porpoise were recorded in the wind farm area. Sighting rate is 0.17, and 0.30 herd/100km, 0.46 herd/10 hours.	No abnormal issues were found.

Table 1.2-1 Environmental Monitoring Results (4/5)

Phase	Category	Monitoring Items	Summary of Monitoring Results	Response Action
Offshore Construction	Underwater Noise	Underwater noise 20 Hz-20kHz. Spectrogram, 1-Hz band, 1/3 Octave band analysis	Due to the currents flowing through the device during tidal changes and the vessels frequently passing by the device, the noise is mainly in low frequency, the energy is mostly under 36Hz.	No abnormal issues were found.
	Underwater piling noise		Piling for five turbine foundations was carried out this quarter. The piling noise was measured by SGS, and the underwater noise results were below SPL_{peak} 190 dB re. 1μPa: 1. YUN-23 Measuring result: SPL_{peak}183.5 2. YUN-19 Measuring result: $SPL_{peak_}$178.2 3. YUN-06A Measuring result: SPL_{peak} 185 4. YUN-35 Measuring result: SPL_{peak} 185.1 5. YUN-34 Measuring result: SPL_{peak} 187.9	-

Table 1.2-1 Environmental Monitoring Results (5/5)

Phase	Category	Monitoring Items	Summary of Monitoring Results	Response Action
Onshore Construction	Air Quality	Wind Direction, Wind Speed, Pollutant (TSP, PM_{10}, $PM_{2.5}$)	Air quality monitoring results complied with the air quality standard.	No abnormal issues were found.
	Noise Vibration	All time period (daytime, nighttime and midnight) equivalent energy sound level, day and night vibration level	Noise monitoring results showed all noise values comply with the Noise Control Standards of Second Type of Zone near roads more than 8m wide. Vibration monitoring results at all stations complied with the referenced First Type Control Zone Standards in Japan Vibration Regulations.	No abnormal issues were found.
	Construction Noise	1. Low Frequency (20 Hz- 200 Hz L_{eq}) 2. General Frequency (20Hz -20kHz L_{eq} and L_{max})	Sihu booster station and Taixi station have obtained operating license in July 2020 and November 2022. Therefore, no low-frequency construction noise monitoring is carried out.	No abnormal issues are found.
	Terrestrial Ecology	Ecology of Terrestrial Animal and Plant	1.Plant Since the survey area is engaged with high frequency human activities, observed species are mostly cultivated or species with high tolerance. Except for planted species, 3 rare indigenous species were discovered within survey area, including winged pulchea, formosan peacock-plume and dimorphic crab grass. Winged pulchea distributed at the trench of selected land cable landing route for Taixi onshore cable, formosan peacock-plume distributed at the roadside of selected land cable landing route for Taixi onshore cable, and dimorphic crab grass that distributed at outlaying area of roads, not on the surface of construction area. 2.Animal 3 Rare and Valuable Wildlife (Painted Snipe, Black-winged Kite and Common Kestrel) was recorded and 1 Other Species deserving Protection (Brown Shrike). Painted Snipe was recorded perching on non-selected land cable landing route. Black-winged Kite and Common Kestrel were recorded flying on the selected land cable landing route. Brown Shrike were recorded perching on the selected land cable landing route and the non-selected land cable landing route.	No abnormal issues are found.

Onshore Operation	Electromagnetic Field	Magnetic field (mG), electronic field	The magnetic field in Sihu booster station is conducted in Q3. No survey was conducted in this quarter.	No survey was conducted in this quarter.

1.3 Summary of Monitoring Project

Monitoring items, locations, frequency and schedule are listed in Table 1.3-1 to Table 1.3-3. Monitoring methodologies of the environmental monitoring are shown in Table 1.3-4.

Table 1.3-1 Table of Offshore Construction and Operation Phase Environmental Monitoring (September-November 2023) (1/2)

Category	Monitoring Item	Location	Frequency	Conducted Time
Marine Water Quality	Water temperature, pH value, BOD, Salinity, Dissolved Oxygen, Ammonia-N, Nutrients, Suspended Solid, Chlorophyll a, Coliform group	5 points in wind farm area	Once per quarter	2023.11.02
Bird Ecology	Species, amount, habiting and flying activities, flying route, seasonal flock change etc. (including shore bird and water bird)	Wind farm area and coastal area near the landing points.	Seasonally in winter (Dec.-Feb.); monthly in migration season during spring (Mar.-May), summer (Jun.-Aug.), fall (Sep.-Nov.)	**Offshore** 2023.09.12 2023.10.26 2023.11.03 **Coastal** 2023.09.04~07 2023.10.03~06 2023.11.06~09
Marine Ecology	Intertidal Ecology	50 m of 2 sides of landing point	Once per quarter	2023.10.11
	Plankton, Fish larva and fish egg, Benthic Organism	5 points in the wind farm area	Once per quarter	2023.10.20
	Fish	3 survey lines	Once per quarter	2023.09.07
	Underwater filming	Turbine foundation and periphery	Once after the piling is completed	2023.09.19~20
Cetacean Ecology	Underwater Acoustic Survey	5 underwater acoustic monitoring stations in total.	Once per quarter (may be stopped if construction is stopped in winter)	YW3-5 2023.09.19~20 YW1-2 2023.09.20~21
	Visual Monitoring	Wind Farm Area	30 trips in one year before offshore construction.	2023.09.18 2023.09.19 2023.09.20 2023.09.21 2023.10.19 2023.10.20

Table 1.3-1 Table of Offshore Construction and Operation Phase Environmental Monitoring (September-November 2023) (2/2)

Category	Monitoring Item	Location	Frequency	Conducted Time
Underwater Noise	Underwater noise 20 Hz-20kHz. Spectrogram, 1-Hz band, 1/3 Octave band analysis	2 stations at the boundary of turbines (data can be selected from underwater cetacean acoustic sampling stations.)	Once per quarter (may be stopped if construction is stopped in winter)	Data is from the underwater cetacean acoustic sampling stations YW-3,5 (2023.09.19~20)
Underwater Noise (Piling)	Underwater noise 20 Hz-20kHz. Spectrogram, 1-Hz band, 1/3 Octave band analysis	750m from the piling location	During the piling of each turbine	YUN-23 (2023.09) YUN-19 (2023.09) YUN-06A (2023.09) YUN-35 (2023.09) YUN-34 (2023.09)

Table 1.3-2 Table of Onshore Construction and Operation Phase Environmental Monitoring (October-December 2023)

Category	Monitoring Item	Monitoring Location	Monitoring Frequency	Conducted Time
Air Quality	Wind direction, wind Speed, pollutant (TSP, PM_{10}, $PM_{2.5}$)	1. Anxi Temple 2. Kouhu Junior High School 3. Feisha residence	Once per quarter	2023.10.17~18 2023.12.28~29
Noise Vibration	All time periods (daytime, nighttime and midnight) equivalent energy sound level and vibration level of day and night	1. Residential house on Yugang Road 2. Anxi Temple 3. Feisha residence	Once per quarter	2023.10.17~18 2023.12.28~29
Construction Noise	1. Low Frequency (20 Hz-200 Hz Leq) 2. General Frequency (20 Hz- 20 kHz Leq and Lmax)	1m from the perimeter of booster station construction site, 2 stations in total.	Once per month, continue for more than 2 minutes every time.	Taixi and Xihu booster stations have obtained the operation license
Terrestrial Ecology	Ecology of terrestrial plant and animal	Onshore transmission and distribution system (including booster station, land cable and its vicinity)	Once per quarter	Plant: 2023.10.02~05 Animal: 2023.10.02~05

Table 1.3-3 Table of Onshore Operation Phase Environmental Monitoring (October-December 2023)

Electromagnetic field	Magnetic field (mG)	Xihu booster station	Once per year	No survey in this quarter

Table 1.3-3 Monitoring Method (1/3)

Category	Monitoring Item	Survey Methods
Marine Water Quality	Water temperature	NIEA W217
	pH value	NIEA W424
	BOD	NIEA W510
	Salinity	NIEA W447
	Dissolved Oxygen	NIEA W455
	Ammonia-N	NIEA W437
	Nitrate	NIEA W436
	Nitrite	NIEA W436
	Orthophosphate	NIEA W436
	Suspended Solid	NIEA W210
	Chlorophyll a	NIEA E509
	Coliform group	NIEA E202
Bird Ecology	Species, amount, habiting and flying activities, flying route, seasonal flock change etc. (including shore bird and water bird)	1.Offshore bird survey Offshore bird visual survey is conducted with line transect method (Camphuysen et al. 2004). Survey area includes the wind farm and 1 km around its periphery. Horizontally parallel transect lines (with parallel gaps that are 2.5 km wide) are set in the survey area. Vessels will sail with even speed (about 10 knot) on the transect lines. To make an even survey, vessels will depart from the opposite end of the transect lines in different surveys. 2.Coastal bird survey Counting method during high tides (Sutherland, 1996) is applied. Shore birds will scatter around the muddy plain of intertidal area for foraging during low tides, which makes counting task difficult. On the other hand, during high tides, shore birds will gather on bank or neighboring inlands for resting. Records and calculation will be easier in this period. Survey will be conducted on sunny day that is few days before/after middle or great tide and will be carried out within 3 hours before/after high tide.

Table 1.3-3 Monitoring Method (2/3)

Category	Monitoring Item	Survey Methods
Marine Ecology	Intertidal Ecology	Sampling of this item will be conducted in accordance with "Sampling of Epibiota in Hardground Sea Area Act" （NIEA E104.20C） and "Sampling of Benthic Organism in Softground Sea Area Act" （NIEA E103.20C） issued by MOENV.
	Plankton, Fish Egg and Fish Larva, Benthic Organism	1.Phytoplankton Survey will be conducted by referring to "Sampling method for Phytoplankton— water sampling" （NIEA E505.50C） issued by MOENV. Standard water sampler will be applied for sampling. Water from different layers will be sampled at the regulated sampling depth in accordance with the technical regulation in sea ecology (MOENV 0960058664A). 2.Zooplankton Survey will be conducted by referring to "Sampling method for Phytoplankton— water sampling" （NIEA E701.20C） issued by MOENV. NORPAC net (mesh: 0.33 mm × 0.33 mm, length: 180 cm, diameter: 45cm) will be applied in the survey. Flow meter (HYDRO-BIOS mechanical German made flow meter) will be attached on its mouth to measure quantity of filtered water. 3.Fish Egg and Fish Larva NORPAC net (mesh: 0.33 mm × 0.33 mm, length: 180 cm, diameter: 100cm) will be applied in the survey. Flow meter will be attached on its mouth to measure quantity of filtered water. 4.Benthic Organism Survey will be conducted by referring to "Sampling of Benthic Organism in Softground Sea Area Act" （NIEA E103.20C） issued by MOENV. In each sampling station, vessel speed is lower than 2 Nm. Bottom trawling will be conducted with benthic organism sampler (Naturalist's rectangular dredge, mesh: 5 mm× 5 mm, mouth width 45cm, mouth height: 18cm).
	Fish	Main sampling method of this project is gillnetting. Bottom gillnet is placed at each sampling station, with its direction generally parallel to the coastline. Coordinate of the correct sampling spots will be located by GPS. Later, net will be deployed along the sampling line for fixed spot sampling. Net will be retrieved 3 hours after the deployment. The samples will be frozen or refrigerated for storing. They will be brought back to laboratory for species identification, quantity and weight recording.

Table 1.3-3 Monitoring Method (3/3)

Category	Monitoring Item	Survey Methods
Marine Ecology	Underwater filming	A lighter observation class underwater vehicle (remotely operated underwater vehicles, hereinafter referred to as ROV) with a high-resolution camera will be used to photo the environment at the sample station. It will stay at two depths (the middle and bottom) for 15 minutes to observe the substrate conditions, fish species and quantity. In case of special phenomena (artificial structures or large marine debris, etc.), additional records will be made. After recording, the ROV will ascend to the stern platform, and personnel will retrieve the ROV. The images recorded will be brought back to the laboratory for identification and analysis.
Cetacean Ecology	Underwater Acoustic Survey	Buoy system is used for the measurement. Submersible underwater acoustic recorder SM2M (Wildlife Acoustics, U.S.A) and standard type hydrophone (sensitivity: - 170.2 dB re 1V/μPa, dynamic range: 20 Hz - 200 kHz) are applied for 24 hours continuous measurement.
	Visual Monitoring	Each survey is conducted by 3 to 6 observers. The observers will exchange observation location every 20 minutes. When cetacean is observed, they will record the initial location and relative direction of the cetacean, its distance with vessel and angle of vessel. Vessel will approach the cetacean group slowly to record the coordinates of cetacean. Estimate the number of cetaceans, observe the behaviors and collect related environmental factors.
Underwater Noise	Underwater noise 20 Hz-20kHz. Spectrogram, 1-Hz band, 1/3 Octave band analysis	Underwater noise data will be obtained in 2 stations at the boundary of turbines from the 5 underwater cetacean acoustic sampling stations. The survey will be carried out using Environmental Inspection Laboratory's survey method for underwater noise (NIEA P210.21B).
Air Quality	TSP	NIEA A102
	PM_{10}	NIEA A206
	$PM_{2.5}$	NIEA A205
	Wind Direction	Anemoscope
	Wind Speed	Anemometer
Noise Vibration	Noise	NIEA P201
	Vibration	NIEA P204
Terrestrial Ecology	Plant Ecology	Technical Guidance for Plant Ecological Assessment (Official Letter 0910020491 issued by MOENV on 28th March 2002)
	Animal Ecology	Technical Guidance for Animal Ecological Assessment (Official Letter 1000058665C issued by MOENV on 12th July 2011)
Electromagnetic field	Magnetic field (mG)	NIEA P202

1.4 Monitoring Locations

The locations of environmental monitoring are shown as in Figure 1.4-1 to Figure 1.4-9.

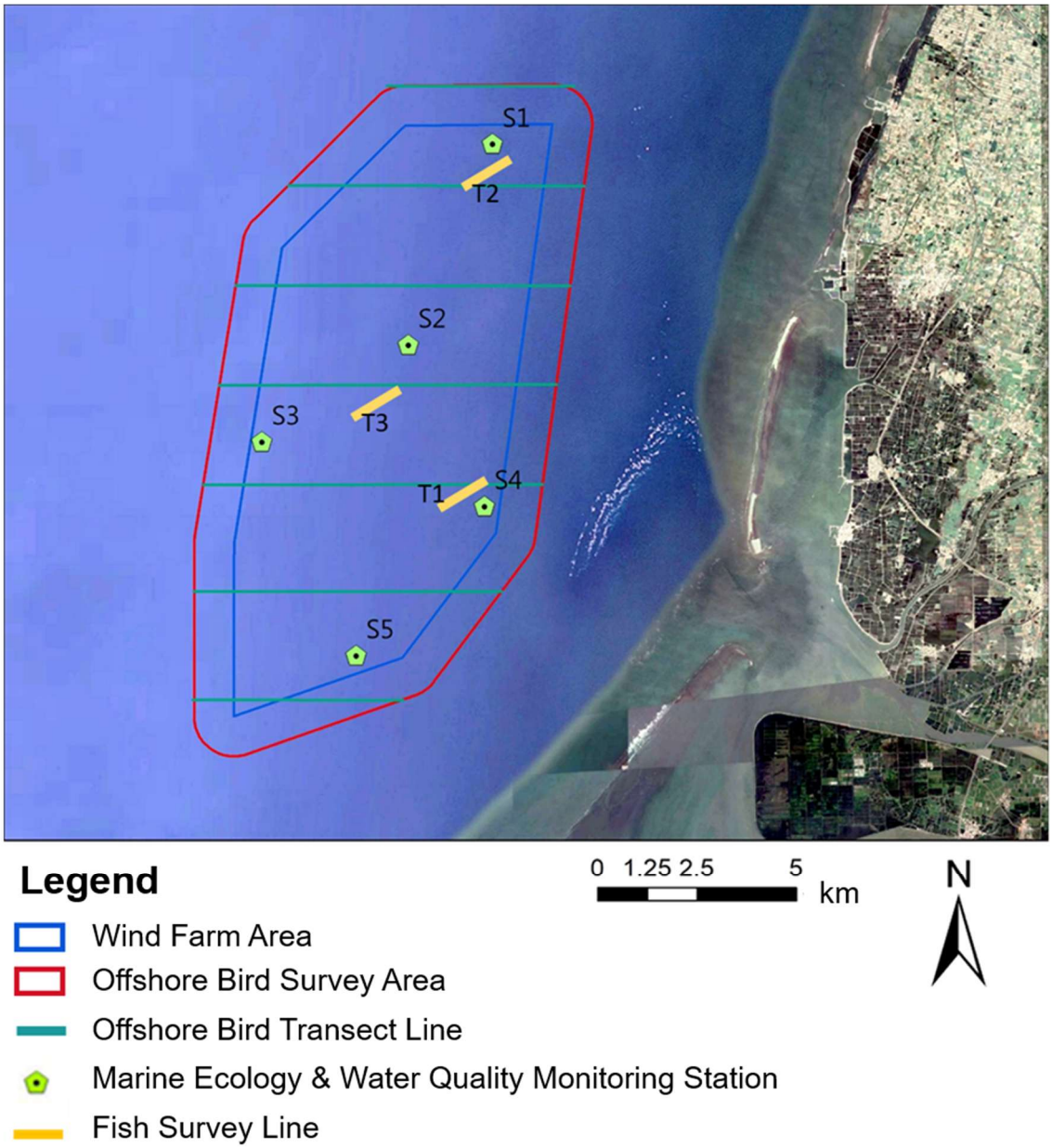


Figure 1.4-1 Location Map of Offshore Bird Ecology, Marine Ecology, Fish and Marine Water Quality Monitoring

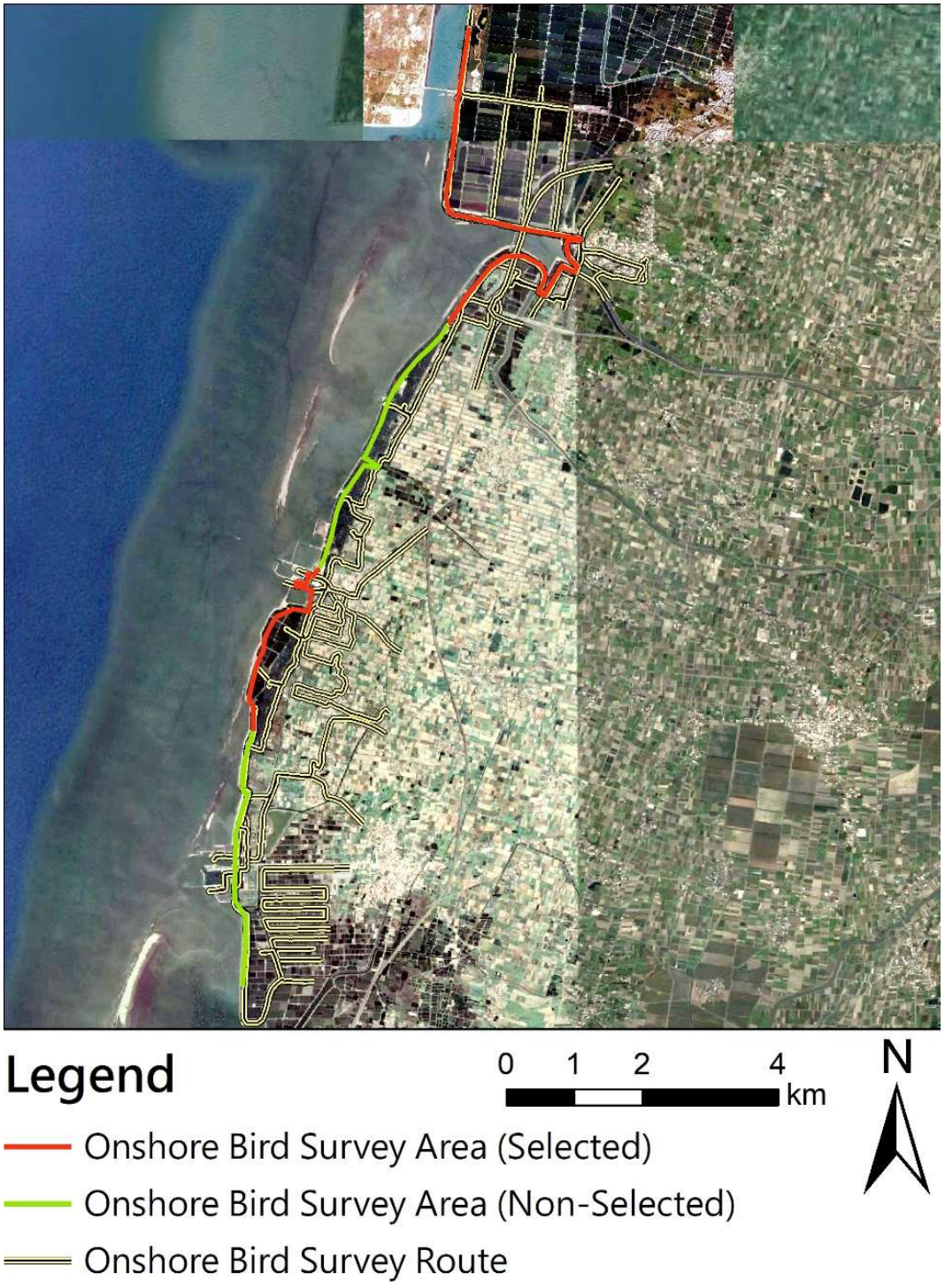
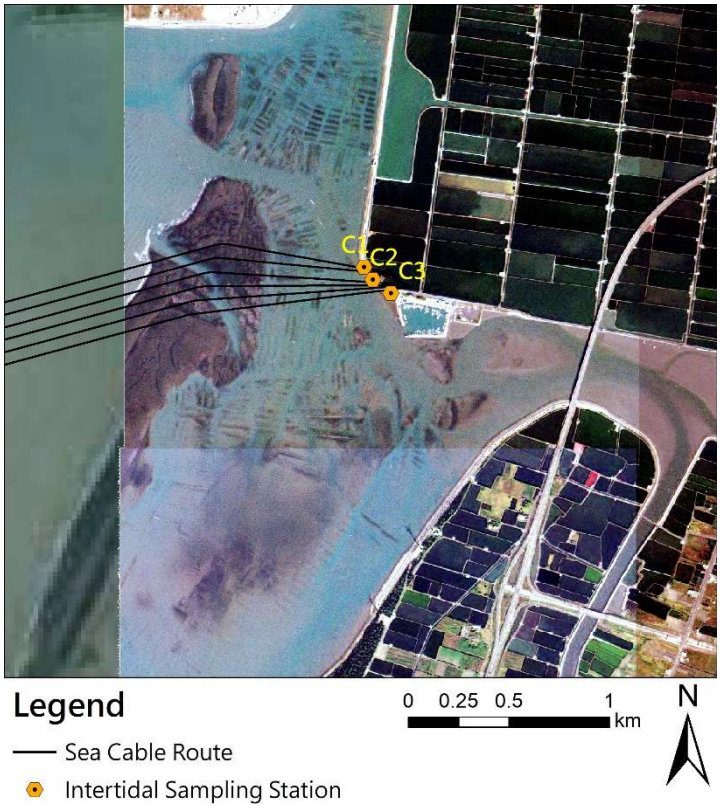


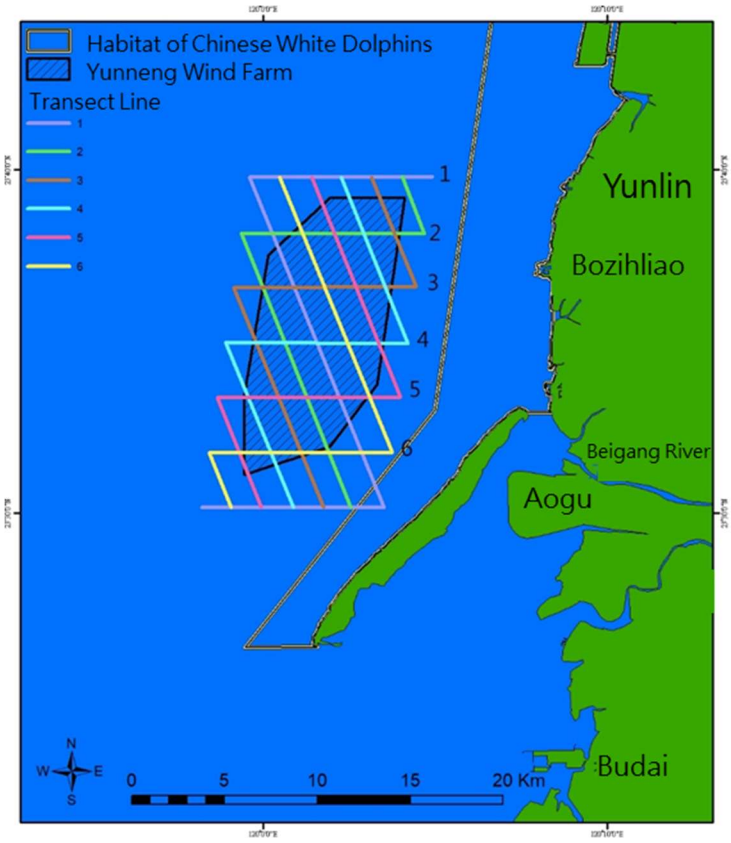
Figure 1.4-2 Location Map of Coastal Bird Survey



(1) Landing Point (Taixi)

(2) Landing Point (Sihu)

Figure 1.4-3 Location Map of Intertidal Ecological Monitoring



Remarks: Numbers indicate transect line conde of this survey.

Figure 1.4-4 Transect Lines of Cetacean Visual Survey

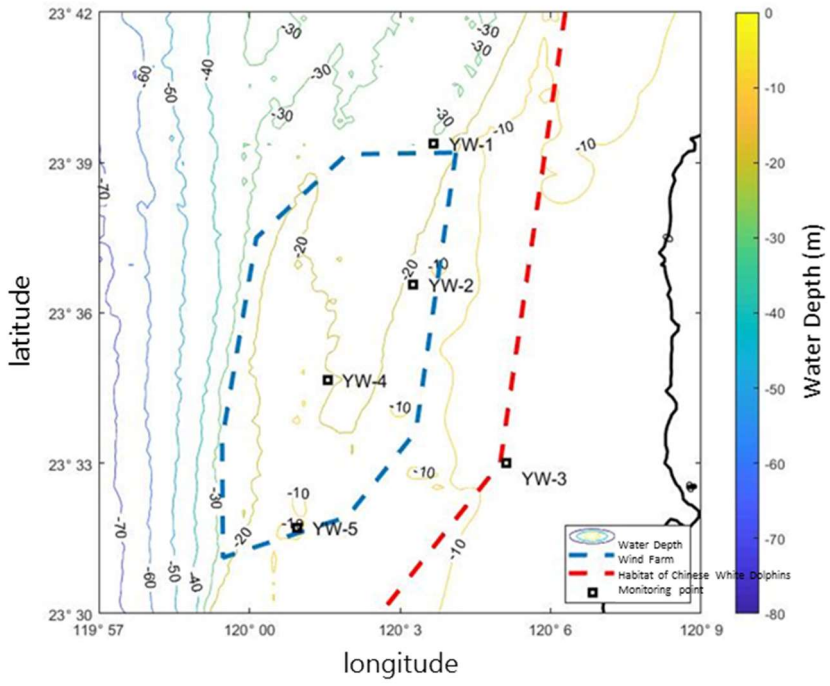
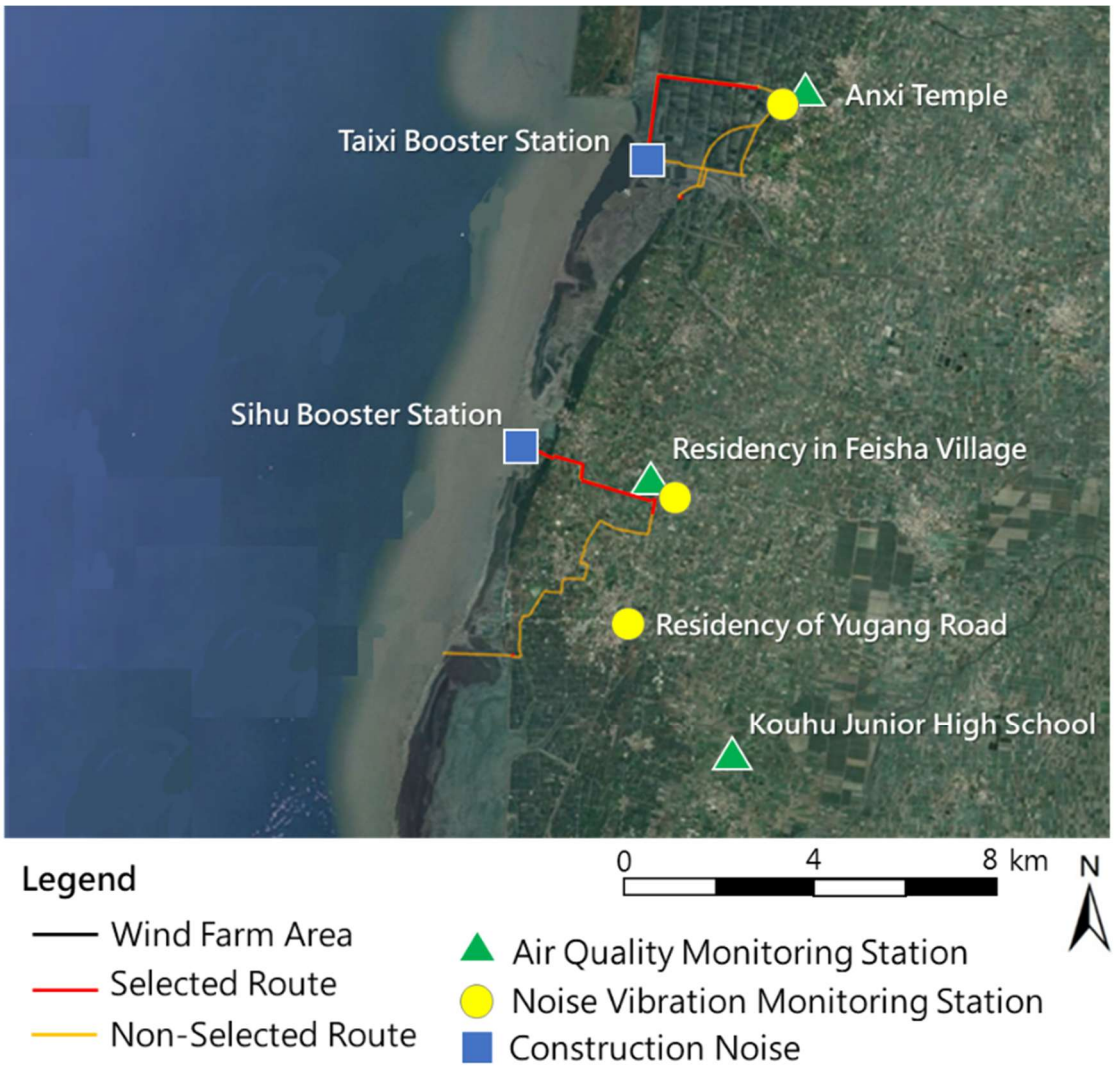


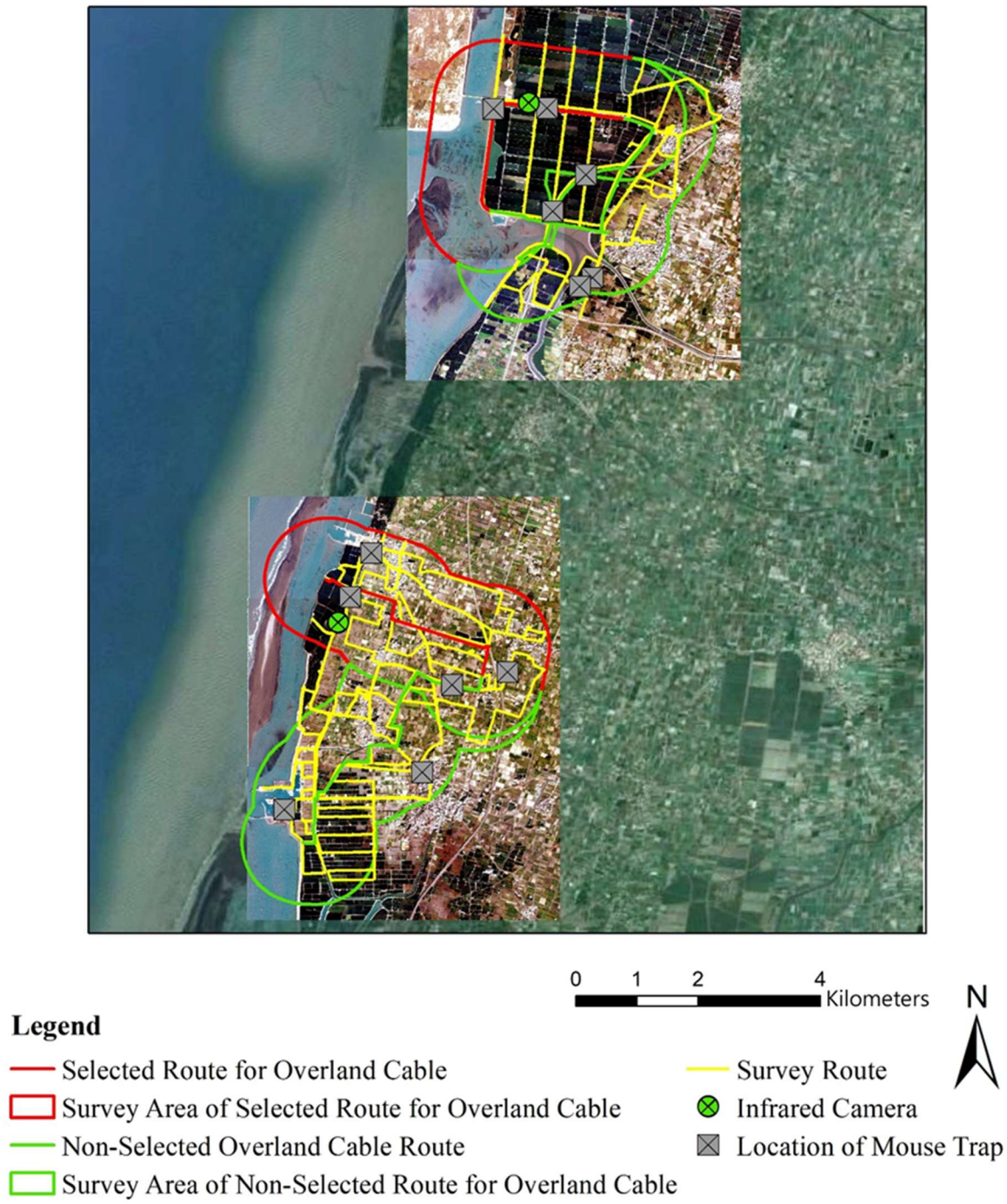
Figure 1.4-5 Schematic Diagram of Underwater Acoustic Measurement



Remark 1: 4 landing points are planned according to EIS, 2 landing points are selected ultimately.

Remark 2: Monitoring spot for air quality has been changed since January 2020 according to 1st EIS report (finalized for review in January 3, 2020), official letter #1080100460.

Figure 1.4-6 Location Map of Air Quality, Noise Vibration and Construction Noise Monitoring



Remarks: 4 landing points are planned according to EIS, 2 landing points are selected ultimately.

Figure 1.4-7 Location Map of Terrestrial Ecological Survey

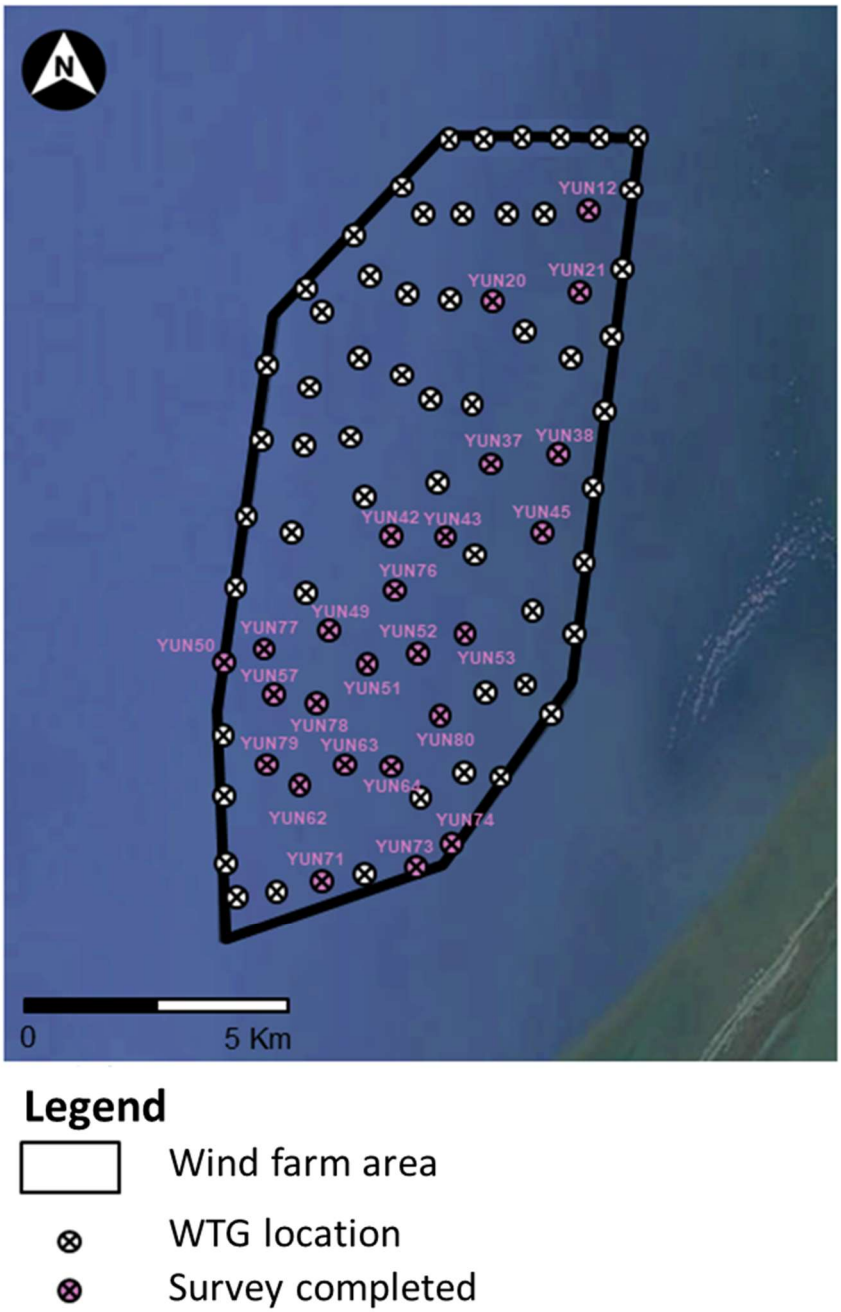


Figure 1.4-8 Wind Farm Area and Location for Underwater Filming

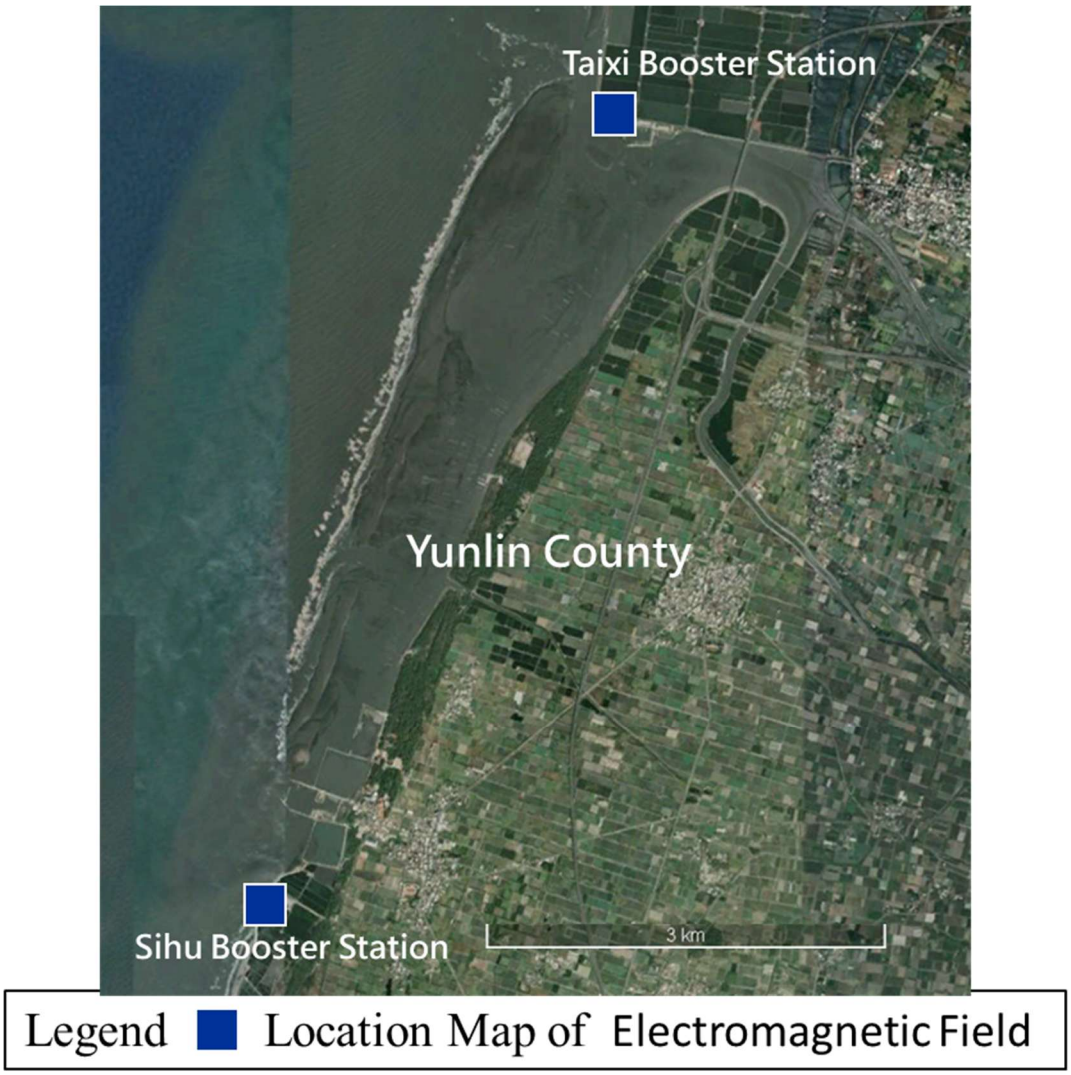


Figure 1.4-9 Location for Electromagnetic Field Survey

1.5 Quality Assurance/ Quality Control Measures

1.5.1 Quality Control/ Quality Assurance of In Situ Sampling

Number of transfers shall be kept to minimum during sampling and delivering processes. Personnel of sampling shall record in sampling log in details and oversee checking, packing and delivering the whole batch of samples. Sample bottles shall be kept in thermostat-container and it shall be sent in whole batch with sampling log to laboratory. They will be accepted by sample keeper. Procedures and notices during sampling and delivering process shall be referred to Table 1.5.1-1 to Table 1.5-5.

When samples are received by sample administrators, it shall be made sure if it is sealed. Thus, the sample bottles shall be examined to make sure it is not damaged, and water sample are not leaked. After examination, sign to take responsibility. The sample shall be kept in assigned refrigerators after recording date and time. Fill out monitoring chain log for further management and tracking of sampling.

Table 1.5.1-1 Procedures and Notices for Processes from Sampling to Delivering -Air Sampling

Sampling Procedure	Objective	Notice
In-Situ Record	To understand possible disturbance during in-situ sampling.	Record meteorological data, environmental factors of vicinity in details.
Stability/ Calibration	Ensure the representativeness of analysis data.	Equipment shall be flow calibrated before use.
Sampling	It shall be switched on in advance to operate while sampling to avoid errors caused by machines.	Before monitoring, switch on in advance until it reaches stable flow capacity. Then, it can be sampled for 24 hours.
Delivering Blank Samples	Ensure accuracy of analysis results, send a set of blank samples each time.	Understand the integrity of delivering process by delivering bank samples.
Storage/ Deliver	Avoid degradation of quality due to lengthy storage duration or improper delivery.	According to regulated preserving method by MOENV, deliver, preserve and pay attention to sealing.

Reference Data: Guidance of Environmental Sampling and Preservation (NIEA-PA102) issued by MOENV, Executive Yuan on 4th October 2004.

Table 1.5.1-2 Procedures and Notices for Processes from Sampling to Delivering-Noise Monitoring

Sampling Procedure	Objective	Notice
Inventory of Equipment	Ensure the integrity of equipment.	Fill in equipment logbook.
Determine the validity of sound-level calibration	Ensure the traceability of monitoring data standards.	Check equipment calibration data.
In Situ Erection	Complete the erection of equipment.	1. Monitoring is conducted according to selected sampling stations and erect equipment according to regulations. 2.Connect the noise dosimeter to power supply and adjust to 1.2m to 1.5m.
Electrical Calibration	Ensure the stability of equipment.	Use built-in electrical signal of NL-18, NL-31, NL-32, read reaction value by internal data acquisition system.
Setting of Equipment	Set data output mode according to project requirements.	A-Weighting is adopted in noise, Fast is adopted for dynamic response, 1 record is read per second.

Reference Data: Guidance of Environmental Sampling and Preservation (NIEA-PA102) issued by MOENV, Executive Yuan (Official Letter 0930072069B) on 4th October 2004.

Table 1.5.1-3 Procedures and Notices for Processes from Sampling to Delivering - Vibration Monitoring

Sampling Procedure	Objective	Notice
Inventory of Equipment	Ensure the integrity of equipment.	Fill in equipment logbook.
Determine the validity of sound-level calibration	Ensure the traceability of monitoring data standards.	Check equipment calibration data.
In Situ Erection	Complete the erection of equipment.	1.Monitoring is conducted at selected sampling points, it is erected according to regulated guidelines. 2.The vibration meter is connected to electricity supply and placed at solid and even surface.
Electrical Calibration	Ensure the stability of equipment.	Use built-in electrical signal of VM52A/53A, read reaction value by internal data acquisition system.
Equipment Setting	Set data output mode according to project requirements.	Direction is set as Z-axis.

Reference Data: Guidance of Environmental Sampling and Preservation (NIEA-PA102) issued by MOENV, Executive Yuan (Official Letter 0930072069B) on 4th October 2004.

Table 1.5.1-4 Procedures and Notices from Sampling to Delivering-Water Quality

Sampling Procedure	Objective	Notice
Cleaning of Sampling Equipment	Clean the water sampler to collect sample that is big enough to represent the water layer.	Wash the sampler with distilled water.
Sampling	Ensure to reduce interruption from chemicals to the least when collecting samples from the water channel.	Prevent bubbles when sampling for items that have higher sensitivity to air (e.g. dissolved oxygen).
Filter/Storage	Water shall be filtered before measuring dissolved materials. This process shall be conducted as soon as possible after the water sample is collected. This step is also deemed as a way to store the sample. Storing of the sample is applied to prevent water sample from deterioration (e.g. volatilization, reaction, adsorption, photolysis) before analysis.	Add proper storing reagent and use clean container to store the samples.
In-Situ Measurement	To ensure that collected sample is integrity, some of the index shall be analyzed as soon as possible after sampling, e.g. pH value, conductivity and water temperature.	Conductivity, pH value and water temperature shall be analyzed on site.
Storage/ Deliver	Avoid degradation of quality due to lengthy storage duration or improper delivery.	Deliver and preserve according to regulated preserving method by MOENV; pay attention to the completeness when sealing.

Reference Data: Guidance of Environmental Sampling and Preservation (NIEA-PA102) issued by MOENV, Executive Yuan (Official Letter 0930072069B) on 4th October 2004.

Table 1.5.1-5 Procedures and Notices from Sampling to Delivering-Electromagnetic Field

Sampling Procedure	Objective	Notice
Inventory of Equipment	Ensure the integrity of equipment.	Fill in equipment logbook.
Determine the validity of the calibration	Ensure the traceability of monitoring data standards.	Check equipment calibration data.
In Situ Erection	Complete the erection of equipment.	1. Monitoring is conducted at selected sampling points, it is erected according to regulated guidelines. 2. The measurement points are typically positioned at a height of 1 m above the ground or floor, with a maximum height not exceeding 2 m.
Electrical Calibration	Ensure the stability of equipment.	Use built-in electrical signal of NBF-550/EHP50F/ EFA-300, read reaction value by internal data acquisition system.
Equipment Setting	Set data output mode according to project requirements.	Measurements are conducted using a 3-axis probe for omnidirectional measurements, with monitoring data automatically stored, and a sampling interval not exceeding 10 seconds.

Reference Data: Guidance of Environmental Sampling and Preservation (NIEA-PA102) issued by MOENV, Executive Yuan (Official Letter 0930072069B) on 4th October 2004.

1.5.2 Quality Assurance/ Quality Control of Analysis

I. When testing personnel is conducting testing analysis, it shall be in accordance with the standard procedure of testing method.

II. Sample of quality management is analyzed (blank, repeated, check, add standard analysis etc.) according to quality management standards. Testing data was recorded in personal log in accordance with testing data standard format.

III. When testing data is in line with quality control, and it falls between range of upper limit and lower limit, the testing personnel shall deliver testing items records to personnel of quality control for reviewing.

IV. While conducting testing and analysis, it should be remarked that only required amount of water sample are taken out from the refrigerator. The remaining water samples shall be placed in the refrigerator for the next personnel. Sample logs shall be filled out.

1.5.3 Calibration Items and Frequency of Instrument

I. Instrument calibration in the environmental laboratory required by environmental testing is divided into external calibration and internal calibration. External calibration shall be assigned to calibration agencies which obtained ISO/IEC 17025 (CNS 17025); internal calibration shall be performed by laboratory or laboratory which obtained ISO/IEC 17025 (CNS 17025). As for maintenance of instrument, it shall be assigned to Original Equipment Manufacturer, authorized distributor or qualified maintenance provider. The maintenance period and related regulations of environmental testing instrument are listed as Table 1.5.3-1. Calibration and maintenance guidelines of environmental testing instrument shall be referred to NIEA PA108.

II. According to general frequency of calibration and frequency listed in Table 1.5.3-1, in the shortest or longest frequency of calibration or maintenance period, the instrument is assumed in good condition with appropriate maintenance and stability. The laboratory is qualified to use and check the instrument. When the instrument is under unfavorable conditions, the frequency of calibration and maintenance shall be shortened. If the instrument is suspected to have problem, calibration and maintenance shall be conducted promptly. Accuracy of some equipment, such as precision balance, will be affected after maintenance or moving; it shall be performed re-examination or recalibration.

III. Laboratory shall create calibration and maintenance plan (table) and checklist of annual calibration and maintenance of instrument or mechanism with same functions to conduct calibration (maintenance) or re-calibration (maintenance).

IV. Calibration or maintenance of instrument shall be recorded and filed, including dates, results and other discoveries.

V. All procedures of instrument calibration and maintenance shall be referred to the manual of each instrument. It shall be in line with regulations of calibration agencies which obtained ISO/IEC 17025 (CNS 17025).

Table 1.5.3-1 Schedule of Equipment Calibration and Maintenance (1/5)

Equipment	Testing Items	Frequency	Notice	Records	Tolerable Error
Thermometer	Calibration: Temperature	Per Annum	Deliver to calibration laboratory	External Calibration Record	-20℃±3℃ 0-50℃ ±0.5 ℃ 50-100℃ ±1 ℃ 100-200℃ ±2 ℃
		Six Months	Check of Freezing Point	Internal Calibration Record	
Working Thermometer	Calibration: Temperature	Before First Use	Multiple Point Calibration of Temperature	Internal Calibration Record	
		6 Months	Freezing point or single point calibration is conducted by thermometer.	Internal Calibration Record	
High Volume Sampler (TSP, PM_{10})	Check: Flow Capacity Calibration: Flow Capacity	Before and After Use	Inspection of Flow Capacity (Single Point Inspection)	Internal Calibration Record	TSP: ±7 % PM_{10}: ±5% PAH: ±7 %
		When start using the new machine	Flow Capacity Calibration (Multiple Point Calibration)	Internal Calibration Record	R>0.995; Errors of all calibration point shall range within ±5 % (TSP)
		During repair of motor and after maintenance or exchange of carbon brush			
		Repair adjustment or exchange of flow meter.			
		When calibration curve is deviated more than ±7%(TSP) or ±5%(PM10) during single point inspection.			
		Regular calibration for every 3 months or after operation of 360 hours (PM_{10})			
	Calibration: Timer	Per Annum	Compare with National Standard Time	Internal Calibration Record	Error of 24 hours shall not exceed 2 minutes (120 s)

Table 1.5.3-1 Schedule of Equipment Calibration and Maintenance (2/5)

Equipment	Testing Items	Frequency	Notice	Records	Tolerable Error
Flowmeter with Small Holes	Calibration: Flow Capacity	Per Annum	Calibrate at laboratory accords with national standards.	External Calibration Record	R > 0.999
PM10 Auto-Analyzer (β-ray)	Check: Flow Capacity	Every Working Day	Record flowing sample.	Record	± 10 %
	Check: Intensity of Radiation Source		Record intensity of radiation source of β-ray.	Record	Original Equipment Specification
	Calibration: Flow Capacity	Every 3 months	Flow calibration is conducted via standard flowmeter.	Internal Calibration Record	± 10 %
	Check: Intensity of Radiation Source		It is conducted via thin film referred by Original Equipment Manufacturer. Confirm radiation source intensity of β-ray.	Internal Calibration Record	Original Equipment Specification
	Calibration: Flow Capacity	New setting of instrument, after repair of failures	Flow capacity calibration is conducted via standard flowmeter.	Internal Calibration Record	± 10 %
	Check: Intensity of Radiation Source		It is conducted via thin film referred by Original Equipment Manufacturer. Confirm radiation source intensity of β-ray.	Internal Calibration Record	Original Equipment Specification
	Comparison: Accuracy	Suspected value of sampling stations/ measuring value	PM_{10} high volume sampling method is used for comparison test of data value.	Internal Calibration Record	Linear Regression: Slope＝1±0.1; Intercept 0±5μg/m³; R≧0.97
Anemometer (NIEA P201, P205, P206 Noise Measurement)	Calibration: Accuracy	Once per 2 years	Deliver to Central Weather Bureau or calibrate at laboratory accords with national standard	External Calibration Record	<1.0 m/s, at least a calibration point shall range between 4 and 6m/s.
Sound Calibrator	Calibration: Accuracy	Per Annum	Calibrate at laboratory accords with national standards.	External Calibration Record	±0.3 dB (1000 Hz)
Noise Audiometer	Confirmation: Accuracy	Before and After use	Confirm acoustic calibrators.	Internal Calibration Record	±0.7 dB, difference of absolute value shall not more than 0.3 dB

Table 1.5.3-1 Schedule of Equipment Calibration and Maintenance (3/5)

Equipment	Testing Items	Frequency	Notice	Records	Tolerable Error
Noise Audiometer	Inspection: Accuracy	Once per 2 years	Calibrate at laboratory accords with national standards.	External Calibration Record	±0.7 dB
	Low Frequency Check: Accuracy	Once per 2 years	Calibrate at laboratory accords with national standards.	External Calibration Record	±0.5 dB(Within 20-200Hz)
Standard Vibration Source	Calibration: Accuracy	Per Annum	Calibrate at calibration and measurement laboratory.	External Calibration Record	±1.0 dB
Vibrometer	Confirmation: Accuracy	Before and After Use	Confirm standard vibration source.	Internal Calibration Record	±1.0 dB
	Calibration: Accuracy	Once per 2 years	Calibrate at laboratory accords with national standards.	External Calibration Record	±1.0 dB
4-digit balance	Calibration: Correctness	Per Annum	Calibration and measurement laboratory to conduct repetitive and linear measurement and calibration	External Calibration Record	To the last digit that can be measured by the balance. E.g. 4-digit balance: ±0.0005g
		Every 6 Months	Repeatability check	Internal Calibration Record	±2SD
		Per Month	One point check	Internal Calibration Record	±3SD
		Before every using	Zero check	—	—
	Maintenance: Clearance without water	Everyday Per Month	Clearance of levelness and plate Clearance inside the plate	— —	—
pH meter	Calibration: Correctness	Every 3 Months	Calibration with thermo probe (same method as working thermometer)	Internal Calibration Record	±0.5 ℃
		Before & after use	First, calibrate with the first standard buffer solution (pH7) and use the second standard buffer solution (pH4 or pH10) to correct its slope. Measure the deviation, zero point potential and slope with the range covering prescribed 2 solutions; the values shall fall within acceptance range.	Internal Calibration Record	Deviation: ±0.05 Zero point potential: -25-25mV Slope: -61--56mV/pH
	Maintenance: Clearance	Before & after use	Wash the glass electrode	—	—

Table 1.5.3-1 Schedule of Equipment Calibration and Maintenance (4/5)

Equipment	Testing Items	Frequency	Notice	Records	Tolerable Error
Water Purification	Check: Resistivity	Everyday	Check resistivity presented on the panel	Record	General regulation: ≧16MΩ-cm(25℃) NIEA W313 regulation: ≧18MΩ-cm(25℃)
	Confirm: Resistivity	Every 6 Months	Test the resistivity of water to ensure that the value meets the requirement	Record	General regulation: ≦0.06μs/cm NIEA W313 regulation: ≦0.05μs/cm
	Maintenance: Clearance	Update according to device condition	Change filter/resin	Record	—
BOD Bottle	Calibration: Volume	Before 1st use	Calibration of all	Internal Calibration Record	According to CALP-PQ-008 requirement
		Per Annum	Calibration of 10%	Internal Calibration Record	
Oven	Calibration: Temperature	Before 1st use	Check temperature changes in calibration and measurement laboratory	External Calibration Record	±1℃
		Per Annum	Use thermal couple to check temperature changes in the used location in the oven in calibration and measurement laboratory	External Calibration Record	±1℃
	Maintenance: Temperature	When using	Check temperature with thermometer and record the temperature	Record	±1℃
Referencing Thermometer	Calibration: Temperature	Per Annum	Send to calibration laboratory	External Calibration Record	-20℃±3℃ 0-50℃ ±0.5 ℃ 50-100℃ ±1 ℃ 100-200℃ ±2 ℃
	Calibration: Temperature	Every 6 Months	Freezing point inspection	Internal Calibration Record	
Working Thermometer	Calibration: Temperature	Before 1st use	Calibration on multiple temperature	Internal Calibration Record	
		Every 6 Months	Freezing point/single point calibration by referencing thermometer	Internal Calibration Record	
Dissolved Oxygen Meter	Calibration: Correctness	Before using	Single point inspection	Internal Calibration Record	3%
	Calibration: Correctness		Electrode inspection	Record	—

Table 1.5.3-1 Schedule of Equipment Calibration and Maintenance (5/5)

Equipment	Testing Items	Frequency	Notice	Records	Tolerable Error
Dissolved Oxygen Meter	Confirm: Atmospheric pressure	Before using	Compare with standard atmospheric pressure meter	Internal Calibration Record	< 1%
	Calibration: Saturated dissolved oxygen		Full point calibration using saturated-water vapor air	Internal Calibration Record	Slope: 0.7-1.25 % Saturation between 100±3%
	Confirm: Zero dissolved oxygen	Per Month	Zero point calibration/confirm with zero dissolved oxygen solution.	Internal Calibration Record	< 0.1 mg/L
	Confirm: Correctness		Check with aerated-to-saturation water, whose dissolved oxygen is testified through iodometry	Internal Calibration Record	<0.2 mg/L
	Confirm: Temperature	Every 3 Months	Compare with standard thermometer	Internal Calibration Record	0-50℃±0.2℃
Conductivity Meter	Calibration: Correctness	Before using	Single point inspection (calibrate with 0.01N KCl)	Internal Calibration Record	±10 μmho/cm
	Calibration: Temperature	Per Annum	Calibration with thermo probe (same method as working thermometer)	Internal Calibration Record	±0.5℃
	Calibration: Correctness	Per Annum	Full scale inspection (0.1, 0.01, 0.001N)	Internal Calibration Record	0.1N: ±2% 0.01N: : ±2% 0.001N: ±5%
	Maintenance: clearance	Before & after use	Wash electrode	—	—
BOD Incubator	Confirm Maintenance: Temperature	Everyday	Record max/min temperature with high/low temperature thermometer	Record	±1 ℃
Spectrophotometer	Calibration: Correctness Stability Reproducibility	Before using	Prepare calibration curve (referring to sample)	Record	According to SOP requirement
		Every 3 Months	Calibration of accuracy of wavelength, absorbance, linearity, stray light, matching of cells	Internal Calibration Record	
		Per Annum	External calibration by manufacturer	External Calibration Record	
	Maintenance: Clearance	Before using	Clean fouling inside the tank	—	
Atomic Absorption Spectrometer	Calibration: Stability	Before using	Check the signal value through middle point of As or Hg's calibration curve	Internal Calibration Record	±20%
		Quarterly	Check absorbance with 5ppm Cu standard solution	External Calibration Record	Absorbance ≧ 0.55ABS
Electromagnetic measurement device	Calibration: Correctness	Every 2 years	Calibrate in the calibration lab	External Calibration Record	±10%

1.5.4 Testing Methods of Analysis Items

To ensure data quality of monitoring analysis, quality control goals for relevant monitoring analysis data are listed in Table 1.5.4-1.

Table 1.5.4-1 Quality Control Objectives of Sample Testing Data

Category	Items	Testing Method	Instrument Detection Limit
Air Quality	Suspended Particles (TSP)	NIEA A102	—
	Suspended Particles (PM_{10})	NIEA A208	0.0001 g
	Suspended Particles ($PM_{2.5}$)	NIEA A205	2 μg/m³
Noise	L_{eq}, L_{max}, L_{day}, L_{night}, $L_{midnight}$, $L_{x(5,10,50,90,95)}$	NIEA P201	30 dB(A)
Vibration	L_{veq}, L_{vmax}, L_{vday}, $L_{v\ midnight}$, $L_{vx(5,10,50,90,95)}$	NIEA P204	30 dB
Marine Water Quality	Temperature	NIEA W217	---
	pH value	NIEA W424	---
	BOD	NIEA W510	<1.0 mg/L
	Salinity	NIEA W447	---
	Dissolved Oxygen	NIEA W455	---
	Ammonia-N	NIEA W437	0.01 mg/L
	Nitrite	NIEA W436	0.001 mg/L
	Nitrate	NIEA W436	0.01 mg/L
	Orthophosphate	NIEA W427	0.003 mg/L
	Suspended Solid	NIEA W210	1.0 mg/L
	Chlorophyll a	NIEA E509	0.02 μg/L
	Coliform group	NIEA E202	10 CFU/100 mL
Electromagnetic field	Electronic field	NIEA P202	0.0001 mT

1.5.5 Data Processing Principles

Calculations of raw data and testing logbook are indicated in significant figure and it is carried over based on regulations.

I. Significant Figure

In the measurement of physic and chemistry, measured value is slightly different with actual value. The difference is called error. Maximum error of every observed value is called uncertainty or absolute uncertainty. For convenient calculation, omit uncertainty. The observed value is indicated by a combination of correct figure and an unconfirmed figure which is called significant figure method. The four fundamental operations of arithmetic are adopted by laboratory, the examples are listed as follows:

i Carry Over: Round off. Round up when the digit is more than 5. Round down when the digit is less than 5. When the front digit is an even number, round down automatically. When the front digit is an odd number, round up automatically.

E.g: 0.455 → 0.46

0.443 → 0.44

ii Observed value is indicated as significant figure

E.g: 0.0025 → 2-significant-digit

13.20 → 4-significant-digit

iii Indicate with exponent sign

E.g: 130000 → ？ 1.30×10^5 → 3-significant-digit

1.3×10^5 → 2-significant-digit

iv Indicate with minimum significant digit in subtraction.

E.g: 120.05 + 10.1 + 56.323 = 186.473, indicate with 186.5.

v Indicate with minimum significant digit in division.

E.g: 2.4x0.452/100.0 = 0.0108 = 0.011 → 2-significant figure

vi Indicate with minimum significant digit in multiplication.

E.g: (1256x12.2) + 125 = 1.53×10^4 + 125 = 1.54 x 104

II. Data Processing and Confirmation

When inspection is completed, inspection records and working log shall be given to personnel of quality assurance. After confirm inspection data, compile preliminary report of inspection data. It shall be given to administrator to create a formal inspection report.

Administrators shall hand in the inspection report, inspection record tables and preliminary report of inspection to director of laboratory. A qualified report is a report

with approval and stamp of director; Report number and sample number shall be listed on report.

1.5.6 Bird Ecology

I. Offshore Visual Survey

i Offshore bird visual survey is conducted with line transect method (Camphuysen et al. 2004). Survey area includes the wind farm and 1 km around its periphery. Horizontally parallel transect lines (with parallel gaps that are 2.5 km wide) are set in the survey area. Vessels will sail with even speed (about 10 knot) on the transect lines. To make an even survey, vessels will depart from opposite end of the transect lines in different surveys.

ii Sailing tracks will be recorded with GPS devices in each survey. Sailing information and sea states during the surveys will be recorded in record sheets.

iii At least 2 observers will be onboard, equipped with binocular and digital camera with at least 500mm equivalent focal length. Observers will conduct visual survey at the left and right sides of the vessel respectively. Distance of the visual survey is 300m from the sailing track (as shown in Figure 1.5.6-1).

iv When observing bird activities, observers should record the species, number, relative ages, feather (plumage & moult), behaviors, spotting time, distance (vertical distance from the sailing track), flying direction and flying altitude depending on in-site condition, as much as possible. Record forms and items refer to recording sheets used in German StUK4 technical directions (Aumüller et al., 2013). Distance of resting birds is indicated by levels. 5 levels are classified, including 0-50m, 50-100m, 100-200m, 200-300m, and above 300m. Altitude of flying birds is indicated by 7 levels, including 0-5m, 5-10m, 10-20m, 20-50m, 50-100m, 100-200m, and above 200m. Taking bird ecological features at the Taiwan marine area into consideration, counting intervals suggested by StUK4 technical induction as well as method that counts all observed birds will be adopted for number recording.

v Surveyed area will be calculated with the length of GPS tracks after each survey to estimate the bird density within the survey area.

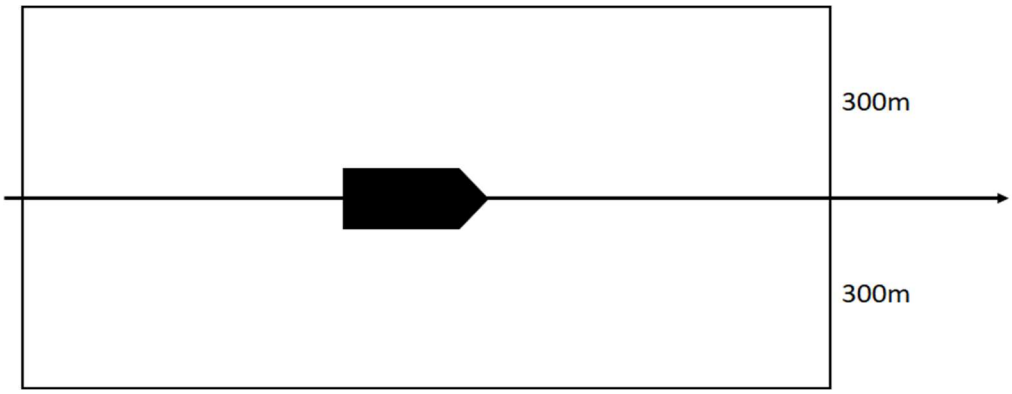


Figure 1.5.6-1 Sailing Tracks of Vessels of Line Transect Method

II. Coastal Visual Survey

i Counting method during high tides (Sutherland, 1996) is applied. Since shore birds will scatter around the muddy plain of intertidal area for foraging during low tides, which makes counting task difficult. On the other hand, during high tides, shore birds will gather in bank or neighboring inlands for resting. Records and calculation will be easier and more precise in this period.

ii Surveyor will walk with binoculars at a slow walking speed along the established road or path in the survey area and record the bird species witnessed or heard along the way. Besides recording bird species and calculate abundance, bird behaviors and habitats will be recorded as well.

1.5.7 Marine Ecology

Survey items in marine ecology include Phytoplankton, Zooplankton, Benthic organism, Fish Egg and Fish Larva. Survey items and methods are described as follows:

I. Intertidal Ecology

Sampling of this item will be conducted in accordance with “Sampling of Epibiota in Hardground Sea Area Act”（NIEA E104.20C） and “Sampling of Benthic Organism in Softground Sea Area Act”（NIEA E103.20C） issued by MOENV.

Sampling of this item will be conducted in accordance with “Sampling of Epibiota in Hardground Sea Area Act”（NIEA E104.20C） and “Sampling of Benthic Organism in Softground Sea Area Act”（NIEA E103.20C） issued by MOENV.

Surveys on benthic creatures that have high mobility (shrimps and crabs) will be conducted along the survey line. For surveys on epibiotic shrimps and crabs, a fixed-length survey line is set from supralittoral zone to infralittoral zone. Survey range is 1m extending from the survey line; species within the range will be recorded. For species

cannot be identified on spot, it will be taken photo and refrigerated for identification once arrive at laboratory. For benthic creatures with low mobility (snails and shellfish), framing survey is adopted. A fixed-length survey line is set from supralittoral zone to infralittoral zone, a fixed number of sampling frames (1m × 1m) are placed along the sides of the survey line (the size of sampling area will be adjusted depending on on-site condition). Benthic snails and shellfish will be observed and collected along the fixed frame. Shovels will be applied for collecting samples 30cm under the earth. Captured individuals will be placed back after their species and number are identified on spot. For species cannot be identified, it will be taken photo and refrigerated for identification once arrive at laboratory.

II. Phytoplankton

i Species Composition and Abundance

Survey will be conducted in accordance with "Sampling Method of Phytoplankton – Water Extraction" (NIEA E505.50C) announced by MOENV. A standard water extraction equipment was used during sampling and the task was performed at specific sampling points and depths for the extraction of water samples at different water layer (as shown in Table 1.5.7-1), as regulated by the Technical Specification for Marine Ecology Assessment (Environment Protection Administration Document No. 0960058664A）. 1 L of water sample was gathered from each layer and placed in a PE plastic bottle and was instantly stabilized by adding neutral formalin with 5% final concentration. It is then kept away from sunlight and stored in ice, waiting to be taken back to the laboratory for species determination and counting.

ii Chlorophyll a

Survey will be conducted in accordance with "Determination of Chlorophylls a in Algae by Ethanol"（NIEA E508.00B） issued by MOENV. Regulated water sampler is applied for the sampling. Sampling water are taken in different layers according to technical regulation of marine ecology（MOENV official letter #0960058664A）, as shown in Table 4.3.2-2. 1 L of water is taken from each layer and is contained in PE wide-mouth bottle. Water sample will be stored temporarily in ice bucket or refrigerator（4 ℃）. It will then be concentrated and filtered onto the filter plate in 24 hours.

iii Primary Productivity

Regulated water sampler is applied for the sampling. Sampling water are taken in different layers according to technical regulation of marine ecology（MOENV official letter #0960058664A）, as shown in Table 1.5.7-1. Water collected will be contained in BOD bottles (1 light bottle and 1 dark bottle) respectively for cultivation. Be careful to prevent bubbles deriving when pouring the water. Place the sample into transparent cultivation box. Cultivation will last for 24 hours with

circulating water and constant temperature. Dissolved oxygen before/after the cultivation will be measured to calculate the primary productivity（organic carbon value in 1L of water per day : μg C/L/d）.

Table 1.5.7-1 Depth Allocation for Sampling Spots

Water Depth	Sampling Layer	Min. Distance between bottom and neighboring layer
<5 m	surface, 3 m under water, bottom[Remark]	-
<10 m	surface, 3 m under water, bottom	3 m
<25 m	surface, 3 m under water, 10 m under water, bottom	5 m
<50 m	surface, 3 m under water, 10 m under water, 25 m under water, bottom	10 m
<100 m	surface, 3 m under water, 10 m under water, 25 m under water, 50 m under water, bottom	10 m

Remark: "Bottom" starts 2-5m from the seabed.

III. Zooplankton

Survey will be conducted in accordance with "Sampling method for Phytoplankton—water sampling"（NIEA E701.20C） issued by MOENV. NORPAC net (mesh: 0.33 mm × 0.33 mm, length: 180 cm, diameter: 45cm) will be applied in the survey. Flow meter (HYDRO-BIOS mechanical German made flow meter) will be attached on its mouth to measure quantity of filtered water.

Survey of Zooplankton is divided into facial horizontal and vertical sampling. Main survey method is vertical sampling; when water depth is under 7 m, horizontal sampling is adopted. For vertical sampling, NORPAC net, with weight attached at its bottom, will be sunk to 1m from the seabed. It will later be pulled up slowly (no faster than 3m/s) to the sea surface. For horizontal sampling, trawling will be conducted at area where water depth is under 7 m and vessel speed is under 3Nm. Mouth of the net is always kept under water surface. After sampling, use wash bottle to filter the sea water and to wash zooplankton into the sampling bottle attached at the bottom of the net. Add 5% Formalin liquid into the bottle. Refrigerate the sampling bottle for following processing and analyzing in the laboratory.

IV. Fish Egg and Fish Larva

NORPAC net (mesh: 0.33 mm × 0.33 mm, length: 180 cm, diameter: 100cm) will be applied in the survey. Flow meter will be attached on its mouth to measure quantity of filtered water. Flow meter (HYDRO-BIOS mechanical German made flow meter) will be attached on its mouth to measure quantity of filtered water. For horizontal sampling,

trawling will be conducted with vessel speed under 3Nm. Mouth of the net is always kept under water surface (about 2 m under water surface). After sampling, use wash bottle to filter the sea water and to wash zooplankton into the sampling bottle attached at the bottom of the net. Add 95% alcohol into the bottle. Refrigerate the sampling bottle for following processing and analyzing in the laboratory.

V. Benthic Organism

Survey will be conducted in accordance with "Sampling of Benthic Organism in Softground Sea Area Act" （NIEA E103.20C） issued by MOENV. In each sampling station, vessel speed is lower than 2 Nm. Bottom trawling will be conducted with benthic organism sampler (Naturalist's rectangular dredge, mesh: 5 mm× 5 mm, mouth width 45cm, mouth height: 18cm). After retrieving the net, wash off the mud with sifting screen, identify and record captured samples and place them back. For species cannot be identified, it will be taken photo, stored in 5% Formalin liquid and refrigerated for identification once arrive at laboratory.

VI. Fish

Main sampling method of this project is gillnetting. Bottom gillnet is placed at each sampling station, with its direction generally parallel to the coastline. Coordinate of the correct sampling spots will be located by GPS. Then, nets will be deployed along the survey line for fixed spot sampling operation. Later, the nets will be retrieved 3 hours after deployment. Samples will be frozen or refrigerated for storing. They will be brought back to laboratory for species identification, quantity and weight record.

VII. Underwater Filming

A lighter observation class underwater vehicle (remotely operated underwater vehicles, hereinafter referred to as ROV) with a high-resolution camera will be used to photo the environment at the sample station. It will stay at two depths (the middle and bottom) for 15 minutes to observe the substrate conditions, fish species and quantity. In case of special phenomena (artificial structures or large marine debris, etc.), additional records will be made. After recording, the ROV will ascend to the stern platform, and personnel will retrieve the ROV. The images recorded will be brought back to the laboratory for identification and analysis.

1.5.8 Cetacean Ecology

I. Underwater Acoustic Survey

i Recording Instrument

The measurement of underwater noise in this Project applies bottom-anchored acoustic measuring system (Figure 1.5.8-1). icListen HF SC2-ETH from Ocean Sonics is applied (Sensitivity=-170.2 dB re V/μPa) for a 24-hour continuous measurement. The sampling frequency of the device is between 20Hz-20kHz, which covers the lower frequency sounds such as operation of turbine, vessel noise, wind and rain, fish sounds and the middle-high noise such as dolphin whistles and impulse of dolphin's echolocation.

When carrying out underwater acoustic measurement, the static platform of the device (including buoy, suspension system, weight and signal cable) will be set up. Depth of the hydrophone is between half of the water depth to 2m above the sea bed. The Platform is deployed subjecting to the direction of the sea current. After the buoy drifts away from the vessel to the designed distance and becomes steady, the recording begins. When making sure the recording is finished, the platform will be retrieved to the deck. Hydrophone will be taken out from the protection frame, and the data inside the device will be put into computer.

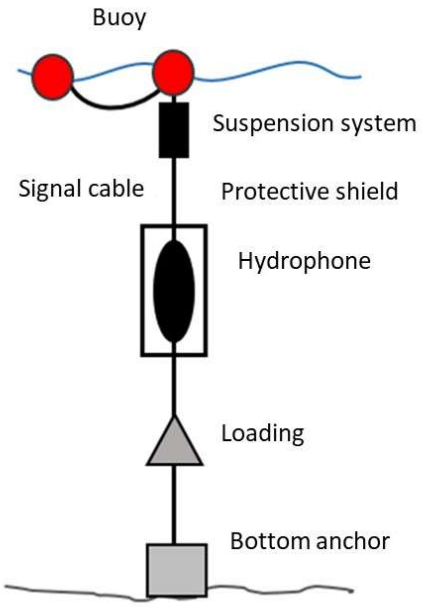


Figure 1.5.8-1 Deployment of the Device

ii Analysis of Ambient Noise

Underwater acoustic device can record the sound changes in the marine area, such as the natural sound (wave, tide) or activity sounds of marine animals (cetacean, fish). Unknown loud noises, such as vessel noises or sounds derived from human activities, can be recorded by the underwater acoustic device. The WAV files recorded by the device will undergo Fast Fourier Transform (FFT), and the results will be represented by 1/3 Octave band. The obtained result is used for analysis of underwater ambient noise sound level.

iii Detection of Cetacean Sound

Cetacean sound include whistles, used for communication and social behavior between groups or individuals, and clicks used for environmental geomorphology detection and locating prey, as shown in Figure 1.5.8-2. Whistles have narrow bandwidth and certain time length, while clicks have wider bandwidth and are impulse sounds with very short time length. In addition, cetacean also have different kinds of whistles, and the whistles can be identified from the recordings. Clicks have wider bandwidth and higher frequency (usually higher than 10kHz). Cetacean will emit a sequence of clicks to detect the distance with other objects via the echoes.

The recording device covers frequency from 20Hz-20kHz. 1/3 octave band filter will be used for analysis in this Project. The specific range of cetacean sounds (2.5k-10k) will be analyzed via spectrum and signal filter. As shown in Figure 1.5.8-2, the features of sound between 2.5k to 10k are relatively obvious. Therefore, 2.5k to 10k is selected from the overall/all frequency spectrum (20Hz-20kHz) for identification of marine animal sounds (cetacean or fish), and the nature of the ambient noise in the wind farm can be analyzed.

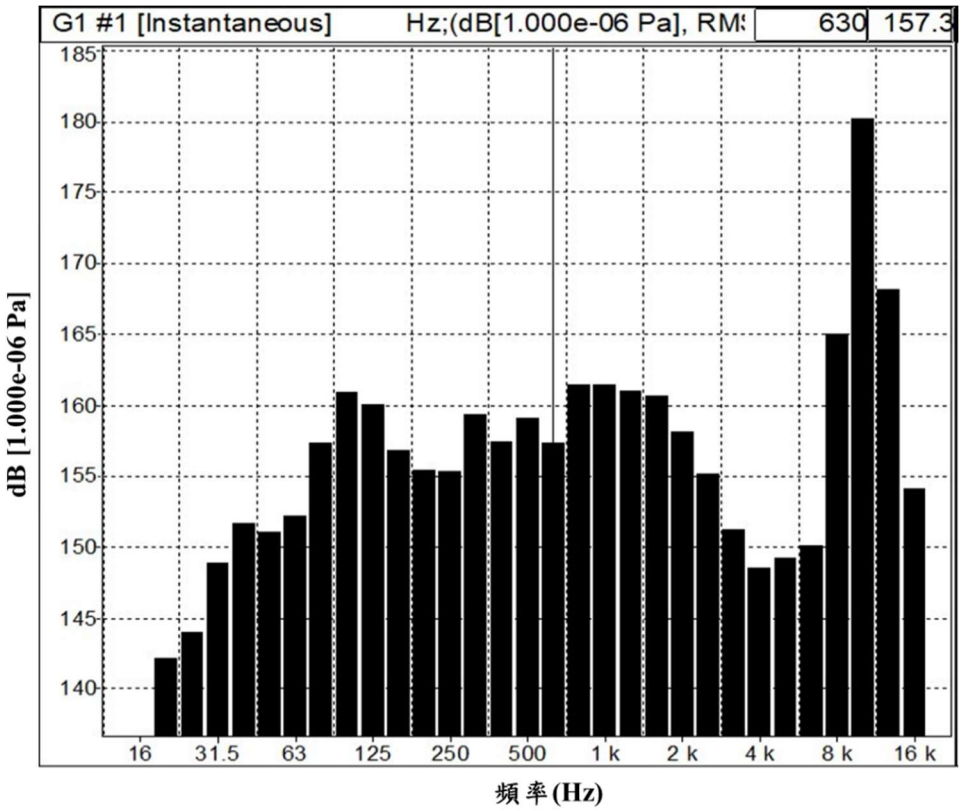


Figure 1.5.8-2 Cetacean Whistles and Clicks

1. Detection of Whistles

Whistles have narrow bandwidth and certain time length. Its frequency might vary over time and the sound varies widely (Van Parijs & Corkeron, 2001; Sims et al., 2012; Lin, 2013). Therefore, whistle detection codes of this project included: signal analysis, noise removal, and selection of energy and bandwidth.

With respect to signal analysis, Window function of Hamming is used via *Short Time Fourier Transform* (STFT) to obtain spectrogram as in Figure 1.5.8-2. After background noise signals are removed, potential whistles are filtered according to energy variance. The filtering is done through interpreting the spectrum. First, signals indicating detected sounds on the spectrum will be marked as black dots. Later, connect the black dots into a line and compare its frequency (height) and duration (length) with the setting value. If it meets the setting value, it will be identified as whistles. This algorithm does not require specific sound plate to detect sound with whistle characteristics. It is a non-specific automatic detector.

Sounds of dolphins frequently seen in the western sea area of Taiwan are in the middle-frequency, which range between 3k -9k Hz. For example, Chinese white dolphin and bottlenose dolphin. Therefore, the range 2.5k-10k Hz were adopted as the range of analysis. Figure 1.5.8-5 shows the

detection result for an hour. If there is no whistle, presented figure will be blank; if whistle is detected within that hour, the location shall be marked as blue dots and personnel could inspect time and frequency of blue dots in the spectrogram to confirm whether they are dolphin whistles or not and filter out non-whistle noises.

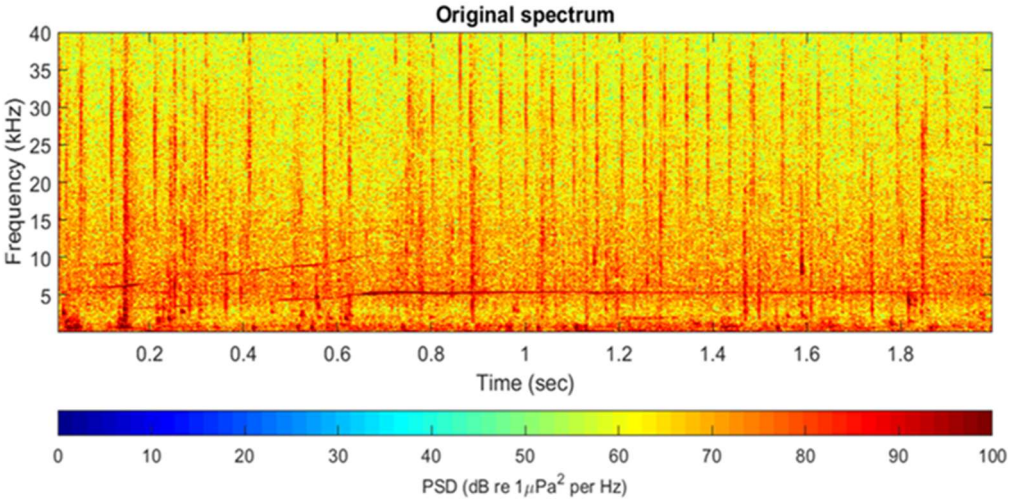


Figure 1.5.8-3 Spectrogram Obtained Via STFT

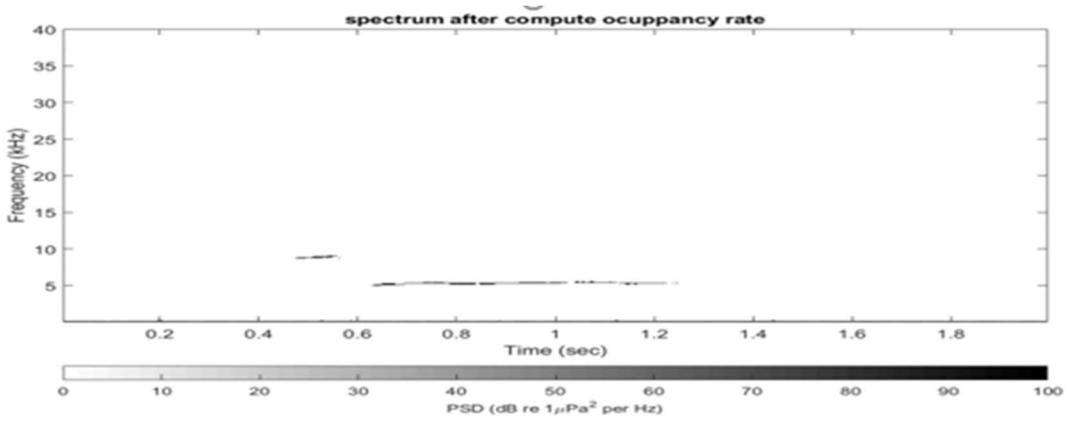


Figure 1.5.8-4 Black Dots Distribution Figure after Hamming Window Function

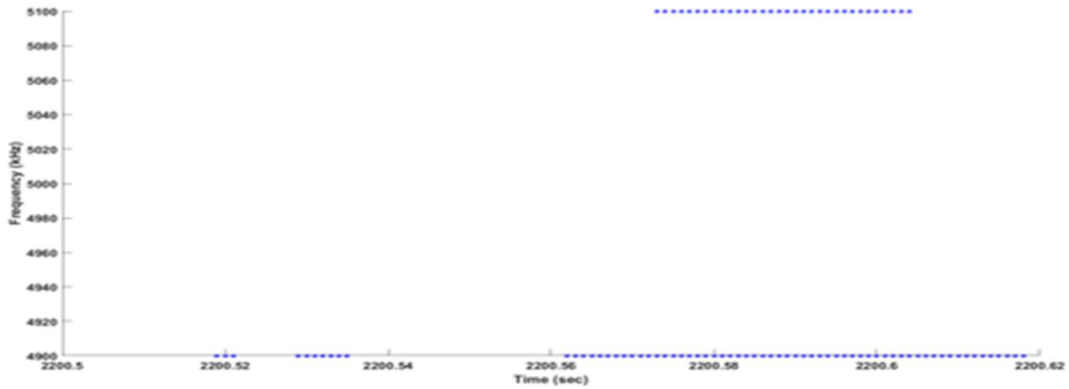


Figure 1.5.8-5 Schematic Diagram of Detection Program Results (Detection Range is 3k to 9k Hz)

2. Detection of Click

As click is impulse sounds with wider bandwidth, it's called Click Train (Figure 1.5.8-6). The interval of pulses is defined as ICI (Inter-Click Interval). The ratio of ICI1 and ICI2 in Figure 1.5.8-6 is ICI ratio (=ICI2/ICI1); if the ratio is smaller than 1/2 or greater than 2, it is considered a different Click Train. The method of click detection in this project is to identify potential Click Train by energy, then select Click Trains with ICI >1ms and contain only 6-500 pulses.

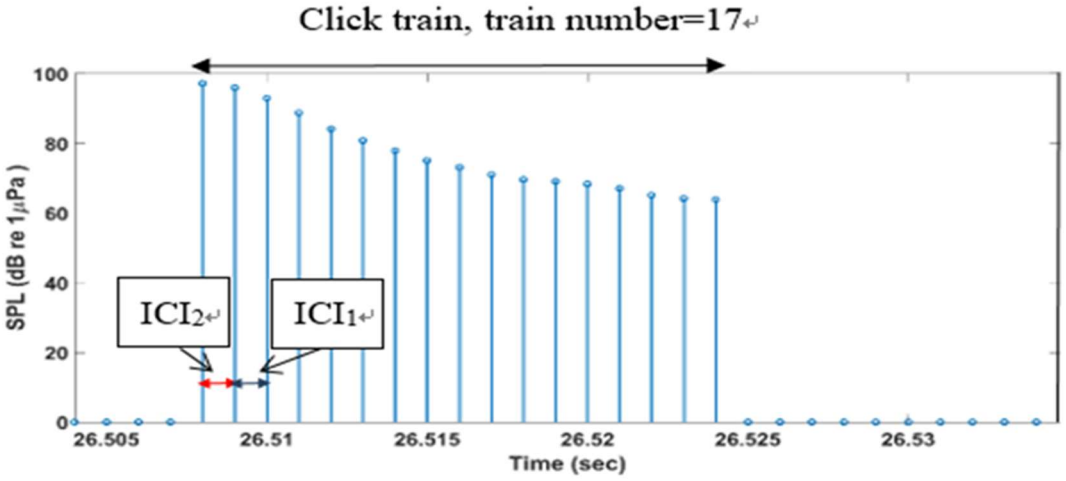


Figure 1.5.8-6 Schematic Diagram of Click

II. Visual Survey

i Survey Methodology

1. Before departure of survey, select 2 navigation channels and the order of survey sequence. The navigation channels for departure and return are different. During navigation, handheld GPS map GPS map 64ST (Garmin Corp., Taiwan) is used for positioning and recording navigation trajectories.

2. Every survey is conducted by at least 3 observers. 1 experienced leading observer leads at least 2 observers. The leader should have rich survey experiences for years. All surveyors shall be trained, for example, an internal lecture for cetacean surveys or 4 hours of offshore safety trainings for marine researchers held by the Fishery Administration.

3. 2 observers are in charge of observation at left and right sides of the vessel and a 3rd observer is responsible for sea surface at the front and sides of the vessel. They observe sea surface for sightings of cetacean with bare eyes or binoculars. Observers shall rotate every 20 minutes to avoid mental fatigue from staring at the same area. Observers will take turns to the position recording water quality for about 20 minutes after taking shifts at 3 observing positions (about 1 hour) for a short rest to maintain physical strength.

4. During survey, when vessel is on designed navigation channel, wave level is less than 4 and visibility is above 500m, it is considered as “on-effort”; When vessel is between harbor and navigation channel, or the weather condition is too bad for conducting valid cetacean observation, it is considered “off-effort”. Although off-effort is not incorporated into analysis of standardized visibility rate, it’s still valuable data if cetacean is observed/sighted. Navigation time is the total time spent from departure to return to harbor, including on-effort and off-effort. During survey, the vessel speed is maintained at 6-9 knots (NM/ hour). The vessel will stop every 10 minutes for sampling surface seawater, measuring sea surface temperature and salinity with YSI 30 thermosalinograph and recording environmental factors (water depth, surface seawater temperature, salinity and weather factors such as waves, visibility, etc).

5. When cetaceans are observed, location, angle, distance from vessel and vessel angle of the initial discovery were recorded. If possible, approach slowly and record the coordinates of the closer location, estimate the population number, observe its behavior, collect related environmental factors and fill out cetacean observation form. Also, use camera or video

recorder for cetacean imagery in order to create individual identification image database. If the cetaceans do not show obvious avoidance behavior, follow them continuously and record their behavior and location. If the followed cetaceans are out of sight for more than 10 minutes, return to the navigation channel and go on searching for the next herd.

ii Data Analysis

1. Survey result is obtained by analyzing sighting rate, spatial distribution, environmental factors and herd structure of all cetaceans and Chinese White Dolphin. There are 3 types of sighting rate calculations: (1) mileage sighting rate (2) hour sighting rate (3) trip sighting rate. The former 2 types are calculated by dividing on-effort observed number of cetacean herds by on-effort mileage/on-effort hour to standardize sighting rate (number of cetacean herds/ 100km, number of cetacean herds/10 hours). Trip sighting rate is from dividing number of trips with cetacean observation by number of all trips.

2. According to the coordinates of sightings, Spatial distribution positioning is conducted using Geographic Information Systems (GIS). Based on the distance between wind farm perimeter and the survey vessel, software ArcGIS10 helps to understand the relationship between different distance intervals and the spatial distribution of cetaceans.

3. Water surface behaviors of dolphins are divided into four genres: “Travelling, Foraging, Socializing, and Milling.” Definitions from Parra (2006) are as followed:

4. The description of the Chinese White Dolphin according to Parra (2006) is as follows:

   (1) “Travelling” herds have a consistent and almost fixed swimming direction. They dive with regular gaps and smaller angles.

   (2) “Foraging” herds may present scattering and inconsistent swimming directions. Dolphins will have big diving angle and raise their tails; no regulation shown in travelling is found. In addition, sudden speeding up or behaviors that indicate foraging (slapping water surface with tail, biting fish with mouth, diving, etc.) are frequently observed.

   (3) “Socializing” herds have a difficult-to-predict diving mode. Physical contacts or even bumps are frequently seen between individuals. A considerable number of activities beyond water surface are observed.

   (4) “Milling” herds have slower activities on water surface and moves

only in a small sea area. Individuals are close with each other, yet without obvious physical contacts. They have a more regular diving mode with smaller angle. The group stays near the surface of water most of the time. The behavior is similar to resting.

(5) Observed behaviors cannot be classified into prescribed genres will be marked as "Others," with possible inference on the behaviors.

1.5.9 Underwater Noise

Data analysis for underwater noise will be conducted with data from 2 stations located in the periphery of the wind turbine. The 2 stations are chosen from the 5 survey stations for cetacean ecological underwater acoustics. Clearly identifiable noise sources (tidal changes, sea currents, vessel noise, marine creatures, etc.) are also included in the overall ambient noise, and the distribution of these underwater noise will be indicated with Percentile level (unit is dB). L_x indicates that the noise value exceeds $L_{eq,T}$ for x% of the total measuring duration. L_{90}= value obtained for more than 90% of the survey duration (equivalent to the ambient sound value during the measuring period); L_{50}= value obtained for more than 50% of the survey duration (equivalent to the average ambient sound value during the measuring period); L_5= value obtained for more than 5% of the survey duration (equivalent to the high-value noise sources during the measuring period).

The sound frequency being measured is set at above 51.2k. The recorded sound will be given to Matlab for Fast Fourier Transform (FFT). The sound pressure level (SPL) of 1Hz bandwidth is calculated. Since level of octave bands is the sum of all energy within the frequency, the SPL of 1/3 octave band is higher than 1Hz band used for underwater acoustic survey.

The measurement is done using the underwater noise measuring system that meets the requirement 18406 International Organization for Standardization (ISO). For the underwater noise analysis, the octave band filter system that meets the requirement 61260-1 in International Electrotechnical Commission (IEC) is used. Central frequency of 1/3 octave band is shown as Table 1.5.9-1.

Table 1.5.9-1 Central Frequency of 1/3 Octave Band

Frequency (Hz)		
1/3 Octave		
Lower limit	Center frequency	Upper limit
14.1	16.0	17.8
17.8	20.0	22.4
22.4	25.0	28.2
28.2	31.5	35.5
35.5	40.0	44.7
44.7	50.0	56.2
56.2	63.0	70.8
70.8	80.0	89.2
89.2	100.0	112.0
112.0	125.0	141.0
141.0	160.0	178.0
178.0	200.0	224.0
224.0	250.0	282.0
282.0	315.0	355.0
355.0	400.0	447.0
447.0	500.0	562.0
562.0	630.0	708.0
708.0	800.0	891.0
891.0	1,000.0	1,122.0
1,122.0	1,250.0	1,413.0
1,413.0	1,600.0	1,778.0
1,778.0	2,000.0	2,239.0
2,239.0	2,500.0	2,818.0
2,818.0	3,150.0	3,548.0
3,548.0	4,000.0	4,467.0
4,467.0	5,000.0	5,623.0
5,623.0	6,300.0	7,079.0
7,079.0	8,000.0	8,913.0
8,913.0	10,000.0	11,220.0
11,220.0	12,500.0	14,130.0
14,130.0	16,000.0	17,780.0
17,780.0	20,000.0	22,390.0

1.5.10 Fishery Resource Survey

Information on the fishing season, fishing grounds, type of harvests, and the operation status fishing vessels in the Yunlin County will be compiled. These data will be analyzed and collected in the report along with the onsite survey data, annual fishery reports and local fishing harvests.

1.5.11 Terrestrial Ecological Survey

The area, methodology, content and report writing of ecological survey are conducted in accordance with "Technical Guidance for Animal Ecological Assessment" official letter 1000058665C of MOENV issued on 12th July 2011 and "Technical Guidance for Plant Ecological Assessment" official letter 0910020491 of MOENV issued on 28th March 2002.

Terrestrial ecological survey was conducted at roads and surrounding environment. Terrestrial survey focused on plant, mammal, bird, amphibian, species of reptile and butterfly, number, diversity, dominant species, protected species and rare and valuable species.

To ensure accuracy and integrity of data quality objective and implementation results, a comprehensive quality control project was drafted. A quality control investigation panel was established to review the adaptability and efficiency of quality control in order to implement correct measures and achieve objective of quality assurance. The flow chart of quality assurance is listed in Figure 1.5.11-1.

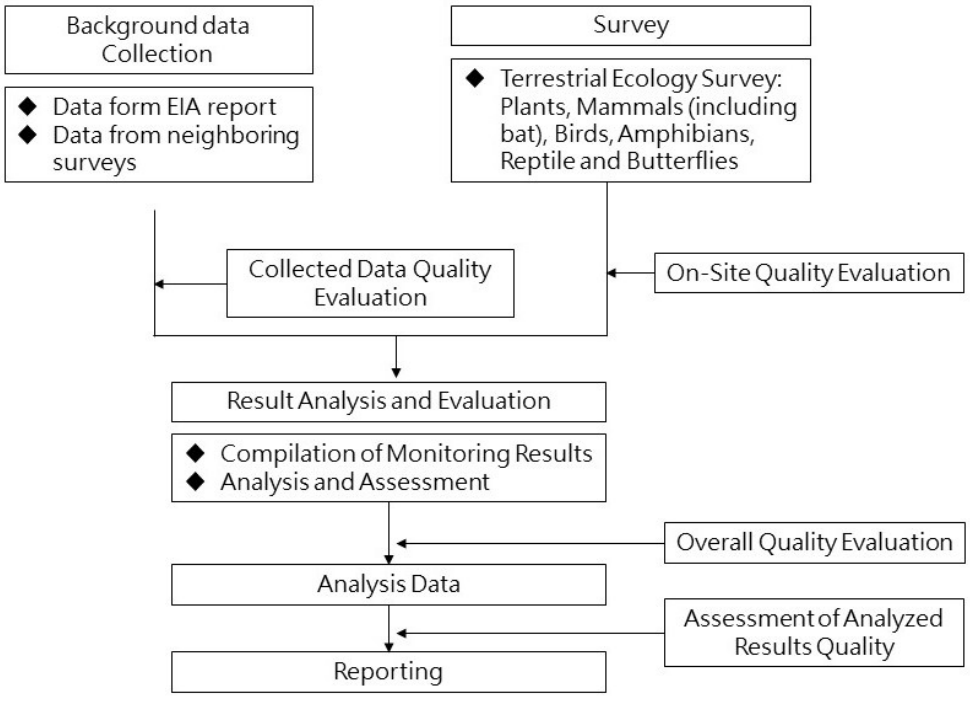


Figure 1.5.11-1 Flow Chart of QA and QC of Terrestrial Ecological Survey

I. Preparations Before Survey

i Single-person operation is prohibited. This is to avoid absence of assistance when emergencies occur.

ii Before survey, related matters are informed (including confirmation of coordinates and working items).

iii Before survey, examination of instrument is conducted; and make sure spare instrument is Prepared. If the instrument is damaged, it shall be examined and restocked in advance of survey.

iv A day prior to survey, survey location and weather shall be confirmed. If the weather condition is poor, the survey must be postponed ensuring the safety of personnel and reducing the occurrence of emergency.

II. In Situ Quality Review

Integrity of in-situ working record is the main basis of future tracking. When abnormal monitoring value occurs, interpretation is based on records or images of sampling conditions, weather conditions, etc. The auditing team will strictly review and assess on-site records reserved. Contents are listed as follows:

i Fill out sampling station records every time and use camera to record the environmental conditions at the time. In special circumstances, report to relevant personnel with specific description.

ii Ensure sampling equipment and survey tools are in good condition and calibrated.

iii Examine the equipment before use and replace with a spare one if damaged.

iv Make sure relevant regulation is followed during in situ sampling to avoid errors from sampling personnel.

v Make sure sampling locations are selected according to the designed ones in this project.

vi Properly record the environmental conditions on site. If any abnormal situation happens, record and conduct preliminary assessment of its potential impact on future monitoring works.

vii In terrestrial animal surveys, relieve the sampled animals on the spot after taking photos and records. If species identification not possible on site, take photos and record its characteristic for identification back in lab.

III. Collected Data for Quality Check

Collected data includes survey data of previous years. Monitoring results shall be used

directly for compilation and report. Quality check is described as follows:

i Ensure collected information is intact.

ii Ensure obtained information is raw data. If it is secondary data (analyzed and compiled data), consider the necessity of redoing the survey for collecting raw data.

iii Ensure the documents are well-printed with no missing pages.

IV. Overall Quality Checking

Overall quality checking items included compilation of new data and data over years, the checking content is shown as follows:

i In the process of compilation, when original data is transcribed to another document, no discrepancies are occurred due to human error.

ii While compiling data, the measuring units of monitoring items are unified.

iii Content of compiled data shall be thoroughly checked to make sure there is no missing part.

iv Compiled data shall be conducted with preliminary examination and discrepancies of report shall be pointed out.

v When the data is archived, format (including unit) shall be consistent for further data analysis, report writing and reducing data error.

vi After compiling data, data with greatest discrepancies shall be pointed out and reviewed. After making sure the data is correct, it shall be labelled for further interpretation by report writer.

vii All data shall be checked and reviewed by 2 people and above, all the data shall be kept in duplicate.

viii Except for self-checking, the report shall be checked by 2 people and above to avoid errors in content due to carelessness.

Chapter 2 Analysis of Monitoring Results

2.1 Offshore Construction Phase Monitoring

2.1.1 Marine Water Quality

Survey on marine water quality was conducted at open sea near Yunlin County on November 2, 2023. Water samples are collected from surface, middle and bottom layers in S1 to S5. Monitoring items in marine water quality include pH value, Water temperature, Dissolved Oxygen, Salinity, Coliform group, Chlorophyll a, BOD, Ammonia-N, Suspended Solid, Nutrients (Nitrate, Nitrite, Orthophosphate, Silicate). Monitoring result is shown as Table 2.1.1-1. For raw monitoring data please refer to Appendix 4.1, for survey location please refer to Figure 1.4-1.

According to Marine Environment Quality Standard, Article 8 issued by MOENV, Executive Yuan (MOENV official letter #1070012375) on February 13, 2018, this survey station shall follow Water Quality Standard of Marine Waterbody (Class A). Monitoring result and comparison with Water Quality Standard of Marine Waterbody (Class A) are described as follows:

I. Water Temperature

Result of the survey is as follows: Water temperature is between 26.4~27.4℃.

II. pH Value

Result of the survey is as follows: pH value is 8.0~8.2, which complies with Water Quality Standard of Marine Waterbody (Class A) (pH value 7.5-8.5).

III. BOD

Result of the survey is as follows: Value of BOD is <1.0 mg/L. Survey result complies to Water Quality Standard for A type Marine Water (<2.0 mg/L).

IV. Salinity

Result of the survey is as follows: Salinity is between 33.3~33.5 psu.

V. Dissolved Oxygen

Result of the survey is as follows: Dissolved oxygen value is between 5.8~6.2 mg/L, which complies to Water Quality Standard of Marine Waterbody (Class A) (> 5.0mg/L).

VI. Ammonia-N

Result of the survey is as follows: Ammonia-N is 0.07~0.19 mg/L or ND. All values comply to Water Quality Standard of Marine Waterbody (Class A) (<0.3 mg/L).

VII. Nutrients

i Nitrate
Result of the survey is as follows: Nitrate is<0.05~0.006 mg/L or ND.

ii Nitrite

Result of the survey is as follows: Nitrate is N.D.~0.01.

iii Orthophosphate

Result of the survey is as follows: Nitrate isN.D.~0.007 mg/L.

VIII. Suspended Solid

Result of the survey is as follows: Suspended solid is between 4.6~25.4 mg/L.

IX. Chlorophyll a

Result of the survey is as follows: Value of Chlorophyll a is between 0.09~0.26 μg/L. All values are within normal range in marine area.

X. Coliform group

Result of the survey is as follows: Values of Coliform group is <10 CFU/100 mL. Coliform group in all stations comply with the Water Quality Standard of Marine Waterbody (Class A) (1,000 CFU/100 mL).

Generally, all values are in normal range and comply with Water Quality Standard of Marine Waterbody. The monitoring will be continued.

Table 2.1.1-1 Marine Water Quality Monitoring Result of this Quarter

Monitoring Date		2023.11.2															Water Quality Standard of Marine Waterbody (Class A)
Station		S1			S2			S3			S4			S5			
Item	Unit	surface	middle	bottom	surface	middle	bottom	surface	middle	bottom	surface	middle	bottom	surface	middle	bottom	
Water temperature	℃	26.9	26.9	26.7	26.9	26.8	26.6	27.4	27.3	27.0	26.8	26.8	26.7	26.9	26.9	26.4	—
pH value	—	8.2	8.2	8.2	8.2	8.2	8.2	8.0	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	7.5-8.5
BOD	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
Salinity	psu	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.3	33.3	33.3	33.4	33.4	33.4	—
Dissolved Oxygen	mg/L	6.1	6.0	5.8	6.2	6.0	5.8	6.1	5.9	5.8	6.1	5.9	5.8	6.1	5.9	5.8	>5.0
Ammonia-N	mg/L	0.15	0.15	0.19	0.15	0.12	0.12	0.11	0.12	0.07	0.07	0.12	0.14	0.10	0.10	0.08	<0.3
Nitrate	mg/L	<0.05 (0.036)	0.05	<0.05 (0.036)	<0.05 (0.045)	0.05	<0.05 (0.038)	<0.05 (0.039)	<0.05 (0.032)	<0.05 (0.037)	<0.05 (0.043)	0.06	0.06	<0.05 (0.045)	<0.05 (0.046)	<0.05 (0.041)	—
Nitrite	mg/L	0.01	N.D.	0.01	N.D.	N.D.	0.01	N.D.	0.01	0.01	0.01	0.01	0.01	N.D.	0.01	0.01	—
Orthophosphate	mg/L	<0.005 (0.003)	<0.005 (0.004)	<0.005 (0.002)	<0.005 (0.002)	<0.005 (0.003)	<0.005 (0.002)	N.D.	N.D.	<0.005 (0.003)	0.007	0.007	0.007	<0.005 (0.004)	<0.005 (0.004)	<0.005 (0.004)	—
Suspended Solid	mg/L	11.3	10.3	10.0	6.6	9.0	8.2	5.1	4.6	4.8	25.4	22.8	25.0	11.2	10.2	9.9	—
Chlorophyll a	μg/L	0.18	0.25	0.19	0.22	0.18	0.26	0.19	0.09	0.21	0.09	0.15	0.24	0.20	0.18	0.22	—
Coliform group	CFU/100mL	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	< 1,000

Remark 1: "<" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.

Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

2.1.2 Bird Ecology

The offshore bird survey within the wind farm area and the coastal bird survey at the coast near the submarine cable landing point are conducted every month in this quarter (September-November 2023). Survey area is shown as Figure 1.4-1 and 1.4-2. Survey records are explained as follows:

I. Offshore Bird Visual Survey

i Recorded Species

3 orders, 3 families, 4 species, and 25 individuals were recorded in this quarter. Barn swallow were recorded with the most individuals (16 individuals, 64.00%). Other species were recorded with 2-4 individuals. For species records please refer to Table 2.1.2-1. All species were recorded flying in sky.Greater crested tern is recorded as the protected species.

Table 2.1.2-1 Resource Table of Offshore Bird Survey

Order	Family	English Name	Scientific Name	Protected Level[1]	Migration Habit in Taiwan[2]	Fall			Total
						Sep.	Oct.	Nov.	
Charadriiformes	Laridae	Greater crested tern	*Thalasseus bergii*	II	Summer		3		3
		Whiskered tern	*Chlidonias hybrida*		Winter,Passage		1	1	2
Procellariiformes	Procellariidae	Streaked Shearwater	*Calonectris leucomelas*		Sea	3		1	4
Passeriformes	Hirundinidae	Barn swallow	*Hirundo rustica*		Summer, Winter, Passage		13	3	16
Total (Individual)						3	17	5	25

Remark1: “II” indicates rare and protected species.

Remark 2: “Summer” indicates summer residents, “Winter” indicates winter resident, “Introduced” indicates introduced species, “Sea” indicates seabirds.

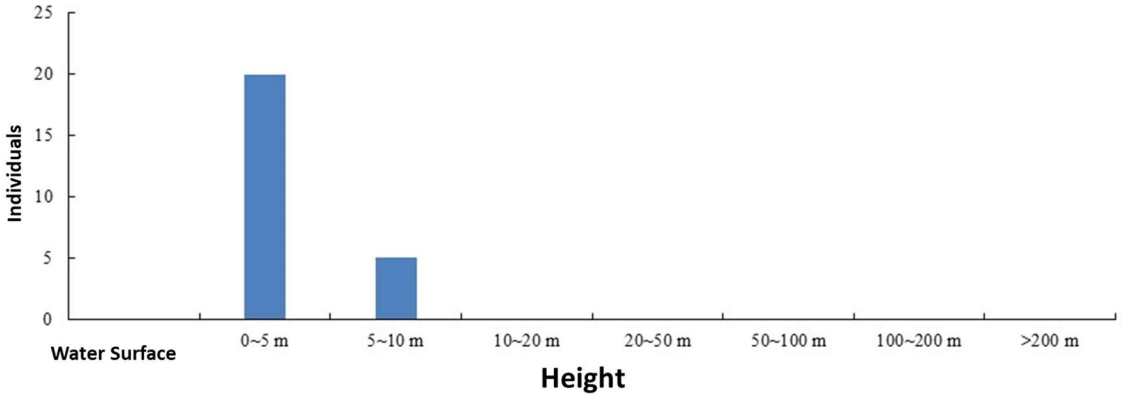
ii Recorded Flying Altitude

All flying altitudes recorded in this quarter are all between 0-10 m. All species were recorded flying in sky. Details are shown in Table 2.1.2-2 and Figure 2.1.2-1.

Table 2.1.2-2 Flying Altitude of Birds recorded in Offshore Survey

Order	Family	Species	Activity Altitude							
			Water surface	0-5 m	5-10 m	10-20 m	20-50 m	50-100 m	100-200 m	>200 m
Charadriiformes	Laridae	Greater crested tern		3						
		Whiskered tern		1	1					
Procellariiformes	Procellariidae	Streaked Shearwater		3	1					
Passeriformes	Hirundinidae	Barn swallow		13	3					
Total (Individual)			0	20	5	0	0	0	0	0

Note: The range of the activity altitude include the upper limit but not the lower limit.



Note: The upper limit is also included.

Figure 2.1.2-1 Altitude Distribution of Birds in Offshore Survey

iii Density Derived from Visual Bird Survey

Visual transect line surveys of the Project are 50.58 km, Visual survey encompasses 30.35 km^2. Therefore, in this quarter (December), the density of birds is 0.275 individual/km^2, as shown in Table 2.1.2-3.

Table 2.1.2-3 Density of Birds in Offshore Visual Survey

Order	Family	Species	Fall			Average Density[note]
			Sep.	Oct.	Nov.	
Charadriiformes	Laridae	Greater crested tern	-	0.099	-	0.033
		Whiskered tern	-	0.033	0.033	0.022
Procellariiformes	Procellariidae	Streaked Shearwater	0.099	-	0.033	0.044
Passeriformes	Hirundinidae	Barn swallow	-	0.428	0.099	0.176
Total (Individual /km^2)			0.099	0.560	0.165	0.275

Remark: Density: individual numbers recorded/ visual area

II. Coastal Bird Survey

i Species Composition

12 orders, 31 families and 67 species were recorded in the coastal bird survey in this quarter. 11 orders, 27 families and 60 species were recorded at the coast of selected submarine cable landing point; 11 orders, 30 families and 59 species were recorded at the coast of non-selected submarine cable landing point. For species records please refer to Table 2.1.2-4.

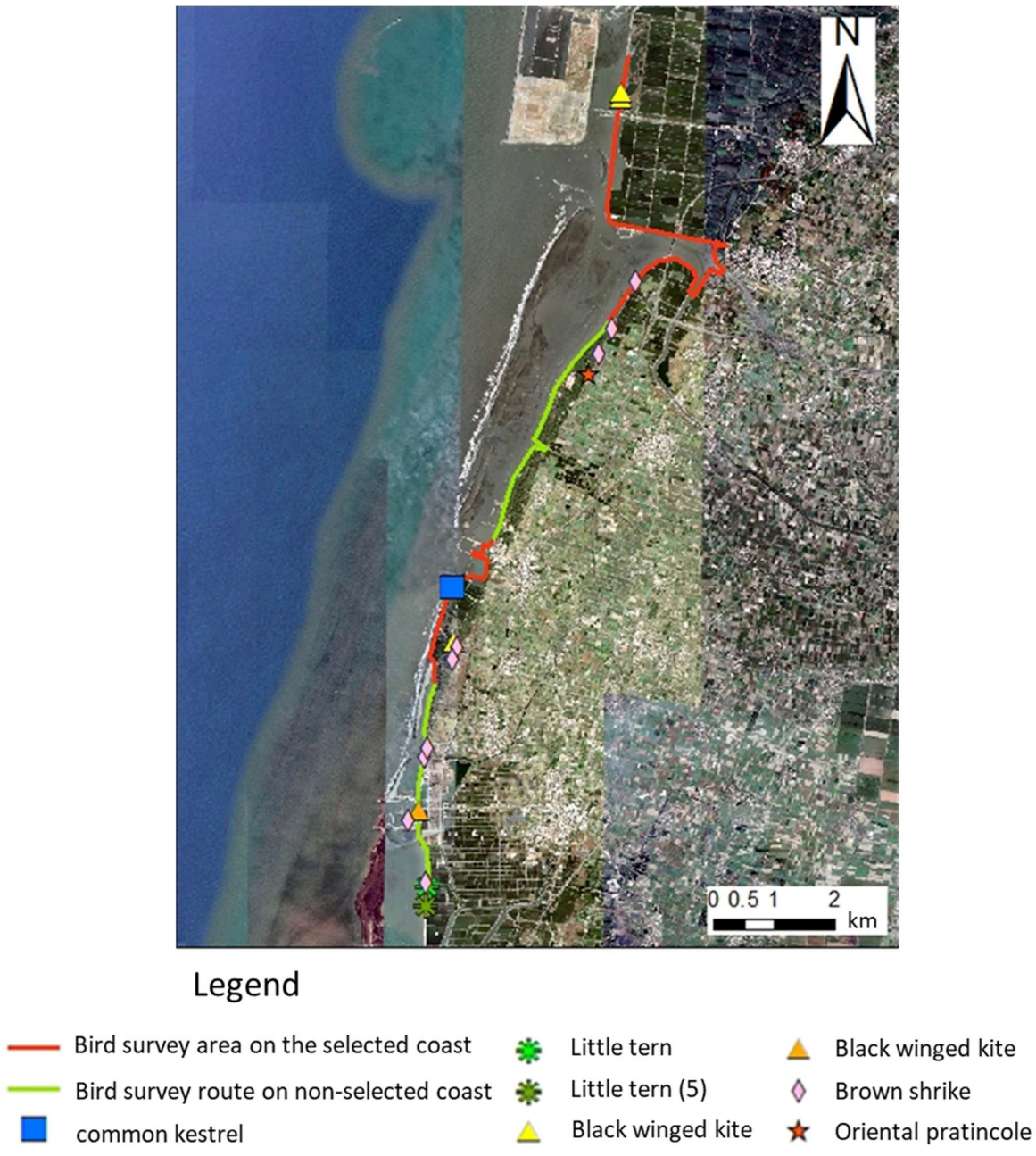
ii Endemics and Protected Species

1 endemic species (Taiwan scimitar babbler) and 8 endemic subspecies (*Turnix suscitator*, *Apus nipalensis*, *Caprimulgus affinis*, *Dicrurus macrocercus*, *Prinia inornata*, *Pycnonotus sinensis*, *Sinosuthora webbiana* and *Hypothymis azurea*) were recorded in this quarter. Endemic (sub) species account for 13.43% of all observed species. 3 protected species was recorded, which are *Sternula albifrons*, *Elanus caeruleus and Falco tinnunculus*. 2 Other Conservation-Deserving Wildlife is recorded, which were *Glareola maldivarum and Lanius cristatus* (Figure 2.1.2-2).

On the coast of selected submarine cable landing point, 7 endemic sub-species (*Apus nipalensis*, *Caprimulgus affinis*, *Dicrurus macrocercus*, *Prinia inornata*, *Pycnonotus sinensis*, *Sinosuthora webbiana* and *Hypothymis azurea*) were recorded. Endemic (sub) species account for 11.67% of all observed species. 2 protected species was recorded, which is *Elanus caeruleus and Falco tinnunculus*. 1 Other Conservation-Deserving Wildlife is recorded, which are *Lanius cristatus*. *Elanus caeruleus* were recorded flying, perching; *Falco tinnunculus* were recorded perching; *Lanius cristatus* were recorded perching.

On the coast of non-selected submarine cable landing point, 1 endemic species (Taiwan scimitar babbler) and 8 sub-species (*Turnix suscitator*, *Apus nipalensis*, *Caprimulgus affinis*, *Dicrurus macrocercus*, *Prinia inornata*, *Pycnonotus sinensis*, *Sinosuthora webbiana and Hypothymis azurea*) were recorded. Endemic (sub) species account for 15.25% of all observed species. 22 protected species

was recorded, which are *Sternula albifrons* and *Elanus caeruleus*. 2 Other Conservation-Deserving Wildlife is recorded, which were *Glareola maldivarum* and *Lanius cristatus*. Little tern were recorded perching; Greater crested tern and Chestnut munia were recorded foraging and foraging, *Elanus caeruleus* were recorded flying, perching, *Glareola maldivarum and Lanius cristatus* were recorded perching.



Remark: Number inside the parentheses indicates individuals recorded.

Figure 2.1.2-2 Distribution of Protected Offshore Bird Species

Table 2.1.2-4 Resource Table of Coastal Bird Survey

Order	Family	Chinese name	Scientific name	Endemism[1]	Protect[2] Level	Migration Habit[3]	EIS[4] Fall 2016Sep-Nov	Monitoring during construction												Total
								2023.09				2023.10				2023.11				
								Selected landing route		Non-selected landing route		Selected landing route		Non-selected landing route		Selected landing route		Non-selected landing route		
								Taixi	Sihu	Taixi	Sihu	Taixi	Sihu	Taixi	Sihu	Taixi	Sihu	Taixi	Sihu	
Anseriformes	Anatidae	琵嘴鴨	*Spatula clypeata*			Winter	*													-[5]
		尖尾鴨	*Anas acuta*			Winter	*													-
		小水鴨	*Anas crecca*			Winter	*											8		8
Charadriiformes	Recurvirostridae	反嘴鴴	*Recurvirostra avosetta*			Winter	*						10				8			18
		高蹺鴴	*Himantopus himantopus*			Resident,Winter	*	17	15	7	17	21	12	15	21	20	12	13	7	177
	Scolopacidae	青足鷸	*Tringa nebularia*			Winter	*	24	7	7	7	5	10		11	10	6	12	6	105
		赤足鷸	*Tringa totanus*			Winter	*	6	4		9						3	3	5	30
		長趾濱鷸	*Calidris subminuta*			Winter	*	6			5				6					17
		黑腹濱鷸	*Calidris alpina*			Winter	*									37		49	22	108
		小青足鷸	*Tringa stagnatilis*			Winter,Passage	*	7								4		4		15
		鷹斑鷸	*Tringa glareola*			Winter,Passage	*	21	10		12		15		10	6	5	8	10	97
		磯鷸	*Actitis hypoleucos*			Winter	*	5	5	3	4		3	5	5	8	2	4	3	47
		三趾濱鷸	*Calidris alba*			Winter	*									8		6		14
		紅胸濱鷸	*Calidris ruficollis*			Winter	*	17	10		15	3			5					50
		尖尾濱鷸	*Calidris acuminata*			Passage	*													-
		寬嘴鷸	*Calidris falcinellus*			Passage	*													-
		彎嘴濱鷸	*Calidris ferruginea*			Winter,Passage	*													-
		黃足鷸	*Tringa brevipes*			Passage	*				3									3
		翻石鷸	*Arenaria interpres*			Winter,Passage	*													-
		中杓鷸	*Numenius phaeopus*			Winter,Passage	*	15												15
		斑尾鷸	*Limosa lapponica*			Winter,Passage	*													-
		反嘴鷸	*Xenus cinereus*			Passage	*													-
	Laridae	紅嘴鷗	*Chroicocephalus ridibundus*			Winter	*													-
		黑腹燕鷗	*Chlidonias hybrida*			Winter,Passage	*		6		6				7		14		19	52
		裏海燕鷗	*Hydroprogne caspia*			Winter	*													-
		小燕鷗	*Sternula albifrons*		II	Resident,Summer	*				8									8
		鳳頭燕鷗	*Thalasseus bergii*		II	Summer	*													-
		鷗嘴燕鷗	*Gelochelidon nilotica*			Winter,Passage	*													-
		白翅黑燕鷗	*Chlidonias leucopterus*			Winter,Passage	*													-
	Charadriidae	東方環頸鴴	*Charadrius alexandrinus*			留,Winter	*	18	10	13	23	16	15	21	18	37	18	22	48	259
		小環頸鴴	*Charadrius dubius*			Resident,Winter	*	9	6	8	6	10	13	5	16	7	6	5	12	103
		太平洋金斑鴴	*Pluvialis fulva*			Winter	*	8								14		8		30
		鐵嘴鴴	*Charadrius leschenaultii*			Winter,Passage	*	5								12				17
		蒙古鴴	*Charadrius mongolus*			Winter,Passage	*													-
		灰斑鴴	*Pluvialis squatarola*			Winter	*													-
	Turnicidae	棕三趾鶉	*Turnix suscitator*	endemic (sub)		Resident				2	3			1	1					7
	Glareolidae	燕鴴	*Glareola maldivarum*		III	Summer,Passage				2										2
Columbiformes	Columbidae	紅鳩	*Streptopelia tranquebarica*			Resident		17	9	13	15	21	11	23	10	28	14	13	13	187
		珠頸斑鳩	*Streptopelia chinensis*			Resident		9	7	5	9	15	5	10	2	8	3	5	5	83
		野鴿	*Columba livia*			Introduced		15	15	10	13	13	7	11	9	26	16	33	22	190

Order	Family	Chinese name	Scientific name	Endemism[1]	Protect[2] Level	Migration Habit[3]	EIS[4] Fall 2016Sep-Nov	Monitoring during construction												Total
								2023.09				2023.10				2023.11				
								Selected landing route		Non-selected landing route		Selected landing route		Non-selected landing route		Selected landing route		Non-selected landing route		
								Taixi	Sihu	Taixi	Sihu	Taixi	Sihu	Taixi	Sihu	Taixi	Sihu	Taixi	Sihu	
Pelecaniformes	Ardeidae	小白鷺	*Egretta garzetta*			Resident,Summer,Winter,Passage	*	15	10	20	10	20	19	15	29	13	18	16	6	191
		夜鷺	*Nycticorax nycticorax*			Resident,Winter,Passage	*	5	6	5	7	16	5	10	7	8	4	8	6	87
		黃頭鷺	*Bubulcus ibis*			Resident,Summer,Winter,Passage	*	17	13	24	13	15	13	16	10	11	4	6	12	154
		蒼鷺	*Ardea cinerea*			Winter	*									5				5
		大白鷺	*Ardea alba*			Resident,Winter	*	6	5	5		12	10	10	10	8	12	19	24	121
		中白鷺	*Ardea intermedia*			Summer,Winter	*	6	5	7	6		10	9	5	2			2	52
		綠簑鷺	*Butorides striata*			Resident,Passage					1		1	1						3
		黃小鷺	*Ixobrychus sinensis*			Resident,Summer							1				1			2
	Threskiornithidae	埃 and 聖鷺	*Threskiornis aethiopicus*			Introduced	*													-
Gruiformes	Rallidae	紅冠水雞	*Gallinula chloropus*			Resident	*	4	3		4	5			5	4	4	6	6	41
		白腹秧雞	*Amaurornis phoenicurus*			Resident										1	2	2	2	7
Podicipediformes	Podicipedidae	小鸊鷉	*Tachybaptus ruficollis*			Resident,Winter	*		6	6	5		3	3	3	5		4	3	38
Accipitriformes	Accipitridae	黑翅鳶	*Elanus caeruleus*		II	Resident	*		1			1				1			2	5
	Pandionidae	魚鷹	*Pandion haliaetus*		II	Winter	*													-
Apodiformes	Apodidae	小雨燕	*Apus nipalensis*	endemic (sub)		Resident		6	10	15			5	13		6	11			66
Suliformes	Phalacrocoracidae	鸕鷀	*Phalacrocorax carbo*			Winter	*													-
Coraciiformes	Alcedinidae	翠鳥	*Alcedo atthis*			Resident,Passage	*		1		2	5			2	2	2	3	2	19
Caprimulgiformes	Caprimulgidae	南亞夜鷹	*Caprimulgus affinis*	endemic (sub)		Resident					5		2	5	2					14
Falconiformes	Falconidae	紅隼	*Falco tinnunculus*		II	Winter											1			1
Passeriformes	Sturnidae	白尾八哥	*Acridotheres javanicus*			Introduced		21	21	19	17	19	10	15	8	21	25	16	13	205
		家八哥	*Acridotheres tristis*			Introduced		16	19	15	6	17	7	10	10	18	16	12	10	156
		八哥	*Acridotheres cristatellus*	endemic (sub)	II	Resident	*													-
	Laniidae	紅尾伯勞	*Lanius cristatus*		III	Winter,Passage	*		2	1	2	1		2					2	10
		棕背伯勞	*Lanius schach*			Resident				2							2	2		6
	Dicruridae	大卷尾	*Dicrurus macrocercus*	endemic (sub)		Resident,Passage		10	5	12	9	10	10	7	9	3	4	4	3	86
	Cisticolidae	褐頭鷦鶯	*Prinia inornata*	endemic (sub)		Resident		8	9	10	8	10	7	2	2	6	3	3	5	73
		灰頭鷦鶯	*Prinia flaviventris*			Resident		3	7	4	4	8	6	4	5	2	1	1	3	48
		棕扇尾鶯	*Cisticola juncidis*			Resident		1			5				4					10
	Passeridae	麻雀	*Passer montanus*			Resident		34	21	27	19	36	19	30	21	61	64	36	43	411
	Hirundinidae	洋燕	*Hirundo tahitica*			Resident		10	10	15	13	27	7	9	15	12	12	15	21	166
		赤腰燕	*Cecropis striolata*			Resident			9	8	15	6	6		7		10			61
		家燕	*Hirundo rustica*			Summer,Winter,Passage		14	13	13	16	19	7	10	13	16	16	10	15	162
		棕沙燕	*Riparia chinensis*			Resident			8	7				5	5	10	8		12	55
	Zosteropidae	斯氏繡眼	*Zosterops simplex*			Resident		13	10	10	17	10	8	15	10	9	10	12	11	135

Order	Family	Chinese name	Scientific name	Endemism[1]	Protect[2] Level	Migration Habit[3]	EIS[4] Fall 2016Sep-Nov	Monitoring during construction 2023.09 Selected landing route Taixi	2023.09 Selected landing route Sihu	2023.09 Non-selected landing route Taixi	2023.09 Non-selected landing route Sihu	2023.10 Selected landing route Taixi	2023.10 Selected landing route Sihu	2023.10 Non-selected landing route Taixi	2023.10 Non-selected landing route Sihu	2023.11 Selected landing route Taixi	2023.11 Selected landing route Sihu	2023.11 Non-selected landing route Taixi	2023.11 Non-selected landing route Sihu	Total
	Pycnonotidae	白頭翁	*Pycnonotus sinensis*	endemic (sub)		Resident		16	19	15	10	17	10	10	18	14	13	9	14	165
	Estrildidae	斑文鳥	*Lonchura punctulata*			Resident			10	10	10	15	10	9	10	6	6	14	10	110
		白喉文鳥	*Euodice malabarica*			Introduced												6		6
	Muscicapidae	鵲鴝	*Copsychus saularis*			Introduced	*		2	3	1	12	5	2	5	1	2	1	1	35
		灰斑鶲	*Muscicapa griseisticta*			Passage						2								2
		白腰鵲鴝	*Copsychus malabaricus*			Introduced										1				1
	Timaliidae	小彎嘴	*Pomatorhinus musicus*	endemic		Resident								2				2	3	7
	Alaudidae	小雲雀	*Alauda gulgula*			Resident			3			5		2	4	3	4		4	25
	Paradoxornithidae	粉紅鸚嘴	*Sinosuthora webbiana*	endemic (sub)		Resident		3		6	3		5			8	6	6	8	45
	Motacillidae	東方黃鶺鴒	*Motacilla tschutschensis*			Winter,Passage											10	7		17
		白鶺鴒	*Motacilla alba*			Resident,Winter		2		4		5			3	3	2	2	3	24
	Monarchidae	黑枕藍鶲	*Hypothymis azurea*	endemic (sub)		Resident				2			5	3	5		2		4	21
		Total（individual）						409	332	335	363	397	292	310	348	485	382	415	422	4,490
		H'					-	3.39	3.46	3.36	3.52	3.26	3.41	3.26	3.46	3.35	3.31	3.35	3.33	
		J'						0.95	0.95	0.94	0.95	0.94	0.96	0.93	0.94	0.89	0.88	0.90	0.90	

Remarks 1: Endemic Species: “Subendemic” indicates Taiwan endemic subspecies.
Remarks 2: Protected Species: II indicates rare and valuable species; III indicates other conservation-deserving species.
Remarks 3: Migratory Habit: Resident indicates resident bird; Winter indicates winter resident; Summer indicates summer resident; Passage indicates passage migrants; Introduced indicates introduced species which from foreign land
Remarks 4: “*” indicates the species was recorded in EIS stage.
Remarks 5: “-” indicates value uncalculatable.

iii Migratory Habit

Based on the survey in this quarter, 23 species owned the natures of resident, accounting for 34.33% of the documented species; 22 species owned the nature of migrant (including passage) (32.84%). 6 species owned the natures of introduced species (8.96%). 11 species obtain the nature of both resident and migrant (including passage) (16.42%). 3 species owned the nature of both resident and passage (4.48%). 2 species owned the nature of passage and introduced species (2.99%).

iv Dominant Species

A total of 4,490 individuals were recorded in the survey. Among which, Sparrow constituted the majority with 411 individuals, accounting for 9.15%. *Charadrius alexandrinus* came in second (259 individuals, 5.77%), followed by *Acridotheres javanicus* (205 individuals, 4.57%).

For coast of selected submarine cable landing point, 2,297 individuals are observed. Among which, Sparrow constituted the majority with 235 individuals, accounting for 10.23%, followed by *Acridotheres javanicus* (117 individuals, 5.09%) and *Charadrius alexandrinus* (114 individuals, 4.96%).

For coast of non-selected submarine cable landing point, 2,193 individuals are observed. Among which, Sparrow constituted the majority with 176 individuals, accounting for 8.03%, followed by *Charadrius alexandrinus* (145 individuals, 6.61%).

v Analysis of Indexes

For coast of selected submarine cable landing point, *H'* is between 3.26~3.46; *J'* is 0.89~0.95; for coast of non- selected submarine cable landing point, *H'* is between 3.31~3.52, *J'* is between0.88~0.96. *H'* index indicates a rich species composition in both areas. In the selected cable landing route in Taixi, *J'* index indicates that species composition is even and is not greatly affected by the dominant species. As the survey area is mostly consisted of coasts, fish farms, intertidal area and dry farmlands. The recorded species are mostly resident and winter visitors. Various kinds of water birds are observed gathering and foraging at coastal area.

2.1.3 Marine Ecology

Intertidal ecology survey is conducted in 50 m at both sides of north and south landing routes (C1-C6) on October 11, 2023 in this quarter. Plankton, fish egg and fish larva, benthic organism survey are conducted at 5 survey points (S1-S5) in the wind farm area on October 20, 2023. 3 fish survey lines (T1-T3) are conducted in the wind farm area on September 7, 2023. Survey area is shown as Figure 1.4-1 to Figure 1.4-3 and Figure 1.4-8. Survey results are explained as follows:

I. Intertidal Ecology Survey

i Sessile marine algae

Since sediment of all stations are sand, there is no spots for sessile marine algae to stick on, such as reef and huge rocks. No large sessile marine algae was recorded in this quarter.

ii Intertidal Benthic Organism

1. Species Composition

14 orders, 25 families and 35 species were recorded (as shown in Table 2.1.3-1). Species in each sampling station is between 8-30, with C3 contributing the most species; abundance in each sampling station is between 80~278 species, with C3 contributing the most abundance.

2. Dominant Species

1,070 individuals are recorded. Amphibalanus amphitrite consists the majority, with 301 individuals recorded, accounting for 28.13% of all the individuals. It was followed by *Austruca lactea* (99 individuals, 9.25%) and *Thais clavigera* (91 individuals, 8.50%), indicating that abundance of the species are relatively higher in this intertidal survey. Among all benthic organisms, 4 species (*Littoraria scabra*, *Nodilittorina radiata*, *Echinolittorina trochoides*, *Nerita albicilla* and *Amphibalanus amphitrite*) have the highest observation frequency. They were recorded in all stations (100.00%) and are species that are frequently spotted in the marine area.

3. Analysis of Indexes

H' is between 1.69~2.87, *J'* is between 0.78~0.91. Except for the lower index in C6 (affected by Amphibalanus Amphitrite), *H'* indicates a rich species composition in all stations. *J'* indicates that species composition is even, and the evenness was not affected by dominant species.

Table 2.1.3-1 Resource Table of Intertidal Benthic Organism

Order	Family	Chinese name	Scientific Name	Specialization[1]	Protected Level	EIS[2] 2016.08	112.10 C1	C2	C3	C4	C5	C6	Total	RA(%)[3]	OR(%)
Decapoda	Varunidae	秀麗長方蟹	*Metaplax elegans*			*							-[4]	-	-
		平背蜞	*Gaetice depressus*					4	3				7	0.65	33.33
		德氏仿厚蟹	*Helicana doerjesi*						1				1	0.09	16.67
		絨毛近方蟹	*Hemigrapsus penicillatus*			*							-	-	-
	Dotillidae	雙扇股窗蟹	*Scopimera bitympana*			*		9	8	19	14	12	62	5.79	83.33
	Ocypodidae	北方丑招潮蟹	*Gelasimus borealis*				8		18				26	2.43	33.33
		角眼沙蟹	*Ocypode ceratophthalmus*						2	1	2	3	8	0.75	66.67
		乳白南方招潮蟹	*Austruca lactea*				29	22	48				99	9.25	50.00
		糾結南方招潮蟹	*Austruca perplexa*					2	2				4	0.37	33.33
		清白招潮蟹	*Uca lactea*			*							-	-	-
		弧邊招潮蟹	*Uca arcuata*			*							-	-	-
		斯氏沙蟹	*Ocypode stimpsoni*								3		3	0.28	16.67
	Mictyridae	短指和尚蟹	*Mictyris brevidactylus*				8	6	16				30	2.80	50.00
	Sesarmidae	斑點擬相手蟹	*Parasesarma pictum*			*			1				1	0.09	16.67
	Grapsidae	白紋方蟹	*Grapsus albolineatus*			*							-	-	-
	Portunidae	鈍齒短槳蟹	*Thalamita crenata*			*							-	-	-
		達氏短槳蟹	*Thalamita danae*			*							-	-	-
	Alpheidae	槍蝦	Gen. sp. (Alpheidae)			*							-	-	-
	Macrophthalmus	萬歲大眼蟹	*Macrophthalmus banzai*			*	5	2	8				15	1.40	50.00
	Diogenidae	閃光活額寄居蟹	*Diogenes nitidimanus*						3				3	0.28	16.67
	Paguridae	窄小寄居蟹	*Pagurus angustus*				4						4	0.37	16.67
	Upogebiidae	美食奧螻姑蝦	*Austinogebia edulis*						1				1	0.09	16.67
Mesogastropoda	Littorinidae	波紋玉黍螺	*Littoraria undulata*			*			4	18	5	8	35	3.27	66.67
		粗紋玉黍螺	*Littoraria scabra*			*	6	9	9	11	7	10	52	4.86	100.00
		細粒玉黍螺	*Nodilittorina radiata*			*	12	11	15	7	4	5	54	5.05	100.00
		顆粒玉黍螺	*Echinolittorina trochoides*				15	18	12	10	11	9	75	7.01	100.00
Archeogastropoda	Neritidae	漁舟蜑螺	*Nerita albicilla*			*	8	9	12				29	2.71	50.00
		粗紋蜑螺	*Nerita undata*			*							-	-	-
	Lottiidae	花青螺	*Notoacmea schrenckii schrenckii*			*	9						9	0.84	16.67
		射線青螺	*Patelloida striata*			*	2						2	0.19	16.67
		高青螺	*Notoacmea concinna*			*							-	-	-
	Trochidae	草蓆鐘螺	*Monodonta labio*			*	11	14	9	2			36	3.36	66.67
	Nacellidae	花笠螺	*Cellana toreuma*			*							-	-	-
	Phasianellidae	雉螺	*Phasianella solida*			*							-	-	-
Actiniaria	Diadumenidae	縱條磯海葵	*Diadumene lineata*			*	5	2	3	4		3	17	1.59	83.33

Order	Family	Chinese name	Scientific Name	Specialization[1]	Protected Level	EIS[2]	112.10						Total	RA(%)[3]	OR(%)
						2016.08	C1	C2	C3	C4	C5	C6			
Sessilia	Balanidae	紋藤壺	*Amphibalanus amphitrite*			*	64	31	47	57	34	68	301	28.13	100.00
Isopoda	*Ligiidae*	奇異海蟑螂	*Ligia exotica*			*		8	5				13	1.21	33.33
Mytiloida	Mytilidae	綠殼菜蛤	*Perna viridis*	introduced						3			3	0.28	16.67
		土嘴瓜殼菜蛤	*Modiolus metcalfei*			*							-	-	-
Neogastropoda	Muricidae	蚵岩螺	*Thais clavigera*			*	18	14	18	22		19	91	8.50	83.33
	Nassariidae	蟹螯織紋螺	*Plicarcularia pullus*						5				5	0.47	16.67
Pteriida	Ostreidae	刺牡蠣	*Saccostrea kegaki*			*		8	8				16	1.50	33.33
		葡萄牙牡蠣	*Crassostrea angulata*			*	11	6	5	4			26	2.43	66.67
		黑齒牡蠣	*Saccostrea mordax*			*							-	-	-
		多樣疣足磷蟲	*Chaetopterus variopedatus*			*							-	-	-
Phyllodocida	Nereididae	沙蠶	Gen. spp. (Nereididae)			*			2				2	0.19	16.67
Anomalodesmata	Laternulidae	截尾薄殼蛤	*Laternula anatina*			*							-	-	-
Venerida	Veneridae	環文蛤	*Cyclina sinensis*			*							-	-	-
	Mactridae	方形馬珂蛤	*Mactra veneriformis*						3				3	0.28	16.67
Spionida	Chaetopteridae	多樣疣足磷蟲	*Chaetopterus variopedatus*			*							-	-	-
Entomotaeniata	Pyramidellidae	條紋塔螺	*Pyramidella sulcata*			*							-	-	-
Spionida	Chaetopteridae	燐蟲	*Chaetopterus* spp.				5		6	5		10	26	2.43	66.67
Heterogastropoda	Naticidae	小灰玉螺	*Natica gualteriana*						1				1	0.09	16.67
Amphipoda	Talitridae	扁跳蝦	*Platorchestia* spp.				4	3	3				10	0.93	50.00
			Total（individual）				224	178	278	163	80	147	1,070		
			H'				2.48	2.63	2.87	2.07	1.69	1.79			
			J'				0.86	0.91	0.84	0.81	0.81	0.78			

Remark 1: "*" indicates the species was recorded in the EIS stage (November 2016).
Remark 2: RA refers to Relative Abundance (%), OR refers to Occurrence Rate (%).
Remark 3: "-" indicates the value is incalculable.

II. Phytoplankton

i Species Composition

6 phylum, 87 families and 160 species were recorded (as shown in Table 2.1.3-2). Species of algae in each water layer are between 21~63. Abundance in each station/water layer is between 730~12,510 Cells/L, with the water surface at S2 station obtaining the most abundance, bottom layer at S3 obtaining the most species.

ii Dominant Species

Trichodesmium erythraeum has the highest abundance with 23,630 Cells/L, which accounts for 36.14% of the individuals this quarter, *Rhaphoneis* sp.2 comes in second (5,500Cells/L, 8.41%) and *Thalassiosira tenera* 3,720 Cells/L, 5.69%), indicating that abundance of these species are relatively higher. Observation frequency of *Biddulphia mobiliensis*, *Coscinodiscus rothii*, *Lithodesmium undulatum*, *Rhaphoneis* sp.2 and *Thalassiosira tenera* is the highest (100.00%). The 5 species were recorded in all stations, indicating these species are normal in the marine area.

iii Analysis of Indexes

In each sampling station, *H'* is between 0.63~3.43; *J'* is between 0.18~0.86. Although the abundance of algae recorded in the surface layer of S2 was higher, it was affected by the dominant algal species, *Trichodesmium erythraeum*, and the diversity index was the lowest among all stations. The bottom water sampling layer at station S3 recorded more algal species and the abundance of algal species was uniformly distributed, so the diversity index was the highest among all stations.

iv Concentration of Chlorophyll a

In each sampling station and sea level, concentration of Chlorophyll a was between 0.45~0.95 μg/L. Results indicate that the water surface at sampling station S2 had the highest concentration of Chlorophyll a, and bottom layer at sampling station S1 had the lowest level of concentration.

v Primary Productivity

In each sampling station and sea level, primary productivity was between 22.76~67.47 μgC/L/d. Results indicate that the water surface at sampling station S2 had the highest primary productivity, and bottom at sampling station S1 had the lowest primary productivity.

III. Zooplankton

i Species Composition

7 phyla and 12 genres were recorded, as shown in Table 2.1.3-3. 5~11 genres are observed in each sampling station, with S2 recorded the most genres. Abundance in each station is between 10,846~47,159 inds./1,000 m^3, with S1 recording the highest abundance.

ii Dominant Species

Calanoida has the highest relative abundance (82,278 inds./1,000 m^3, 62.98%), followed by Chaetognatha (11,567 inds./1,000 m^3, 8.85%) and Decapoda larvae (10,870 inds./1,000m^3, 8.32%), indicating that abundance of these species are relatively higher. The 4 genres, including Calanoida, Cyclopoida, Decapoda larvae and Chaetognatha have the highest observation frequency. They were recorded in all stations (100.00%) and are the species that are frequently spotted in the marine area, indicating that these genres are the common zooplankton in this survey.

iii Analysis of Indexes

H' is between 1.08~1.63; *J'* is between 0.55~0.74. The species abundance is high. *J'* shows that composition in S2 is the lowest as being affected by the dominant species Calanoida. S3 has a relatively even species composition, the index are the highest.

IV. Benthic Organism

i Species Composition

5 orders, 9 families, 11 species and 35 individuals were recorded. The list of species is shown as Table 2.1.3-4. Species in each sampling station is between 3-11, with S3 recording the highest abundance and species.

ii Dominant Species

1-6 individuals were recorded for each species. No dominant species were observed, observation frequency is not high (under 50.00%), indicating that no common species were recorded.

iii Analysis of Indexes

H' is between 介於 0.64~1.47, and *J'* is between 0.87~1.00. Overall, the species composition in all stations are rich, and the *H'* is higher. S2 has lower *J'* as more Tellinidae was recorded. No dominant species is recorded in other stations and the *J'* is high.

Table 2.1.3-2 Resource Table of Marine Plankton

Phylum	Genus	Chinese Name	Scientific Name	EIS[1] 2016.08	2023.10 S1				S2				S3				S4		S5				Total	RA(%)[2]	OR(%)
					0M	3M	10M	bottom	0M	3M	10M	bottom	0M	3M	10M	bottom	0M	3M	bottom	0M	3M	10M	bottom			
Cyanobacteria	*Trichodesmium*	紅海束毛藻	*Trichodesmium erythraeum*			430	370		11,140	2,000	400	1,800	2,440				3,530		160		380	400	580	23,630	36.14	63.16
		束毛藻 1	*Trichodesmium* sp.1	*																				0	-	-
Euglenozoa	*Eutreptia*	雙鞭藻 1	*Eutreptia* sp.1	*																				0	-	-
Myzozoa	*Alexandrium*	尤卡亞歷山大藻	*Alexandrium fraterculus*										10											10	0.02	5.26
	Archaeperidinium	微小古多甲藻	*Archaeperidinium minutum*												10									10	0.02	5.26
	Diplopsalis	透鏡翼甲藻	*Diplopsalis lenticula*																	10	10			20	0.03	10.53
	Gonyaulax	具指膝溝藻	*Gonyaulax digitalis*																	10				10	0.02	5.26
	Gymnodinium	豐富裸甲藻	*Gymnodinium uberrimum*	*																				0	-	-
	Peridinium	多甲藻	*Peridinium* spp.	*																				0	-	-
	Prorocentrum	閃光原甲藻	*Prorocentrum micans*	*			10			10							10			10	10			50	0.08	26.32
	Protoperidinium	原多甲藻 1	*Protoperidinium* sp.1		*																			0	-	-
	Tripos	叉角藻	*Tripos furca*	*													10							10	0.02	5.26
		大角角藻	*Tripos macroceros*																				10	10	0.02	5.26
		三叉角藻	*Tripos trichoceros*												10									10	0.02	5.26
		角藻 1	*Tripos* sp.1		*																			0	-	-
Haptophyta	*Coronosphaera*	地中海花冠球藻	*Coronosphaera mediterranea*				580																	580	0.89	5.26
	Reticulofenestra	無柄網格藻	*Reticulofenestra sessilis*																	780				780	1.19	5.26
	Scyphosphaera	阿氏杯球藻	*Scyphosphaera apsteinii*		170																			170	0.26	5.26
	Umbilicosphaera	希布格臍球藻	*Umbilicosphaera sibogae*						450															450	0.69	5.26
Bacillariophyta	*Achnanthes*	短柄曲殼藻	*Achnanthes brevipes*			30		160		100	20	50		90	240	70								760	1.16	42.11
		短柄曲殼藻窄形變種	*Achnanthes brevipes* var. *angustata*			10	30	10	10	20	20	80	10	70	80	200								540	0.83	57.89
		波緣曲殼藻	*Achnanthes crenulata*						10	20				20	10	20								80	0.12	26.32
		膨脹曲殼藻	*Achnanthes inflata*									10					20							30	0.05	10.53
		亞縊曲殼藻	*Achnanthes subconstricta*												40									40	0.06	5.26
	Actinoptychus	六幅輻裸藻	*Actinoptychus senarius*													20		10						30	0.05	10.53
		華美輻裸藻	*Actinoptychus splendens*					10			20	10		10			20							70	0.11	26.32
	Amphora	卵圓雙眉藻	*Amphora ovalis*								10		10											20	0.03	10.53
		雙眉藻 1	*Amphora* sp.1	*																				0	-	-
	Asterionella	日本星杆藻	*Asterionella japonica*	*			110																	110	0.17	5.26
	Asterolampra	南方星芒藻	*Asterolampra marylandica*									10												10	0.02	5.26
	Bacillaria	派格棍形藻	*Bacillaria paxillifera*					40		10	10		280			10	140				50			540	0.83	36.84
	Bacteriastrum	輻杆藻	*Bacteriastrum* spp.	*																				0	0.00	0.00
	Bellerochea	錘狀中鼓藻	*Bellerochea malleus*	*		50						80			70								50	250	0.38	21.05
		中鼓藻 1	*Bellerochea* sp.1				40	80		20			20		50	50		10		30	30	60	60	450	0.69	57.89
		中鼓藻 2	*Bellerochea* sp.2																				30	30	0.05	5.26
	Biddulphia	活動盒形藻	*Biddulphia mobiliensis*	*	40	40	30	90	10	30	50	20	70	50	70	90	80	90	170	140	140	170	250	1,630	2.49	100.00
		菱狀盒形藻	*Biddulphia rhombus*		20	10	30			50	70	90	80	110	150	190	100	190	70	60	50	120	180	1,570	2.40	89.47
		高盒形藻	*Biddulphia rigia*		30	20		10	10	10		60	30	50	20	30	10	30	30	10	40	10		400	0.61	84.21
		中華盒形藻	*Biddulphia sinensis*	*																				0	-	-
	Caloneis	非洲美壁藻	*Caloneis africana*									10												10	0.02	5.26
	Campylosira	舟形鞍鏈藻	*Campylosira cymbelliformis*	*							30	20	120	70		200	180	380	960			70	410	2,440	3.73	52.63
	Cerataulina	角管藻 1	*Cerataulina* sp.1	*																				0	-	-
	Cerataulus	顆粒角狀藻	*Cerataulus granulatus*						20															20	0.03	5.26
	Chaetoceros	扁面角毛藻	*Chaetoceros compressus*																		20			20	0.03	5.26
		旋鏈角毛藻	*Chaetoceros curvisetus*	*									50	270	170	50							120	660	1.01	26.32
		並基角毛藻	*Chaetoceros decipiens*									30									20	70		120	0.18	15.79
		雙刺角毛藻	*Chaetoceros dichaeta*																	20				20	0.03	5.26
		角毛藻	*Chaetoceros* spp.	*																				0	-	-
	Cocconeis	扁圓卵形藻	*Cocconeis placentula*					10			10	20	30	20	20					20	30	20		180	0.28	47.37
		盾卵形藻	*Cocconeis scutellum*											10										10	0.02	5.26
		盤裂卵形藻	*Cocconeis dirupta*									10												10	0.02	5.26
	Coscinodiscus	星臍圓篩藻	*Coscinodiscus asteromphalus*			10											10				10			30	0.05	15.79
		中心圓篩藻	*Coscinodiscus centralis*																			10		10	0.02	5.26
		變異圓篩藻	*Coscinodiscus commutata*												10									10	0.02	5.26
		整齊圓篩藻	*Coscinodiscus concinnus*					10		10		10	10				20	10	20		10	30		130	0.20	47.37
		弓束圓篩藻	*Coscinodiscus curvatulus*						10						10				10			10		40	0.06	21.05

Phylum	Genus	Chinese Name	Scientific Name	EIS[1] 2016.08	2023.10 S1				S2				S3				S4				S5				Total	RA(%)[2]	OR(%)
					0M	3M	10M	bottom	0M	3M	10M	bottom	0M	3M	10M	bottom	0M	3M	10M	bottom	0M	3M	10M	bottom			
	Coscinodiscus	瓊氏圓篩藻	*Coscinodiscus jonesianus*						10		10					20	30	10	30					20	130	0.20	36.84
		光亮圓篩藻	*Coscinodiscus nitidus*				10				10				10	20			10		10			10	80	0.12	36.84
		輻射圓篩藻	*Coscinodiscus radiatus*					10	10		10					20							10		60	0.09	26.32
		洛氏圓篩藻	*Coscinodiscus rothii*		40	10	40	50	10	20	10	10	40	70	70	20	40	50	50	40	40	60	20	690	1.06	100.00
		圓篩藻	*Coscinodiscus* spp.	*																					-	-	-
	Cyclotella	可辨小環藻	*Cyclotella distinguenda*		10	10																			20	0.03	10.53
		孟氏小環藻	*Cyclotella meneghiniana*			30				20	20	10		10		20									110	0.17	31.58
	Cymbella	近緣橋彎藻	*Cymbella affinis*				10	10	10	30	20	40	10	20	20	140	50	120		20	10	20	20	550	0.84	84.21
		纖細橋彎藻	*Cymbella gracilis*				10			10		10	10		10	160		40					20	270	0.41	42.11
		膨脹橋彎藻	*Cymbella tumida*												10		10				10			30	0.05	15.79
	Diatoma	普通等片藻	*Diatoma vulgaris*												10								30	40	0.06	10.53
	Diploneis	蜂腰雙壁藻	*Diploneis bombus*	*		10	20			10		10	30	30	20	30		10		10	10	20		210	0.32	63.16
		查爾雙壁藻	*Diploneis chersonensis*								10			10								20		40	0.06	15.79
		光亮雙壁藻	*Diploneis nitescens*													10								10	0.02	5.26
		卵圓雙壁藻	*Diploneis ovalis*																			10		10	0.02	5.26
	Ditylum	布氏雙尾藻	*Ditylum brightwellii*		10	10			10	10		20	30		10		30	110		20	10	20	30	320	0.49	68.42
	Entomoneis	翼繭形藻	*Entomoneis alata*	*									10	10										20	0.03	10.53
	Eucampia	長角彎角藻	*Eucampia cornuta*	*																20				20	0.03	5.26
		短角彎角藻	*Eucampia zoodiacus*	*																				-	-	-
	Fallacia	侏儒琴弦藻	*Fallacia pygmaea*														10	10						20	0.03	10.53
	Fogedia	琴狀福氏藻	*Fogedia lyra*									10												10	0.02	5.26
	Fragilaria	大洋脆杆藻	*Fragilaria oceanica*		20	150	280	270	110	130	190	160	110	50	160	280	90	20		60	40	100	70	2,290	3.50	94.74
		脆杆藻 1	*Fragilaria* sp.1	*																				0	-	-
	Gomphonema	尖異極藻	*Gomphonema acuminatum*						20		10			20			10	10	10					80	0.12	31.58
		微細異極藻	*Gomphonema parvulum*			10				30		10		30	10	50	10			10			20	180	0.28	47.37
		近棒形異極藻	*Gomphonema subclavatum*										20		20	10								50	0.08	15.79
	Grammatophora	海生斑條藻	*Grammatophora marina*									10				30								40	0.06	10.53
	Guinardia	薄壁幾內亞藻	*Guinardia flaccida*			140				100														240	0.37	10.53
		幾內亞藻 1	*Guinardia* sp.1	*																				-	-	-
	Gyrosigma	柔弱布紋藻	*Gyrosigma tenuissimum*																	10				10	0.02	5.26
	Halamphora	咖啡形鹽生雙眉藻	*Halamphora coffeiformis*					50	10	10		20	20	20	10									140	0.21	36.84
	Hantzschia	雙尖菱板藻	*Hantzschia amphioxys*					10						10	10							10		40	0.06	21.05
	Haslea	亞力山海氏藻	*Haslea alexanderi*											10										10	0.02	5.26
	Helicotheca	泰唔士旋鞘藻	*Helicotheca tamesis*	*																				0	-	-
	Hemiaulus	膜質半管藻	*Hemiaulus membranaceus*									40												40	0.06	5.26
		中華半管藻	*Hemiaulus sinensis*													40					40			80	0.12	10.53
	Lauderia	環紋勞德藻	*Lauderia annulata*	*					40	40			70	20	240	10						20		440	0.67	36.84
	Leptocylindrus	丹麥細柱藻	*Leptocylindrus danicus*	*												30								30	0.05	5.26
	Licmophora	短紋楔形藻	*Licmophora abbreviata*	*																				-	-	-
		朱吉楔形藻	*Licmophora juergensii*								10													10	0.02	5.26
	Lithodesmium	波狀石絲藻	*Lithodesmium undulatum*		10	30	10	10	10	20	10	100	50	80	40	80	170	140	170	70	40	70	80	1,190	1.82	100.00
	Luticola	端泥生藻	*Luticola mutica*				10	10	10	20	160	10	10		30	30							10	300	0.46	52.63
	Lyrella	琴狀琴形藻	*Lyrella lyra*																			10		10	0.02	5.26
	Mastogloia	布氏胸隔藻	*Mastogloia braunii*											10										10	0.02	5.26
	Melosira	顆粒直鏈藻	*Melosira granulata*													10								10	0.02	5.26
		擬貨幣直鏈藻	*Melosira nummuloides*			20								20		10								50	0.08	15.79
		波形直鏈藻	*Melosira undulata*														10	60						70	0.11	10.53
		變異直鏈藻	*Melosira varians*					20		10	10						60		60	20		10		190	0.29	36.84
	Meuniera	膜狀繆氏藻	*Meuniera membranacea*	*																				-	-	-
	Moreneis	顆粒棲沙藻	*Moreneis granulata*														10	30						40	0.06	10.53
		六角棲沙藻	*Moreneis hexagona*								10													10	0.02	5.26
	Navicula	系帶舟形藻	*Navicula cincta*							10		10				40		20				10		90	0.14	26.32
		隱頭舟形藻	*Navicula cryptocephala*										10			20								30	0.05	10.53
		直舟形藻	*Navicula directa*																20					20	0.03	5.26
		放射舟形藻	*Navicula radiosa*			20				10	40	20	90	30	10	70				10	40		20	360	0.55	57.89
		喙頭舟形藻	*Navicula rhynchocephala*									20												20	0.03	5.26
		紡錘舟形藻	*Navicula rostellata*									30				20					20		20	90	0.14	21.05
		舟形藻	*Navicula* spp.	*																				-	-	-

Phylum	Genus	Chinese Name	Scientific Name	EIS[1] 2016.08	2023.10 S1 0M	S1 3M	S1 10M	S1 bottom	S2 0M	S2 3M	S2 10M	S2 bottom	S3 0M	S3 3M	S3 10M	S3 bottom	S4 0M	S4 3M	S4 bottom	S5 0M	S5 3M	S5 10M	S5 bottom	Total	RA(%)[2]	OR(%)
	Nitzschia	兩棲菱形藻	*Nitzschia amphibia*								10		10											20	0.03	10.53
		絲狀菱形藻	*Nitzschia filiformis*					130	20	20	30	130		330	80									740	1.13	36.84
		纖細菱形藻	*Nitzschia gracilis*									10												10	0.02	5.26
		披針菱形藻	*Nitzschia lanceolata*									10				10								20	0.03	10.53
		線形菱形藻	*Nitzschia linearis*										10					10						20	0.03	10.53
		長菱形藻	*Nitzschia longissima*										10		10						20			40	0.06	15.79
		洛倫菱形藻	*Nitzschia lorenziana*				10	10				20	20		10	10							10	90	0.14	36.84
		小頭菱形藻	*Nitzschia microcephala*			20				10			10											40	0.06	15.79
		鈍頭菱形藻	*Nitzschia obtusa*					20							20									40	0.06	10.53
		毅皮菱形藻	*Nitzschia palea*							10		20			10	10	20			30	20			120	0.18	36.84
		鏈狀菱形藻	*Nitzschia paleacea*			20	10							10										40	0.06	15.79
		菱形藻	*Nitzschia* spp.	*																				-	-	-
	Odontella	長耳齒狀藻	*Odontella aurita*		10		10			10		90	30	50	10	30	50	20	10	20	10	20	40	410	0.63	78.95
		長角齒狀藻	*Odontella longicruris*	*									10	10	10	40	20	50	30	30			20	220	0.34	47.37
		鈍角齒狀藻	*Odontella obtusa*													10								10	0.02	5.26
	Orthoseira	角狀正鏈藻	*Orthoseira roeseana*													10								10	0.02	5.26
	Paralia	具槽帕拉藻	*Paralia sulcata*		80	60		60	40			90	180	120		130	140			160		50	50	1,160	1.77	63.16
	Pinnularia	附屬羽紋藻	*Pinnularia appendiculata*		10							20		10		20	10			30		10		110	0.17	36.84
	Plagiogramma	範氏斜斑藻	*Plagiogramma vanheurckii*								60	170	270	180		400					20			1,100	1.68	31.58
	Plagiolemma	扭斜膜藻	*Plagiolemma distortum*												10					10				20	0.03	10.53
	Plagiotropis	鱗翅斜脊藻	*Plagiotropis lepidoptera*								10	20	10					10						50	0.08	21.05
	Planktoniella	具翼漂流藻	*Planktoniella blanda*					10								10					20	10		50	0.08	21.05
	Pleurosigma	寬角斜紋藻	*Pleurosigma angulatum*				10	10					10	10					10	10	10			80	0.12	42.11
		長斜紋藻	*Pleurosigma elongatum*									50	10	20	20	40			10	50	30	20		250	0.38	47.37
		膨脹斜紋藻	*Pleurosigma inflatum*			10				20		10		30		10	10		20			10		120	0.18	42.11
		諾馬斜紋藻	*Pleurosigma normanii*			20	20	30	20	10	60	40	50	30	90	110	20	20	130	20	20	50	20	760	1.16	94.74
		斜紋藻	*Pleurosigma* spp.	*																				-	-	-
	Podosira	星形柄鏈藻	*Podosira stelligera*							10		10										20		40	0.06	15.79
	Proboscia	翼象鼻藻	*Proboscia alata*	*	10									10										20	0.03	10.53
	Psammodictyon	琴式砂網藻	*Psammodictyon panduriforme*									40	10	10		30					10	10	10	120	0.18	36.84
	Pseudictyota	可疑擬網藻	*Pseudictyota dubia*						10							10				10			10	40	0.06	21.05
	Rhaphoneis	雙角縫舟藻	*Rhaphoneis amphiceros*	*																				-	-	-
		縫舟藻 1	*Rhaphoneis* sp.1		10		20	40			30	10	30	10		40		20	20	20	80	60	30	420	0.64	73.68
		縫舟藻 2	*Rhaphoneis* sp.2		80	320	50	120	150	80	300	480	510	660	490	750	220	410	20	150	200	190	320	5,500	8.41	100.00
	Rhizosolenia	伯氏根管藻	*Rhizosolenia bergonii*												10									10	0.02	5.26
		卡氏根管藻	*Rhizosolenia castracanei*						10															10	0.02	5.26
		假根管藻	*Rhizosolenia fallax*									20		100										120	0.18	10.53
		覆瓦根管藻	*Rhizosolenia imbricata*									20									10			30	0.05	10.53
		粗根管藻	*Rhizosolenia robusta*											10										10	0.02	5.26
		剛毛根管藻	*Rhizosolenia setigera*			10	10						10		20						20			70	0.11	26.32
		筆尖形根管藻	*Rhizosolenia styliformis*				10																	10	0.02	5.26
		根管藻	*Rhizosolenia* spp.	*																				-	-	-
	Rhoicosphenia	短彎楔藻	*Rhoicosphenia abbreviata*											40	10	20								70	0.11	15.79
	Rhopalodia	隆凸棒杆藻	*Rhopalodia gibba*								10													10	0.02	5.26
		駝峰棒杆藻	*Rhopalodia gibberula*						10													10		20	0.03	10.53
	Roperia	方格羅氏藻	*Roperia tesselata*					10	30			20		20	30	10	100	30		30	10	20	50	360	0.55	63.16
	Sellaphora	瞳孔鞍型藻	*Sellaphora pupula*																			10		10	0.02	5.26
	Skeletonema	中肋骨條藻	*Skeletonema costatum*	*													140							140	0.21	5.26
	Stephanopyxis	塔形冠蓋藻	*Stephanopyxis turris*																			10		10	0.02	5.26
	Striatella	條紋藻 1	*Striatella* sp.1	*																				-	-	-
	Surirella	美麗雙菱藻	*Surirella elegans*							10				10					10					30	0.05	15.79
		華壯雙菱藻	*Surirella fastuosa*																			20		20	0.03	5.26
	Tabularia	伽氏平片藻	*Tabularia gaillonii*	*					10				10	20	20				10					70	0.11	26.32
	Thalassionema	伏恩海線藻	*Thalassionema frauenfeldii*								40	30	20			40				20	20		40	210	0.32	36.84
		菱形海線藻	*Thalassionema nitzschioides*	*		40				20	90	60	20	20	30	60					40	20		400	0.61	52.63
	Thalassiosira	離心列海鏈藻	*Thalassiosira eccentrica*			30	20			20		10	20	20	40	50		70	50	30	40	40	50	490	0.75	73.68
		細長列海鏈藻	*Thalassiosira leptopus*		30	50	10	20	10				10	30	20	10					20	10	20	240	0.37	63.16
		碟形海鏈藻	*Thalassiosira minicosmica*		10	10	40		10	10	30		20			20	40	40	10	10		20		270	0.41	68.42

Phylum	Genus	Chinese Name	Scientific Name	EIS[1] 2016.08	2023.10 S1 0M	S1 3M	S1 10M	S1 bottom	S2 0M	S2 3M	S2 10M	S2 bottom	S3 0M	S3 3M	S3 10M	S3 bottom	S4 0M	S4 3M	S4 bottom	S5 0M	S5 3M	S5 10M	S5 bottom	Total	RA(%)[2]	OR(%)
	Thalassiosira	斑點海鏈藻	*Thalassiosira punctigera*		40	50	40	40	30	60	20	90	40	100	90	90				40	80	80	110	1,000	1.53	84.21
		柔弱海鏈藻	*Thalassiosira tenera*		60	110	180	190	130	420	250	460	330	360	410	230	100	100	90	60	90	60	90	3,720	5.69	100.00
		海鏈藻	*Thalassiosira* spp.	*																				-	-	-
	Thalassiothrix	柔弱海毛藻	*Thalassiothrix delicatula*											10										10	0.02	5.26
		長海毛藻	*Thalassiothrix longissima*												20									20	0.03	5.26
	Trachyneis	粗糙粗紋藻	*Trachyneis aspera*		10	10			10	10	10			10	20		40					10		130	0.20	47.37
	Tryblionella	尖錐盤杆藻	*Tryblionella acuminata*								10													10	0.02	5.26
	Trybliоptychus	卵形褶盤藻	*Trybliоptychus cocconeiformis*										10											10	0.02	5.26
	Ulnaria	縊縮肘形藻	*Ulnaria contracta*									10												10	0.02	5.26
		肘狀肘形藻	*Ulnaria ulna*			20	20	10	10		60	20	10	30	60		20	50	30	20	60	30		450	0.69	78.95
Ochrophyta	*Dictyocha*	小等刺矽鞭藻	*Dictyocha fibula*		30	90	50	90	100	40	30	80	100	60	70	60				10			10	820	1.25	73.68
	Distephanus	六異刺矽鞭藻	*Distephanus speculum*								10				10									20	0.03	10.53
Chlorophyta	*Scenedesmus*	彎曲柵藻	*Scenedesmus arcuatus*				80																	80	0.12	5.26
		Total（Cells/L）			730	1,910	2,180	1,650	12,510	3,520	2,230	4,890	5,450	3,560	3,260	4,360	5,590	2,180	2,220	2,140	1,900	2,160	2,940	65,380		
		Chl a (μg/L)			0.45	0.69	0.72	0.58	0.95	0.71	0.77	0.67	0.91	0.77	0.66	0.70	0.86	0.84	0.72	0.67	0.66	0.81	0.72			
		PP(ugC/L/d)		-	22.76	42.39	42.68	34.81	67.47	46.17	48.68	41.45	61.49	44.73	39.25	41.13	57.83	51.63	47.09	42.29	38.68	49.31	45.51			
		Diversity Index（*H'*）			2.65	2.82	2.58	2.93	0.63	1.99	3.00	2.80	2.46	3.28	3.30	3.43	1.84	2.84	2.30	2.75	3.24	3.31	2.93			
		Evenness Index（*J'*）			0.86	0.79	0.73	0.84	0.18	0.53	0.79	0.68	0.61	0.80	0.81	0.82	0.50	0.81	0.68	0.74	0.85	0.84	0.80			

Note 1: "*" indicates the species was recorded in EIS stage

Note 2: RA= Relative Abundance,%; OR= Occurrence Rate,%

Table 2.1.3-3 Resource Table for Marine Zooplankton

Phylum	Genre	English name	EIS 105.08	S1	S2	112.10 S3	S4	S5	Total	RA（%）[2]	OR（%）
Protozoa	有孔蟲	Foraminifera	*						-	-	-
	放射蟲	Radiolaria	*						-	-	-
Cnidaria	水螅水母	Hydroida	*	1,572	1,104	362	583		3,621	2.77	80.00
	管水母	Siphonophora	*	524	1,104	362			1,990	1.52	60.00
Arthropoda	藤壺幼生	Barnacle larvae	*						-	-	-
	哲水蚤	Calanoida	*	30,391	30,335	5,421	8,733	7,398	82,278	62.98	100.00
	橈足類幼生	Copepoda nauplius	*						-	-	-
	劍水蚤	Cyclopoida	*	2,620	3,310	723	583	617	7,853	6.01	100.00
	十足類幼生	Decapoda larvae	*	2,096	4,964	1,446	1,747	617	10,870	8.32	100.00
	猛水蚤	Harpacticoida	*						-	-	-
	螢蝦類	Luciferidae	*						-	-	-
	糠蝦類	Mysidacea	*						-	-	-
	介形類	Ostracoda	*	3,668	1,104				4,772	3.65	40.00
Annelida	多毛類	Polychaeta	*						-	-	-
Mollusca	雙殼貝類幼生	Bivalve larvae	*						-	-	-
	其他腹足類	Other Gastropoda	*	1,048	1,104				2,152	1.65	40.00
	翼足類	Pteropoda	*	524	1,104	362		617	2,607	2.00	80.00
Bryozoa	苔蘚蟲幼生	Bryozoan larvae			552				552	0.42	20.00
Chaetognatha	毛顎類	Chaetognatha	*	4,192	552	1,446	2,911	2,466	11,567	8.85	100.00
Echinodermata	棘皮幼生	Echinodermata larvae	*		552	362			914	0.70	40.00
Chordata	有尾類	Appendicularia	*						-	-	-
	魚卵	Fish eggs	*	524		362	583		1,469	1.12	60.00
	仔稚魚	Fish larvae	*						-	-	-
Total（inds./1,000 m^3）				47,159	45,785	10,846	15,140	11,715	130,645		
Diversity Index（*H'*）				1.34	1.31	1.63	1.26	1.08			
Evenness Index（*J'*）				0.58	0.55	0.74	0.70	0.67			

Note 1: "*" indicates the species was recorded in EIS stage

Note 2: RA= Relative Abundance,%; OR= Occurrence Rate,%.

Table 2.1.3-4 Resource Table for Marine Benthic Organism

Order	Family	Chinese name	Scientific name	Endemic	Protected level	EIS[1] 2016.08	2023.10 S1	S2	S3	S4	S5	Total	RA(%)[2]	OR(%)
Decapoda	Diogenidae	活額寄居蟹	Gen. spp. (Diogenidae)				3	3				6	17.14	40.00
		閃光活額寄居蟹	*Diogenes nitidimanus*							2		2	5.71	20.00
		寄居蟹	*Diogenes* spp.			*						-[3]	-	-
	Penaeidae	哈氏仿對蝦	*Parapenaeopsis hardwickii*			*						-	-	-
		細巧仿對蝦	*Parapenaeopsis tenella*								2	2	5.71	20.00
		刀額新對蝦	*Metapenaeus ensis*					1				1	2.86	20.00
	Crangonidae	褐蝦	Gen. spp. (Crangonidae)							4		4	11.43	20.00
	Matutidae	頑強黎明蟹	Matuta victor			*						-	-	-
	Sergestidae	櫻蝦	Gen. sp. (Sergestidae)						2		2	4	11.43	40.00
	Pasiphaeidae	玻璃蝦	Gen. spp. (Pasiphaeidae)					2				2	5.71	20.00
Mesogastropoda	Potamididae	栓海螺	*Cerithidea cingulata*			*						-	-	-
	Cerithioidea	中華蟹守螺	*Rhinoclavis sinensis*			*						-	-	-
Phyllodocida	Nereididae	沙蠶	Gen. spp. (Nereididae)			*						-	-	-
Neogastropoda	Nassariidae	粗肋織紋螺	*Nassarius nodifer*			*	3	1				4	11.43	40.00
Gnathophiurida	Amphiuridae	陽燧足	*Amphiura* spp.			*						-	-	-
Venerida	Veneridae	文蛤	*Meretrix lusoria*			*						-	-	-
		花蛤	Gomphina aequilatera			*						-	-	-
		黃文蛤	Pitarina sulfureum			*						-	-	-
	Tellinidae	櫻蛤	Gen. spp. (Tellinidae)					4		1		5	14.29	40.00
Pleuronectiformes	Soleidae	卵鰨	*Solea ovata*			*						-	-	-
Spionida	spionidae	海稚蟲	spp.						1		2	3	8.57	40.00
Clypeasteroida	Dendrasteridae	馬氏扣海膽	*Sinaechinocyamus mai*								2	2	5.71	20.00
			Total（species）				6	11	3	7	8	35		
			Diversity Index（*H'*）				0.69	1.47	0.64	0.96	1.39			
			Evenness Index（*J'*）				1.00	0.91	0.92	0.87	1.00			

Note 1: "*" indicates the species was recorded in EIS stage (2016 February)

Note 2: "-" indicates incalculable data.

Note3: RA= Relative Abundance,%; OR= Occurrence Rate,%.

V. Fish Egg and Larva

i Species Composition

489 eggs were captured in this quarter. 3 families and 3 species of fish egg were identified, including Cynoglossidae sp., *Stolephorus commersonnii* and *Pennahia macrocephalus* (as shown in Table 2.1.3-5). 3 individuals were recorded. 3 families and 3 species of fish larva were captured in this quarter, 4 families and 4 species were identified, which are Clupeidae sp., *Photopectoralis aureus and Trichiurus* sp. (as shown in Table 2.1.3-6).

Table 2.1.3-5 Fish Egg Composition and Abundance Collected in this Quarter

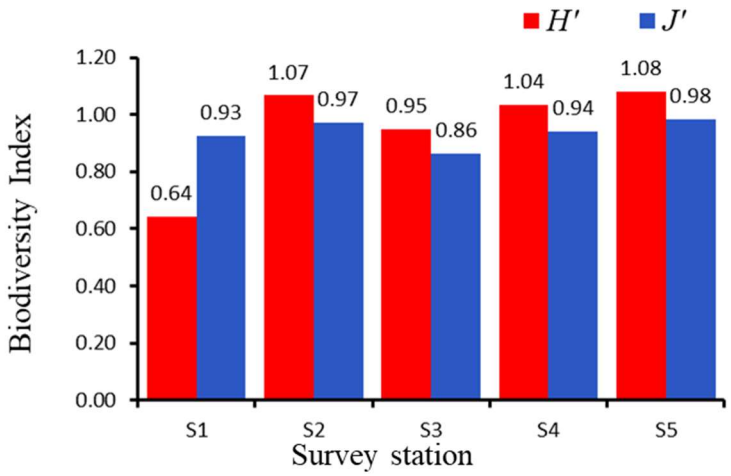
Taxa\Station	Chinese name	st.1	st.2	st.3	st.4	st.5	Total
Cynoglossidae							
Cynoglossidae sp.	舌鰨科	2	120	40	91	44	297
Engraulidae							
Stolephorus commersonnii	康氏側帶小公魚		13	3	6	16	38
Sciaenidae							
Pennahia macrocephalus	大頭白姑魚	4	30	3	109	10	156
Abundance (egg/100 m^3)		**6**	**163**	**46**	**206**	**70**	**491**
Genre		2	3	3	3	3	3
Family		2	3	3	3	3	3
Fish Egg actually collected(egg)		**4**	**173**	**37**	**240**	**35**	**489**

ii Index Analysis

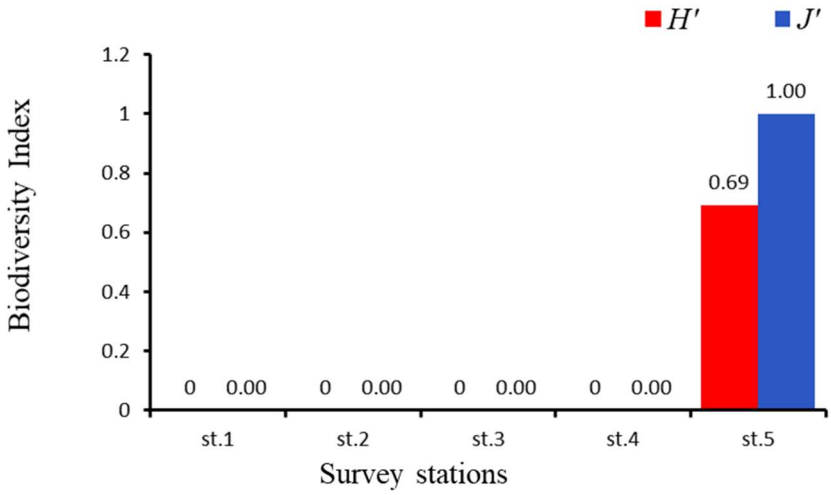
H' and *J'* index analysis of fish eggs and larvae in each sampling station is as shown in Figure 2.1.3-1. Shannon-Wiener diversity index (H') is a composite reflection of the number of species and the proportion of each species in the cluster, while Pielou's evenness (J') is a calculation of the degree to which each species is evenly distributed in the cluster (value is between 0 and 1, greater value indicates the greater evenness). For fish eggs, the *H'* is between 0.64-1.08, *J'* is between 0.86-0.98. S5 has the highest *H'* index (*H'* =1.08), and S2 has the lowest *H'* index (*H'* =0.64). As for fish larva, no egg was collected in S3 and S4, so both *J'* and *H'* are incalculable. Only 1 fish larva was captured in S2, *H'* is 0, and *J'* is incalculable. *H'* index in S5 is 0.69, and *J'* index in both stations is 1.00.

Table 2.1.3-6 Fish Larva Composition and Abundance Collected in this Quarter

Taxa\Station	Chinese name	st.1	st.2	st.3	st.4	st.5	Total
Clupeidae							
Clupeidae sp.	鯡科					2	2
Leiognathidae							
Photopectoralis aureus	金黃光胸鯧					2	2
Trichiuridae							
Trichiurus sp.	帶魚屬		1				1
Abundance (ind./100 m^3)		**0**	**1**	**0**	**0**	**4**	**5**
Genre		0	1	0	0	2	3
Family		0	1	0	0	2	3
Fish Larva actually collected		**0**	**1**	**0**	0	**2**	**3**



(a) Fish Egg



(b) Fish Larva

Figure 2.1.3-1 Diversity Index (*H'*) and Evenness Index (*J'*) of Fish Egg and Fish Larva in each Sampling Station

VI. Fish

i Species Composition

In this quarter, 9 families, 14 species and 54 individuals of fish were captured in three sampling stations, amounting to 16.93 kg (Table 2.1.3-7).

In sampling station T1, 6 families, 7 species and 13 individuals of fish were captured, amounting to 5.27 kg. *Arius maculatus* had the most individuals caught (8 individuals), followed by *Netuma thalassina* (3 individuals) and Orbfish (4 individuals). *Scoliodon laticaudus*, *Neotrygon kuhlii*, *Ilisha melastoma*, *Pomadasys kaakan*, *Pennahia macrocephalus* (1 individual respectively).

In sampling station T2, 7 families, 12 species and 26 individuals of fish were captured, amounting to 6.42 kg. *Arius maculatus* had the most individuals caught (7 individuals), followed by *Pennahia pawak* (5 individuals) and *Netuma thalassina* (3 individuals), *Johnius borneensis* and *Cynoglossus bilineatus* (2 individuals respectively) and *Neotrygon kuhlii*, *Ilisha melastoma*, *Thryssa hamiltonii*, *Chrysochir aureus*, *Johnius trewavasae*, *Pennahia macrocephalus*, *Ichthyscopus lebeck* (1 individual respectively).

In sampling station T3, 5 families, 6 species and 15 individuals of fish were captured, amounting to 5.24 kg. *Arius maculatus* had the most individuals caught (9 individuals), followed by *Netuma thalassina* (2 individuals) and *Thryssa hamiltonii*, *Pomadasys kaakan*, *Pennahia macrocephalus*, *Cynoglossus bilineatus* (1 individual respectively).

ii Dominant Species

Regarding fish species, *Arius maculatus* is the dominant species with 21 individuals (38.9%), followed by *Netuma thalassina* (8 individuals, 14.8%) and *Pennahia pawak* (5 individuals, 9.3%). *Pennahia macrocephalus*, *Cynoglossus bilineatus*, came in the fourth and fifth place, which were captured with 3 individuals, accounting for 5.6. Other 9 species were captured with 1-2 individuals.

In this quarter, 3 species (*Arius maculatus*, *Netuma thalassina and Pennahia macrocephalus*) were recorded in all three stations, indicating the species have the widest range of distribution. 5 species, including *Neotrygon kuhlii*, *Pomadasys kaakan*, *Ilisha melastoma*, *Thryssa hamiltonii*, *Cynoglossus bilineatus* were recorded in 2 stations, whose distribution were the second widest. 6 species, including *Scoliodon laticaudus*, *Chrysochir aureus*, *Johnius borneensis*, *Johnius trewavasae*, *Pennahia pawak*, *Ichthyscopus lebeck* were only recorded in 1 station.

iii Analysis of Indexes

H' recorded for sampling station T1 was 1.69, *J'* was 0.87;

H' recorded for sampling station T2 was 2.19, *J'* was 0.88;

H' recorded for sampling station T3 was 1.3, *J'* was 0.72.

The three sampling stations in succession of *H'* index is T2> T1> T3.

The three sampling stations in succession of *J'* index is T2> T1> T3.

The successions of the three sampling stations are the same regarding the two index *H'* and *J'*.

iv Comprehensive Discussion

According to the comprehensive analysis of the 14 fish species that were recorded in the three stations, 10 species (*Pennahia macrocephalus*, *Neotrygon kuhlii*, *Pomadasys kaakan*, *Cynoglossus bilineatus*, *Scoliodon laticaudus*, *Chrysochir aureus*, *Johnius borneensis*, *Johnius trewavasae*, *Pennahia pawak*, *Ichthyscopus lebeck*) have higher economic values. 4 species (*Arius maculatus*, *Netuma thalassina*, *Ilisha melastoma*, *Thryssa hamiltonii*) are food fish but less popular in the market, they are either sold with low price, dealt with as trash fish or even thrown away. If analyzed by species composition, the species with higher commercial values account for 71.4%. If analyzed by amount captured, the species with higher commercial values account for 38.9%.

With regard to the correlation between fish species and marine habitat: the substrate of the marine environment in Yunlin County is mainly mud and sand, and no artificial reef was placed in the waters. The substrate is relatively homogeneous. Local fishers said that there is a severely-disintegrated ship wreck near the shore around the wind farm site, and it is known that the wreck can serve as artificial reef. The survey in 2021 Q1 (January 14) also found traces of reef substrate fish species, such as Kyphosus cinerascens. This shows that there are a few fish species near the wind farm area prefer reef substrate. However, mud and sand substrates are still the most preferred marine environment in Yunlin wind farm area. Out of the 14 species captured in this quarter, 11 species were mud/sand substrate species, and 3 species were reef/sand substrate species. They are all common fish species in the Taiwan Strait. The survey result suggests that local fish species mainly prefer mud/sand substrate, with some species prefer reef/sand substrate. The sampling result of this quarter also shows that the species composition is quite consistent with the geographical location and the substrate in Yunlin.

VII. Underwater Filming

ROV is applied in this monitoring program on September 19-20, 2023 at turbine No.

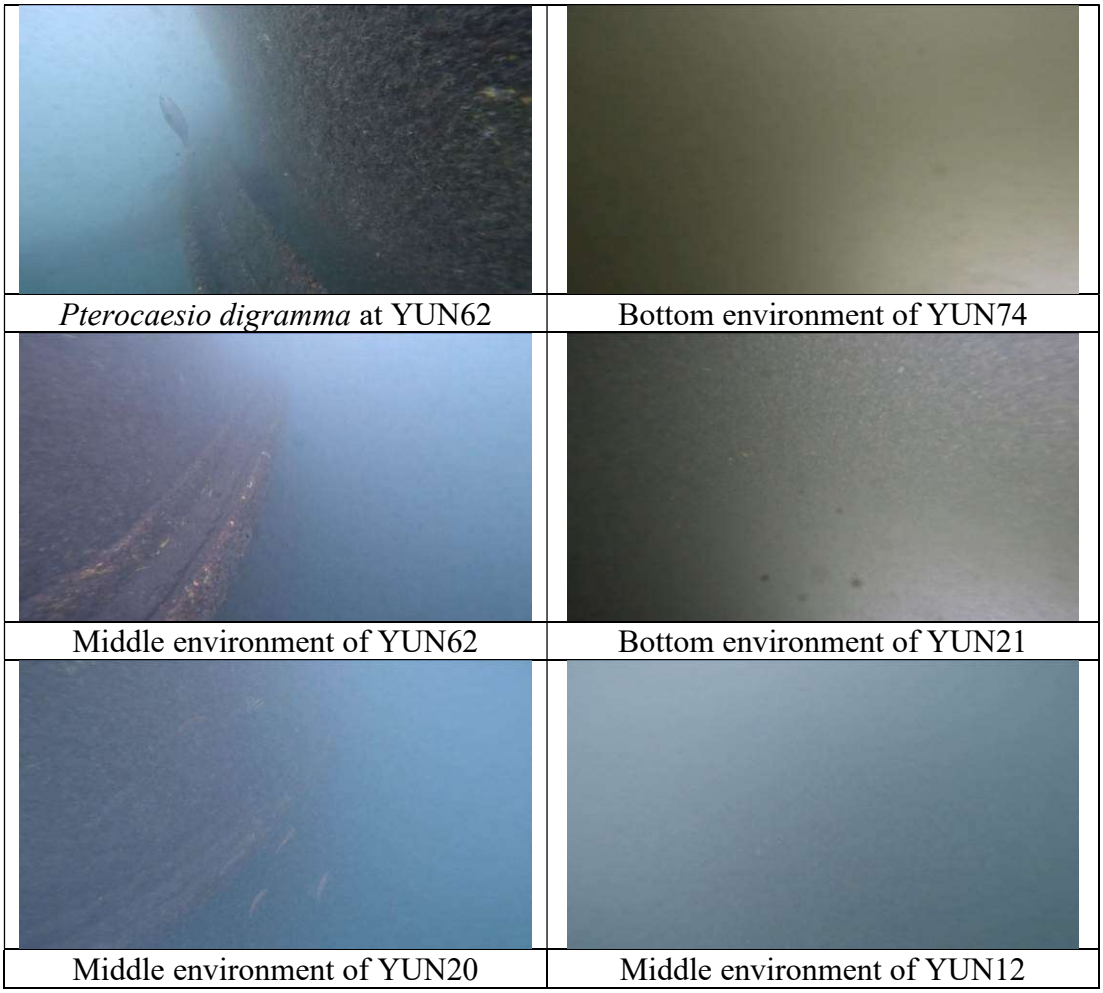
YUN12, YUN20, YUN21, YUN62 and YUN74. In all locations, the middle layer is water area, and the bottom layer is sand-based with some rocks.

As the foundation has just been installed and there is no algae yet, so the biodiversity of the middle and bottom layers is low. The ROV only recorded fish occasionally swimming by. 1 order, 4 families and 4 species were documented. 3 species were recorded at the middle layer at YUN20, including 1 *Plectorhinchus cinctus* and 6 *Abudefduf vaigiensis* and 8 *Pterocaesio digramma*. 1 species of Apogonidae was recorded at the bottom layer at YUN20. 7 *Pterocaesio digramma* were recorded at the middle layer at YUN62. No species were recorded in YUN12, YUN21 and YUN74. Survey results are shown as Table 2.1.3-9. The photos of species were shown as Figure 2.1.3-2.

In this survey, *Plectorhinchus cinctus* were mainly observed in the reef area along the coast, as well as in the mud/sand-based area of estuary and artificial reef in the water depth within 50m. *Plectorhinchus cinctus* is carnivorous, they feed on crustaceans and small fish. The spawning season of the species is from May to June every year. The *Abudefduf vaigiensis* mainly inhabits shallow waters in the rocky reefs along the coast, but it can also inhabit in waters farther away from the shore or in deeper waters. They often gather in groups to feed on zooplankton or algae. The *Pterocaesio digramma* mainly inhabits deep lagoons or steep slopes of reefs along the coast. It prefers to migrate in large groups in the middle waters; they can swim fast for a long period of time. The habitat depth ranges from 0 to 50 meters. It is a diurnal fish, foraging for zooplankton in the daytime and resting in sheltered areas of the reef at night. They are carnivorous and feed mainly on zooplankton. Apogonidae mainly inhabits the upper end of corals in rocky reefs or lagoons in groups. They feed on zooplankton and other benthic invertebrates.

Organisms would avoid the waters adjacent to the wind farm construction during the piling and assembly of wind turbines. The construction of the wind turbine for this project is partially completed, with some of the installation still on-going, precursor species such as barnacles have not yet been found on the piles to attract other organisms to gather. Therefore, there are relatively few species.

	
Abudefduf vaigiensis at YUN20	Apogonidae at YUN20



Pterocaesio digramma at YUN62 | Bottom environment of YUN74

Middle environment of YUN62 | Bottom environment of YUN21

Middle environment of YUN20 | Middle environment of YUN12

Figure 2.1.3-2 Underwater Filming in this Monitoring Project

Table 2.1.3-9 Underwater Filming Result for this Quarter

Order	Family	Chinese Name	Scientific Name	12		20		21		62		74	
				middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom
Perciformes	Haemulidae	花尾胡椒鯛	*Plectorhinchus cinctus*			1							
	Pomacentridae	條紋豆娘魚	*Abudefduf vaigiensis*			6							
	Caesionidae	雙帶鱗鰭烏尾鮗	*Pterocaesio digramma*			8				7			
	Apogonidae	天竺鯛科	Gen. sp. (Apogonidae)				1						
Total				0	0	15	1	0	0	7	0	0	0

Table 2.1.3-7 Composition of Fish Captured in Sampling Stations in this Quarter

Date of Sampling				2023.9.7			2023.9.7			2023.9.7			
Station				Bottom gill T1			Bottom gill T2			Bottom gill T3			
Family	Scientific Name	Chinese Name	Habitat	No.	TL	BW	No.	TL	BW	No.	TL	BW	Total
Carcharhinidae	*Scoliodon laticaudus*	寬尾斜齒鯊	reef/sand	1	51	620							1
Dasyatidae	*Neotrygon kuhlii*	古氏新紅	reef/sand	1	37	495	1	41	516				2
Pristigasteridae	*Ilisha melastoma*	黑口鰳	sand	1	15	57	1	14	48				2
Engraulidae	*Thryssa hamiltonii*	漢氏稜鯷	sand				1	21	112	1	23	115	2
Ariidae	*Arius maculatus*	斑海鯰	sand	5	32~38	2,350	7	25~41	2,951	9	27~39	3,376	21
Ariidae	*Netuma thalassina*	大頭多齒海鯰	sand	3	35~40	1,162	3	26~36	1,070	2	28~33	920	8
Haemulidae	*Pomadasys kaakan*	星雞魚	reef/sand	1	31	510				1	33	532	2
Sciaenidae	*Chrysochir aureus*	黃金鰭鰔	sand				1	28	290				1
Sciaenidae	*Johnius borneensis*	婆羅洲叫姑魚	sand				2	16~17	151				2
Sciaenidae	*Johnius trewavasae*	屈氏叫姑魚	sand				1	17	82				1
Sciaenidae	*Pennahia macrocephalus*	大頭白姑魚	sand	1	17	72	1	18	85	1	17	69	3
Sciaenidae	*Pennahia pawak*	斑鰭白姑魚	sand				5	16~18	405				5
Uranoscopidae	*Ichthyscopus lebeck*	披肩騰	sand				1	27	310				1
Cynoglossidae	*Cynoglossus bilineatus*	雙線舌鰨	sand				2	28~30	401	1	32	230	3
Weight (g)						5,266			6,421			5,242	
Species				7			12			6			14
Individuals				13			26			15			54
(*H'*)				1.6924			2.1913			1.2973			
(*J'*)				0.8697			0.8818			0.72403			

Note: No. indicates individual; TL indicates total length (cm); BW indicates weight (g)

2.1.4 Underwater Acoustic Survey of Cetacean Ecology

There are 5 measuring locations in this survey (YW-1-YW-5). Valid data collected in the locations will be analyzed. Underwater acoustic survey was carried out from September 19-20 2023 and 20-21 2023. The measurement lasted for 1 day (24 hours). The analysis durations are as Table 2.1.4-1, with explanation provided below. Deployment locations as shown in Figure 1.4-5.

Table 2.1.4-1 Duration of the Underwater Acoustic Data Analyzed in this Quarter

Measuring location	Duration of the data analyzed
YW-1	2023 September 20-21
YW-2	2023 September 20-21
YW-3	2023 September 19-20
YW-4	2023 September 19-20
YW-5	2023 September 19-20

I. Analysis of Underwater Ambient Noise

Underwater acoustic equipment is able to record change of surrounding sounds, such as natural ambient noise (wave, tide, etc), sound of creatures (cetaceans, fish, etc), etc. Intermittent unknown high-level sound sources such as vessel noise or human activities can all be recorded if occurred. The Wav files recorded by the acoustic device undergoes FFT, and the result is presented in 1Hz and 1/3 Octave band. Characteristics and changes of the underwater ambient noise in the Project area were learned via spectrogram and cumulative probability distribution diagram of ambient noise.

i Analysis of Underwater Time/frequency

The spectrograms of ambient noise time-frequency analysis for each measuring locations are shown in Figure 2.1.4-1 to Figure 2.1.4-5. From the spectrum, it can be found that the underwater noise was affected by vessel noises and the tidal period. In other words, when the tides changes during high tides or low tides, the flowing noise will be derived from the sea current. The analysis of the spectrum shows that noise mostly distributed in low frequency.

ii Cumulative Probability Distribution of Ambient Noise

The cumulative probability distributions of ambient noise at each measuring

location are shown in Figure 2.1.4-1 to Figure 2.1.4-5. The percentages of each curve indicate the cumulative probability that is lower than the noise value; 5% purple curve and 95% red curve represent the lower and upper limits of the range of ambient noise. L_5 and L_{90} are the upper limit and lower limit of the ambient noise, and L_{50} is the median.

Survey was conducted for 24 hours in YW-1, YW-2, YW-3, YW-4 and YW-5. Measuring results show peaks in low frequency. This is mainly contributed by the currents flowing through the device and the vessels around the wind farm.

Dolphins frequently seen in the western sea area of Taiwan include Chinese white dolphin and bottlenose dolphin. Sounds of these dolphins are in the middle-frequency, which range between 3k -9k Hz. Therefore, the Project adopts the background noise value from 2.5k to 10k Hz as the threshold for detection of cetacean sounds. Cumulative probability of noise with the frequency domain is shown as Table 2.1.4-2 to Table 2.1.4-6.

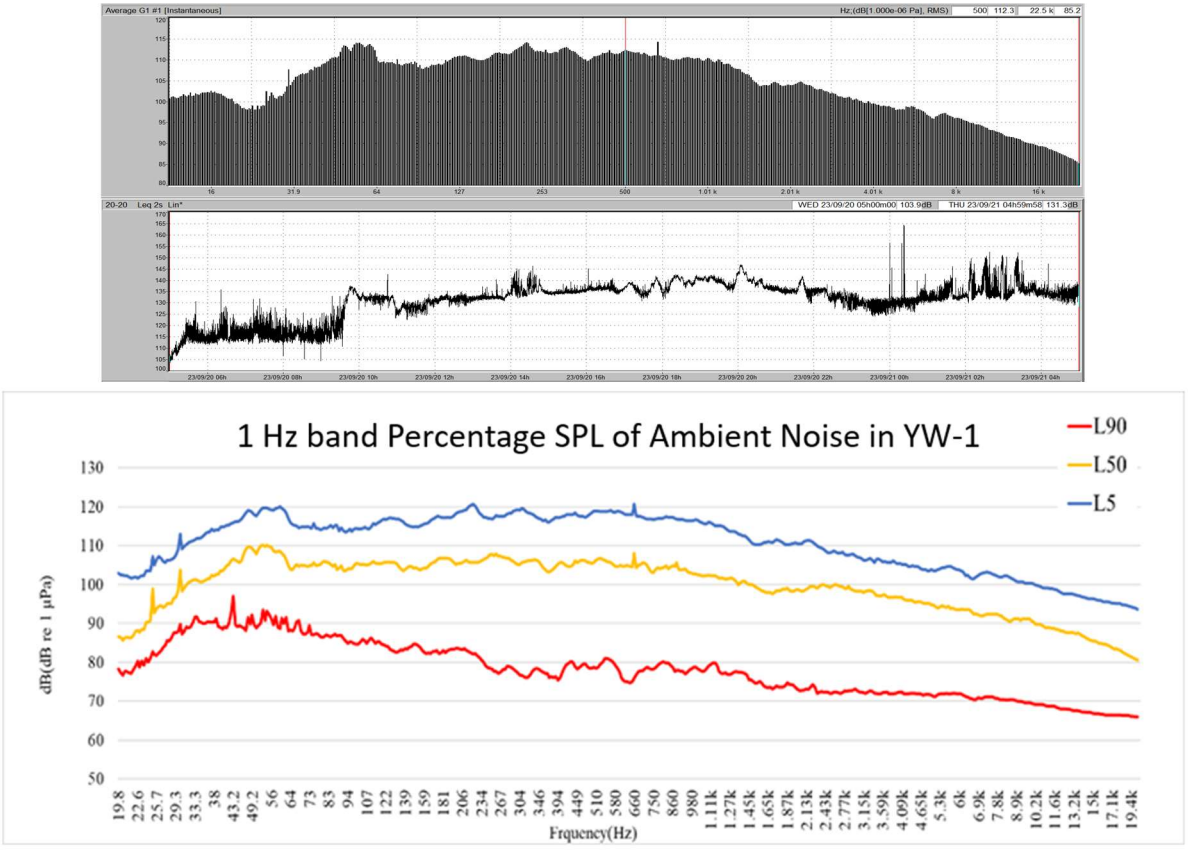


Figure 2.1.4-1 Time Domain Figure, Spectrum, and 1 Hz band Percentage SPL of the Ambient Noise in YW-1

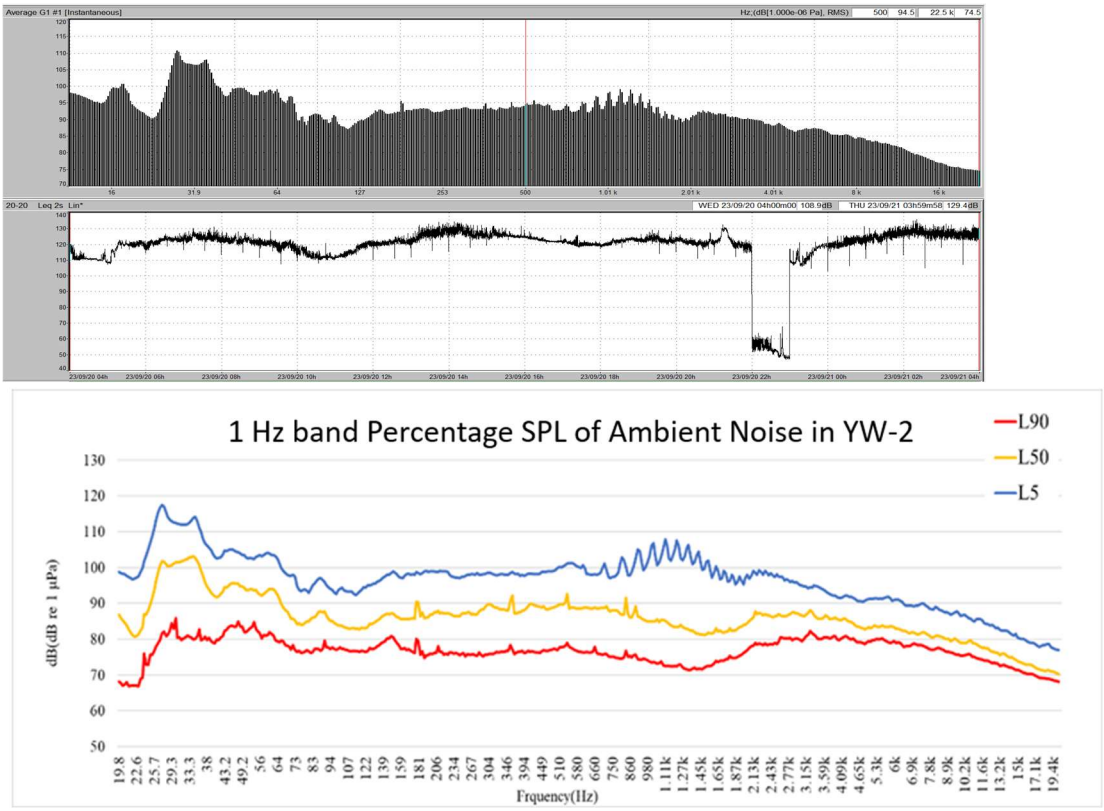


Figure 2.1.4-2 Time Domain Figure, Spectrum, and 1 Hz band Percentage SPL of the Ambient Noise in YW-2

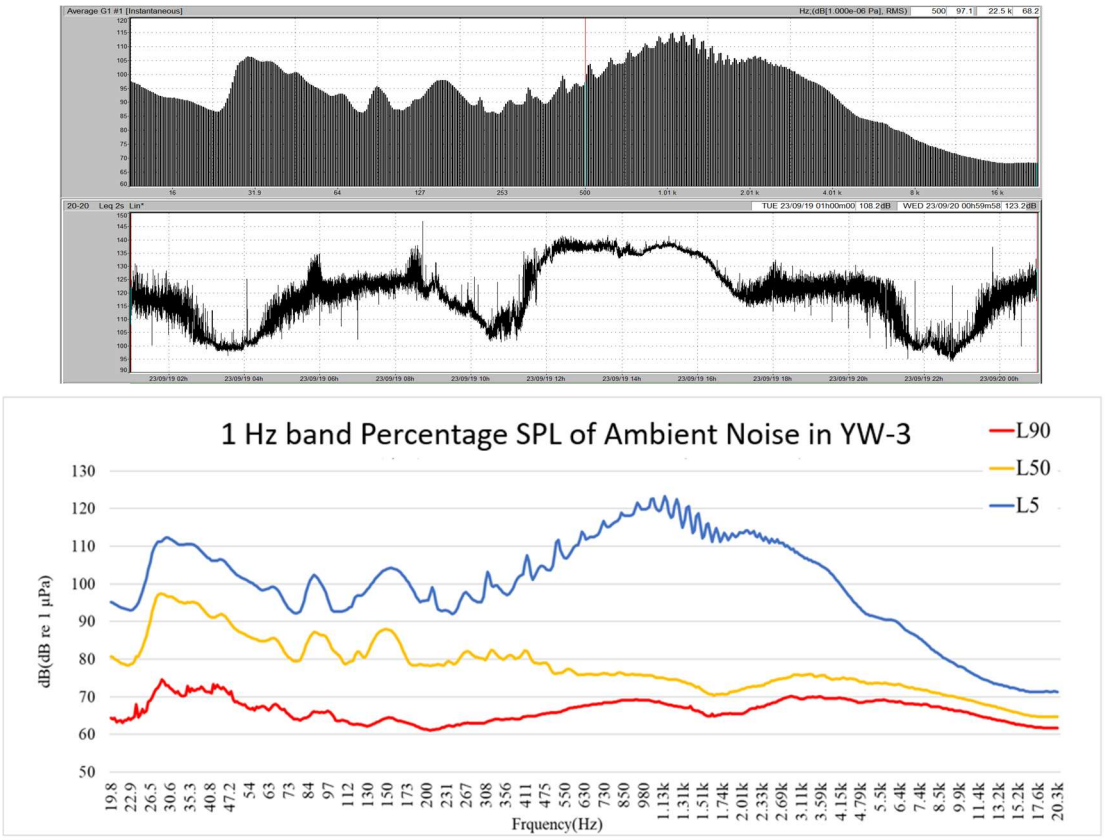


Figure 2.1.4-3 Time Domain Figure, Spectrum, and 1 Hz band Percentage SPL of the Ambient Noise in YW-3

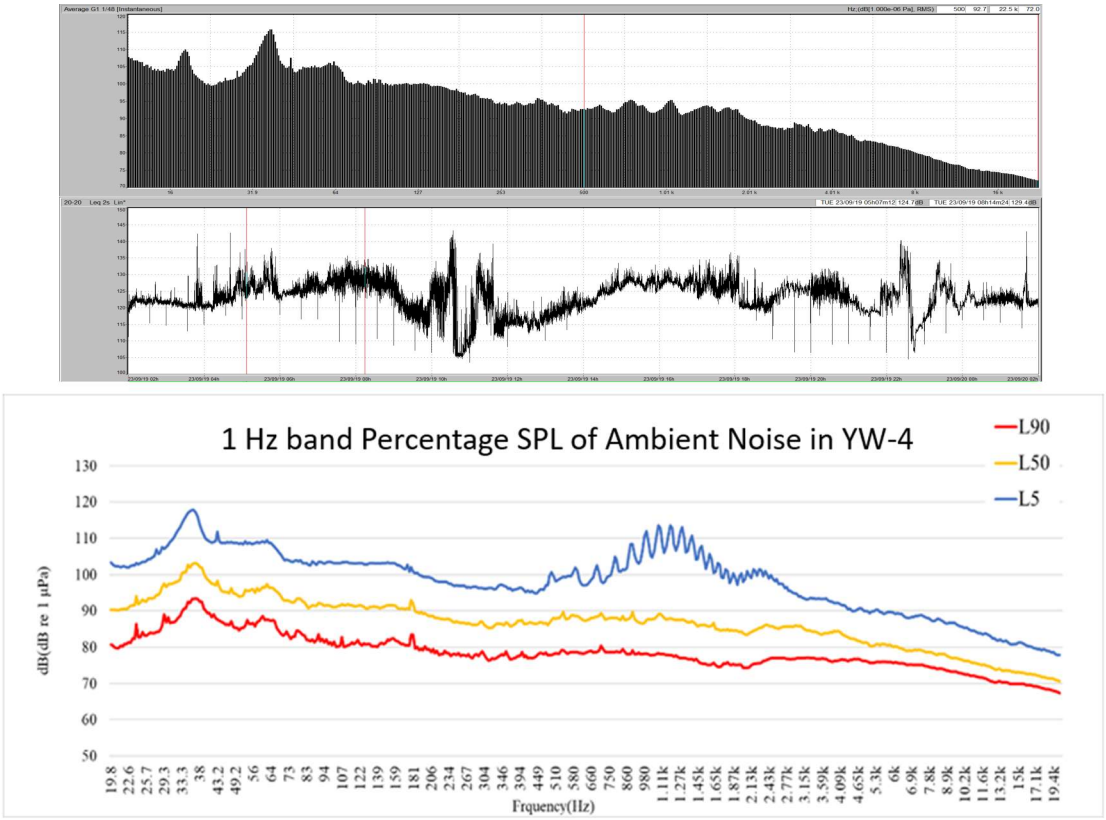


Figure 2.1.4-4 Time Domain Figure, Spectrum, and 1 Hz band Percentage SPL of the Ambient Noise in YW-4

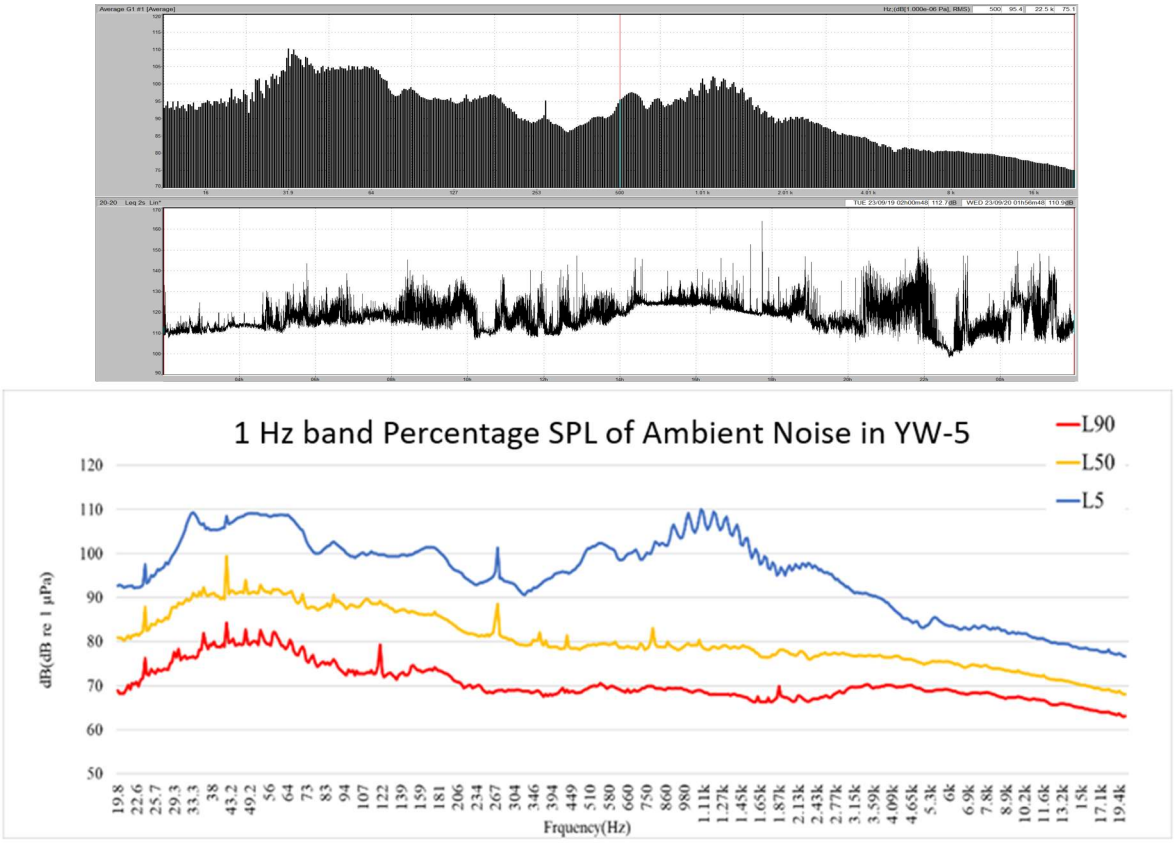


Figure 2.1.4-5 Time Domain Figure, Spectrum, and 1 Hz band Percentage SPL of the Ambient Noise in YW-5

Table 2.1.4-2 Distribution of the Cumulative Probability of the Ambient Noise between 2.5k-10k Hz in YW-1

Unit: dB re 1μPa

Frequency(Hz) / percentage(%)	2.5k	3.15k	4k	5k	6.3k	8k	10k
L_5	110.0	108.1	106.3	104.8	104.2	103.2	101.3
L_{50}	100.1	99.3	97.9	96.3	95.1	93.8	92.3
L_{90}	74.7	74.5	74.1	73.7	73.2	72.7	71.8

Table 2.1.4-3 Distribution of the Cumulative Probability of the Ambient Noise between 2.5k-10k Hz in YW-2

Unit: dB re 1μPa

Frequency(Hz) / percentage(%)	2.5k	3.15k	4k	5k	6.3k	8k	10k
L_5	99.8	97.0	94.0	93.2	92.9	91.2	89.2
L_{50}	89.0	89.2	88.0	85.8	85.2	83.3	81.8
L_{90}	81.4	82.7	82.5	81.8	80.5	79.7	77.2

Table 2.1.4-4 Distribution of the Cumulative Probability of the Ambient Noise between 2.5k-10k Hz in YW-3

Unit: dB re 1μPa

Frequency(Hz) / percentage(%)	2.5k	3.15k	4k	5k	6.3k	8k	10k
L_5	113.4	109.7	104.1	94.8	91.4	85.7	80.1
L_{50}	76.4	78.4	77.7	76.7	75.8	74.1	72.7
L_{90}	70.8	71.7	71.3	70.6	71.1	70.4	69.3

Table 2.1.4-5 Distribution of the Cumulative Probability of the Ambient Noise between 2.5k-10k Hz in YW-4

Unit: dB re 1μPa

Frequency(Hz) / percentage(%)	2.5k	3.15k	4k	5k	6.3k	8k	10k
L_5	100.4	95.5	93.7	92.0	91.1	89.9	87.8
L_{50}	88.2	87.6	86.4	83.4	82.0	80.7	78.6
L_{90}	77.6	77.8	77.0	77.5	77.5	76.2	74.6

Table 2.1.4-6 Distribution of the Cumulative Probability of the Ambient Noise between 2.5k-10k Hz in YW-5

Unit: dB re 1μPa

Frequency(Hz) / percentage(%)	2.5k	3.15k	4k	5k	6.3k	8k	10k
L_5	100.4	95.5	93.7	92.0	91.1	89.9	83.7
L_{50}	79.8	79.4	79.2	78.2	77.9	77.1	75.7
L_{90}	70.6	73.0	73.5	73.5	72.6	71.4	70.5

II. Analysis on Cetacean Sound

Dolphin sounds include whistles, which are used for communication and social behavior between groups or individuals, and clicks, which are used for environment detecting and prey locating. These sounds underwent spectrum analysis and signal filtering to identify the sounds of the marine animals (cetacean or fish). Analysis results are as follow.

i Detection of Whistles

In this quarter, measurement was carried out for 24 hours in YW-1 to YW-5. The spectrum and signal filtering (2.5k-10k) analysis per second at each sampling station (Table 2.1.4-7) show that whistles were detected in YW-1 to YW-5. No whistles were detected from YW-1 to YW-4. Whistles were detected in 1 hour, contact rate is 0.042 times/hour. The whistle distribution regarding daytime/nighttime are shown as Figure 2.1.4-6 to 2.1.4-7. Overall, there is no obvious difference in distributions regarding daytime and nighttime.

As for tidal change (High tide is presented as 0, 1 hour before high tide as -1, 1 hour after high tide as +1, and so on), whistles were detected at 1 hour after high tide (1) at YW-5. Overall, no obvious difference in whistle distribution was found regarding tidal changes.

Table 2.1.4-7 Results of Whistles in each Sampling Stations

Stations	Valid days	Whistles detected	Hours[1] recorded	Hours recorded /24 hours Ratio [2]	Contact Rate (time/hour)[3]
YW-1	1	0	0	0	0
YW-2		0	0	0	0
YW-3		0	0	0	0
YW-4		0	0	0	0
YW-5		1	1	0.042	1

Note 1: “Hours recorded” refers to the hours with whistles detected.
Note 2: “Hours recorded /24 hours Ratio” refers to hours with whistles detected/24 hours.
Note 3: “Contact rate” refers to whistles detected/ hours with whistles detected.

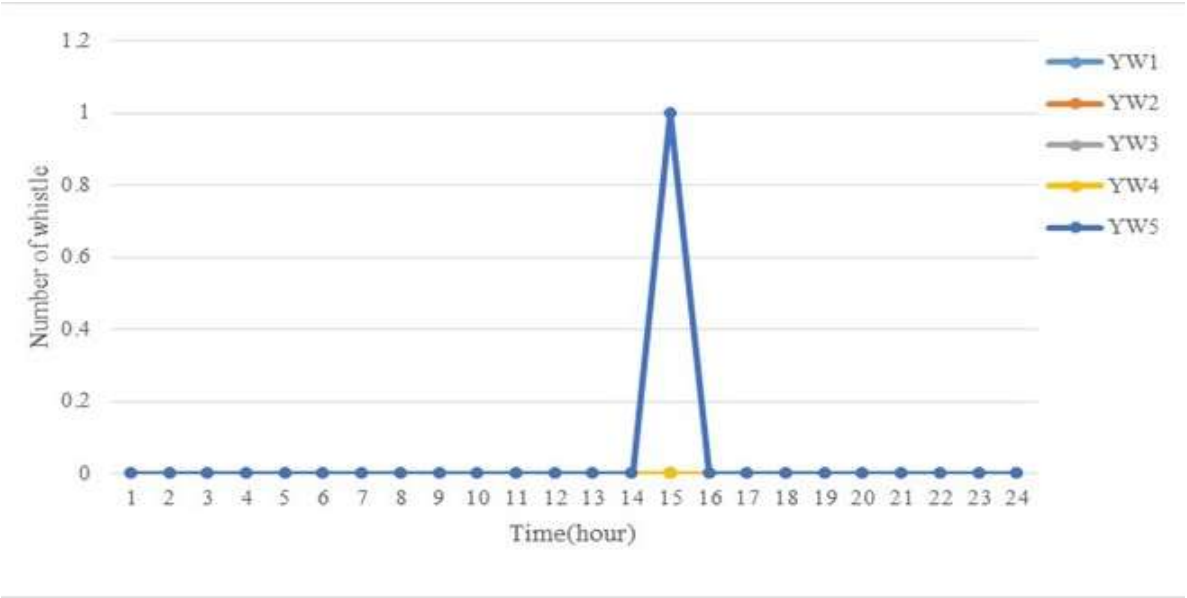
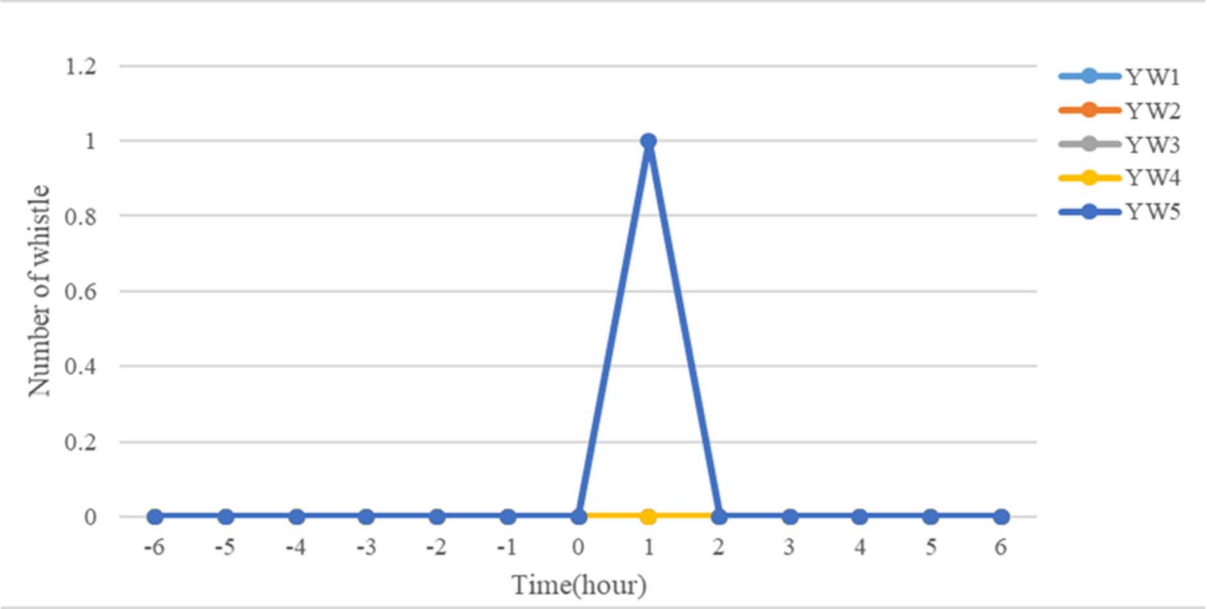


Figure 2.1.4-6 Time Distribution of Whistles Detected at Each Locations



Remarks: High tide is presented as 0, 1 hour before high tide as -1, 1 hour after high tide as +1, and so on.

Figure 2.1.4-7 Tide Time Distribution of Whistles Detected at Each Locations

ii Detection of Clicks

In this quarter, measurement was carried out for 24 hours in YW-1 to YW-5. The spectrum and signal filtering (10k-20k) analysis per second at each sampling station (Table 2.1.4-8) show clicks detected from YW-1 to YW-5. No click was detected in this quarter from YW-1 to YW-4. Clicks were detected in 1 hour, contact rate is 0.042 times/hour. The click distribution regarding daytime/nighttime and tidal change are shown as Figure 2.1.4-8 to 2.1.4-9.

As for tidal change (High tide is presented as 0, 1 hour before high tide as -1, 1 hour after high tide as +1, and so on), the results are shown as Figure 2.1.3-4. The click was detected at 1 hour after high tide (1) at YW-5. Overall, no obvious difference in click distribution was found regarding tidal changes.

Table 2.1.4-8 Click Detection in each Station

Stations	Valid days	Clicks detected	Recording Hours[1]	Recording Time Ratio[2]	Contact Rate (Occurrence/Hour)[3]
YW-1	1	0	0	0	0
YW-2		0	0	0	0
YW-3		0	0	0	0
YW-4		0	0	0	0
YW-5		1	1	0.042	1

Note 1: “Hours recorded” refers to the hours with clicks detected.
Note 2: “Hour/ clicks Ratio” refers to hours with clicks detected/24 hours.
Note 3: “Contact rate” refers to detection time/(Hour/clicks Ratio x 24 hours)

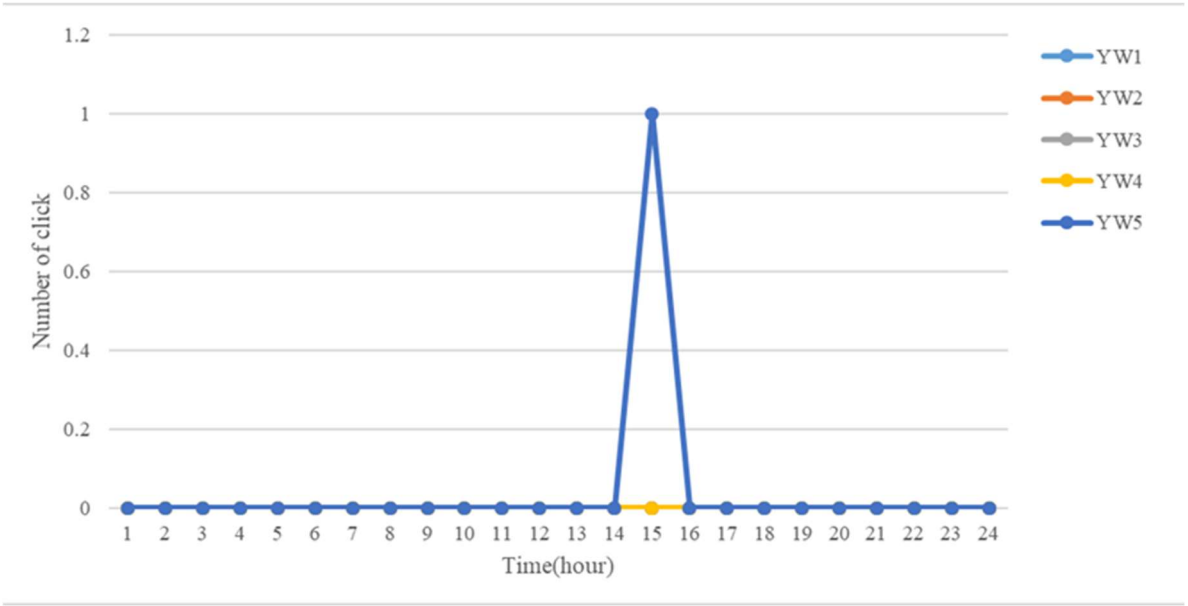
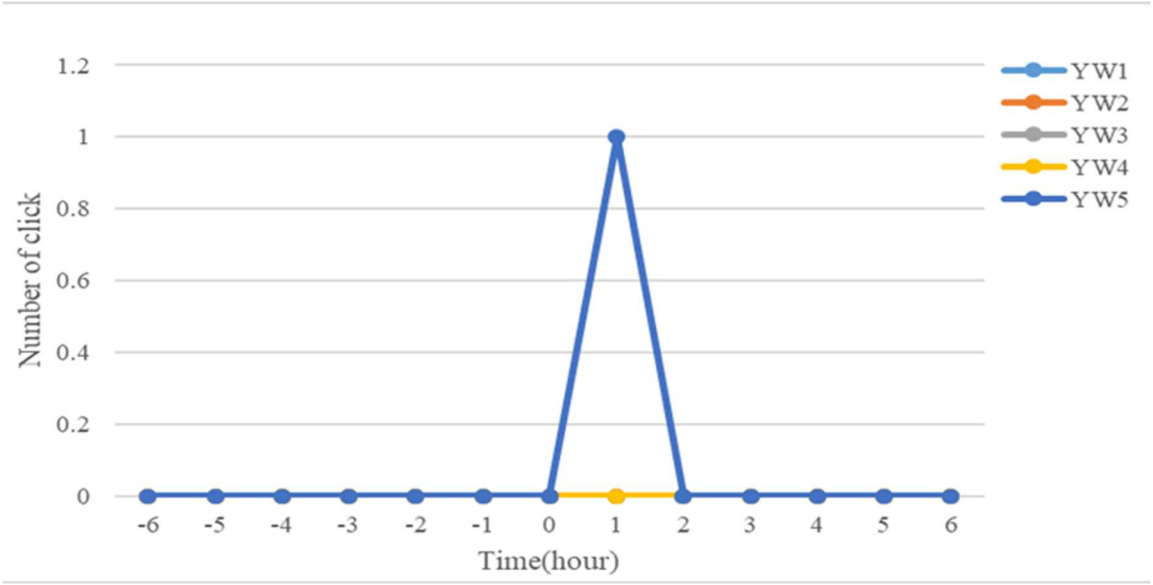


Figure 2.1.4-8 Time Distribution of Clicks Detected at Each Locations



Remarks: High tide is presented as 0, 1 hour before high tide as -1, 1 hour after high tide as +1, and so on.

Figure 2.1.4-9 Tide Time Distribution of Clicks Detected at Each Locations

iii Biological Sound Detection

This quarter, the vocalizations of cetaceans at five monitoring points (YW-1, YW-2, YW-3, YW-4, and YW5) were identified and detected through the program. According to the analysis, among the 24-hour measurement data from the five monitoring points, the cetacean vocalizations were detected once only at YW-5. Based on the 24-hour time-frequency characteristics, the background noise levels at YW-1 to YW-5 are primarily within 10 Hz to 100 Hz, while frequencies between 500 Hz and 2500 Hz consists of sounds from schools of fish. Fish schooling sounds were not observed at YW-1 (Figure 2.1.4-11(a)). Compared to other monitoring points, high frequency fish schooling sounds were detected at YW-3 (Figure 2.1.4-11(c)). In the 10 Hz to 10,000 Hz spectrograms and 1/3 octave band spectrograms for each monitoring station, the low-frequency noise characteristics below 100 Hz are primarily influenced by tidal changes (Figure 2.1.4-12 to Figure 2.1.4-13). The 1/3 octave band spectrograms show noise characteristics in the range of 500 Hz to 2500 Hz, which is presumed to be caused by fish schooling sounds (Figure 2.1.4-13).

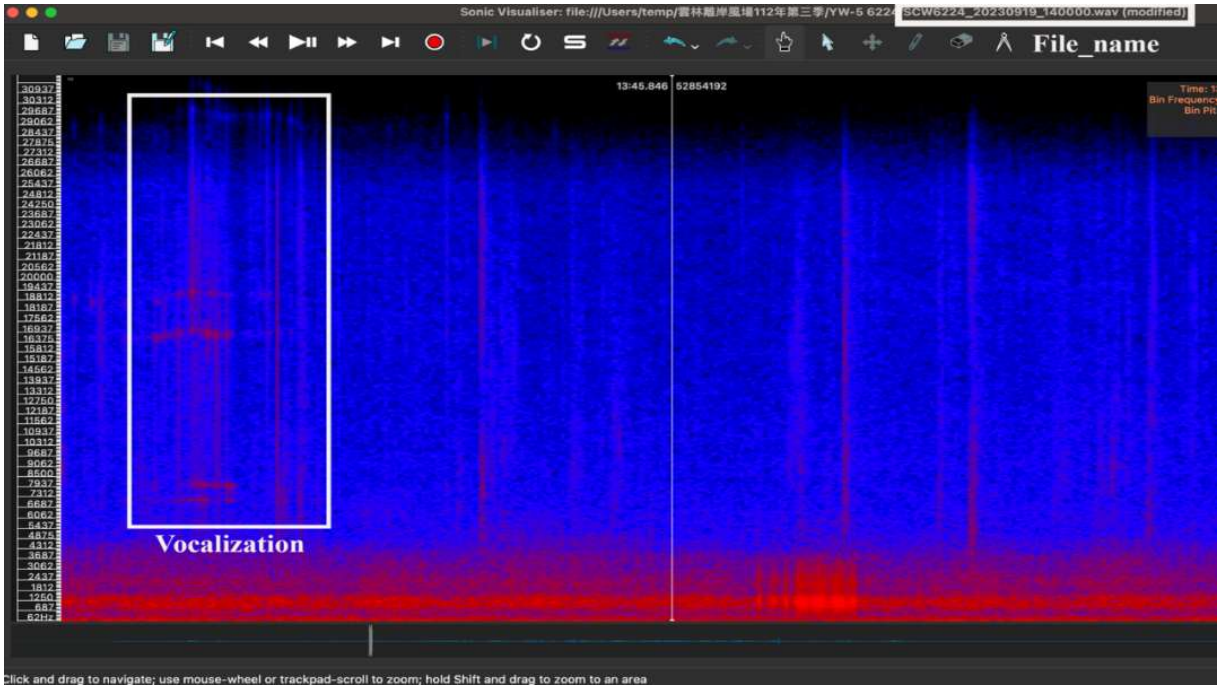


Figure 2.1.4-10 Cetacean Sound Monitoring Records at Yunlin OWF YW-5

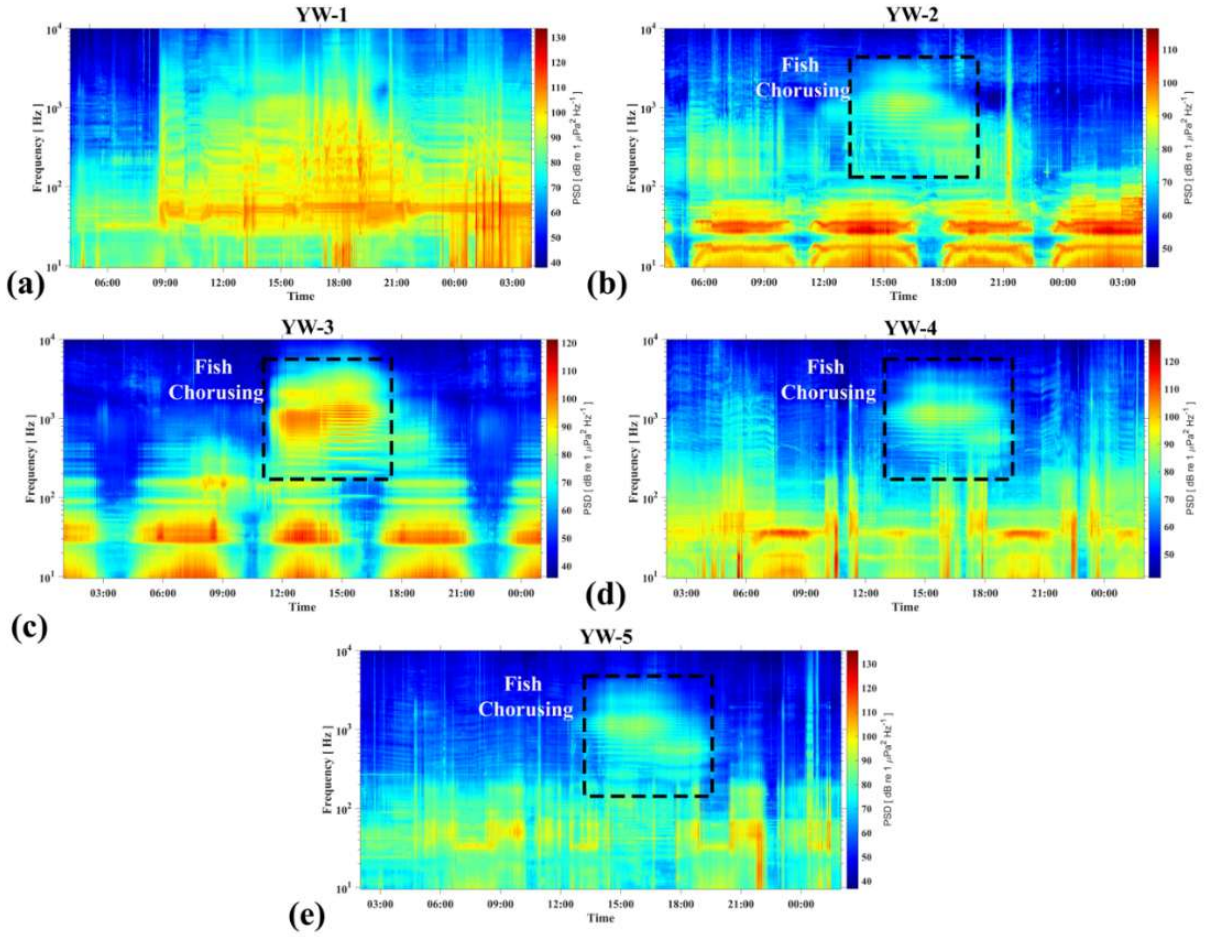
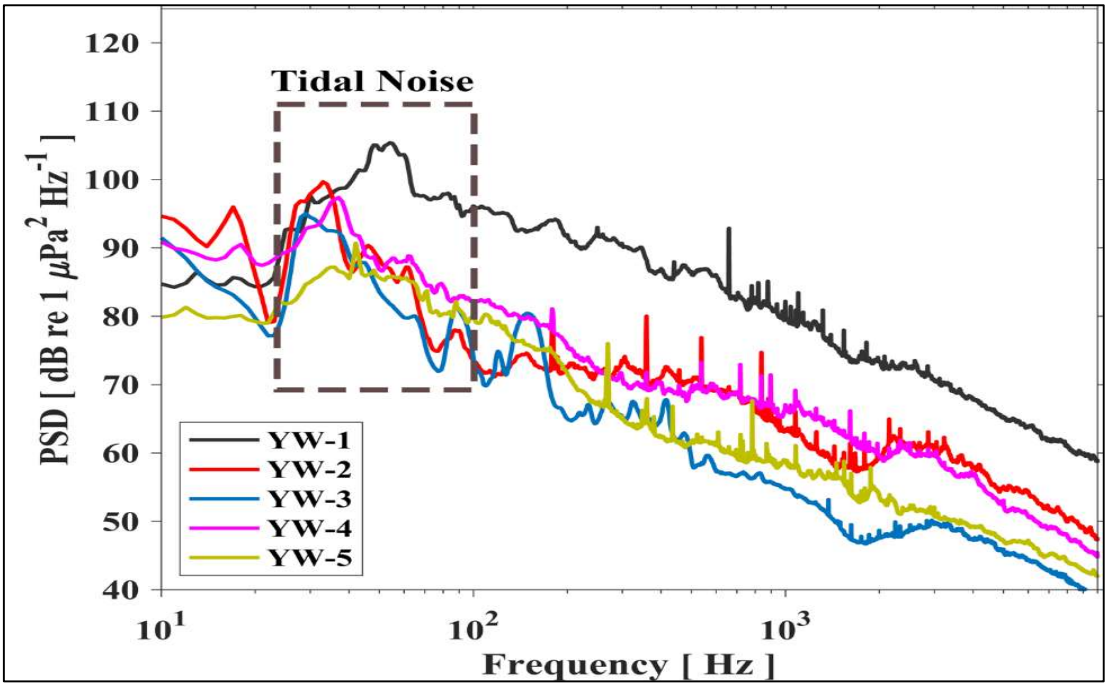
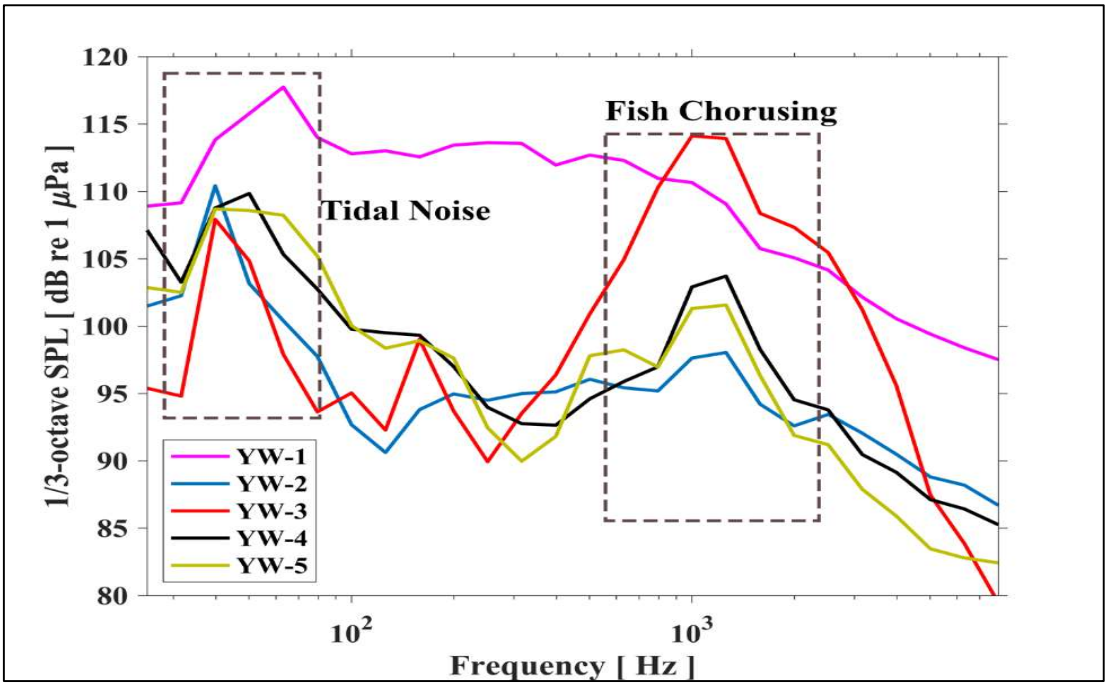


Figure 2.1.4-11 YW-1~YW-5 Spectrogram of Background Noise



Note: Box indicate noise influenced by tides.

Figure 2.1.4-12 YW-1~YW5 10Hz-10000Hz Spectrogram



Note: Boxes indicate an increase in volume between 10-60Hz and 500-2500Hz, mainly influenced by tidal noise and fish chorusing.

Figure 2.1.4-13 YW-1~YW5 1/3Octave band Spectrogram

III. Comprehensive Discussion

During the underwater noise measurement, the devices were affected by the sea current and vessel traffics. Also, during the tidal changes, the flowing noise emitted as the sea

current speed increased would affect the monitoring in the low frequency. The overall noise changes from YW-1 to YW-5 are similar and were more significant in the low frequency while other characteristic frequencies are mostly ambient noise, with low frequency noise characteristics below 100 Hz being primarily influenced by tidal changes.

As for the sounds of marine animals: The survey was carried out for 24 continuous hours at the five stations (YW-1 to YW-5). The spectrum and signal filtering per second at each sampling station were analyzed to ensure the monitoring results. At YW-5, approximately 1 click and 1 whistle of cetaceans were detected. Fish schooling sounds were detected at YW-3. No cetacean clicks and whistles were detected at YW-1 to YW-4. The 1/3 octave band spectrograms show stronger noise characteristics in 500 Hz to 2500 Hz, which is presumed to be due to fish schooling sounds.

2.1.5 Visual Monitoring of Cetacean Ecology

6 surveys were completed this quarter (September-November 2023), including 4 in September, 2 in October, and 0 in November. Total survey record are 33.73 hours and 682.0 km, with 21.77 hours and 338.1 km on transect lines. Please refer to Table 2.1.5-1 for details. No cetacean was observed in this quarter, sighting rate is 0. For offshore survey track please refer to Appendix 4.2. 1 herd of Yangtze Finless Porpoise was sighted within the wind farm area, with a trip strike rate of 0.17, a group strike rate of 0.30 groups/100km, and a time strike rate of 0.46 groups/ten hours. One group of Chinese white dolphins was also sighted on the navigation channel, which was not part of the transect survey line, and therefore was not included in the estimation of the sighting rate. The trajectory of the marine survey route is shown in Appendix 4.2.

Table 2.1.5-1 Table of Cetacean Visual Survey of this Quarter

Trips	Survey Date	Transect[R1] Line		Total Hours (hour)	Total Mileage (km)	On-Effort Hours (hours)	On-Effort Mileage (km)	Sighting Rate (herd (individual))
		Departure	Return					
1	September 18	6	3	5.42	108.0	3.44	53.7	0
2	September 19	1	4	5.74	119.0	3.87	60.5	0
3	September 20	1	5	5.94	120.0	3.65	56.6	1(1)
4	September 21	3	1	5.65	118.0	3.71	58.0	0
5	October 19	4	2	5.34	110.0	3.42	52.7	0
6	October 20	3	5	5.63	107.0	3.68	56.5	0
Total	6 Trip	-		33.73	682.0	21.77	338.0	1(1)

Remark: Number of transect line (departure and return) indicates the numbered planned cetacean transect line survey route.

2.1.6 Underwater Noise

2 sampling stations for cetacean acoustic survey (YW-3 and YW-5) are selected for underwater noise analysis. The duration of the data analyzed in this quarter is shown as Table 2.1.6-1. Items of analysis include spectrogram of underwater noise time frequency between 20Hz-20kHz; 1-Hz band; 1/3 octave band. The description of results are as follows:

Table 2.1.6-1 Duration of the Underwater Acoustic Data Analyzed in this Quarter

Measuring Points	Duration of data Analyzed
YW-3	September 19-20 2023
YW-5	September 19-20 2023

I. Ambient Noise Analysis

Underwater acoustic equipment is able to record change of surrounding sounds, such as natural ambient noise (wave, tide, etc.), sound of creatures (cetaceans, fish, etc.), etc. Intermittent unknown high-level sound sources such as vessel noise or human activities can all be recorded if occurred. The Wav files recorded by the acoustic device undergoes FFT, and the result is presented in 1Hz and 1/3 Octave band. Characteristics and changes of the underwater ambient noise in the Project area were learned via spectrogram and cumulative probability distribution diagram of ambient noise. Real time monitoring results is shown as Appendix 4.7.

i Time Frequency Analysis

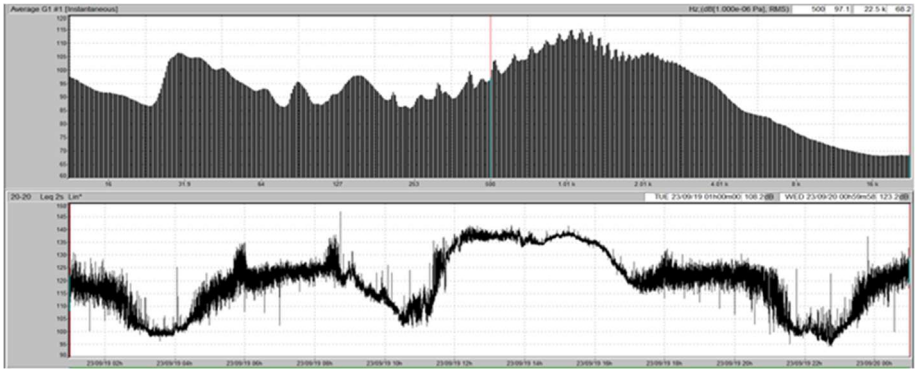
The spectrogram of time frequency analysis for ambient noise at YW-3 and YW-5 (Figure 2.1.6-1) is displayed using figures of noise level energy. In the measurement, the value of underwater noise was affected by tidal changes. The noise was caused by the flowing noise of sea currents and the busy vessel traffic in the periphery. The frequency detected in this quarter is mainly low frequency at 31.9Hz and 37.4 Hz.

ii 1-Hz Band Analysis

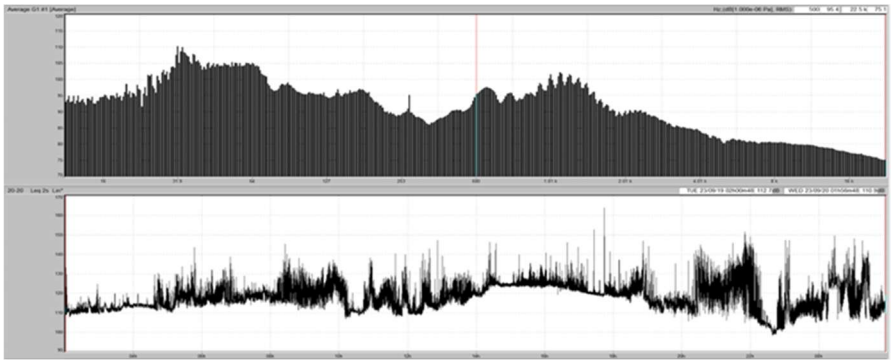
Fluctuation trends of underwater background noise is shown using noise cumulative possibility distribution of underwater noise with 1-Hz bandwidth (Figure 2.1.6-2). The percentages of each curve indicate the cumulative probability that is lower than the noise value. L_5 and L_{90} are the upper limit and lower limit of the ambient noise, and L_{50} is the median. The range of fluctuation for noise between 20Hz and 20kHz is as shown in Table 2.1.6-2 and 2.1.6-3.

In YW-3, the noise curve shows obvious peaks under 64Hz. This is

contributed by the flowing noise as the water flew through the device during tidal changes and the noise of vessel traffic. In YW-5, the noise curve shows obvious peaks under 31.9Hz. This is contributed by sea currents flowing by the buoy and monitoring device and the frequent vessel traffic in the marine area. Unknown momentary ambient noise was observed between 400Hz-2kHz.

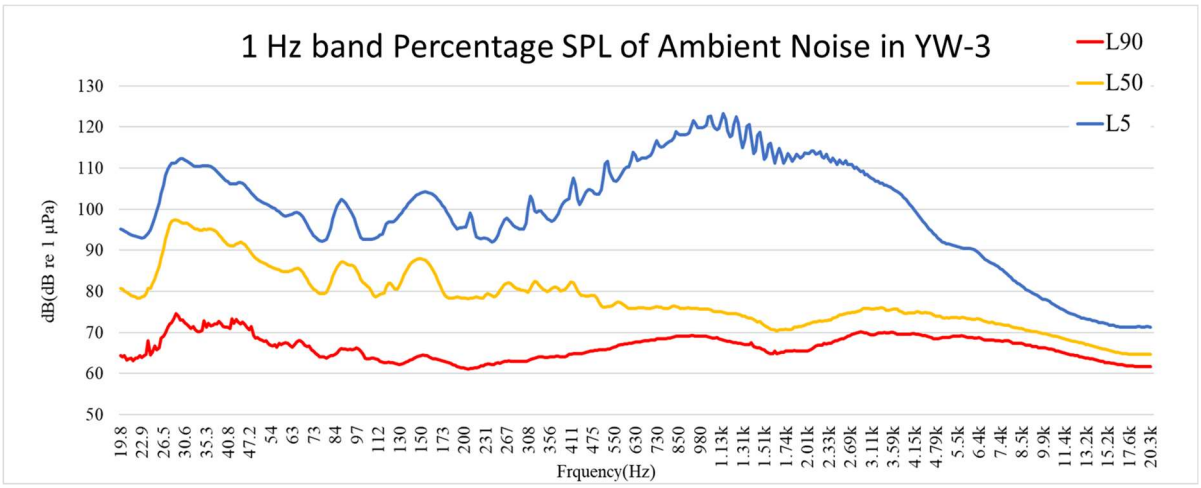


Time Domain and Spectrum of Ambient noise in YW-3

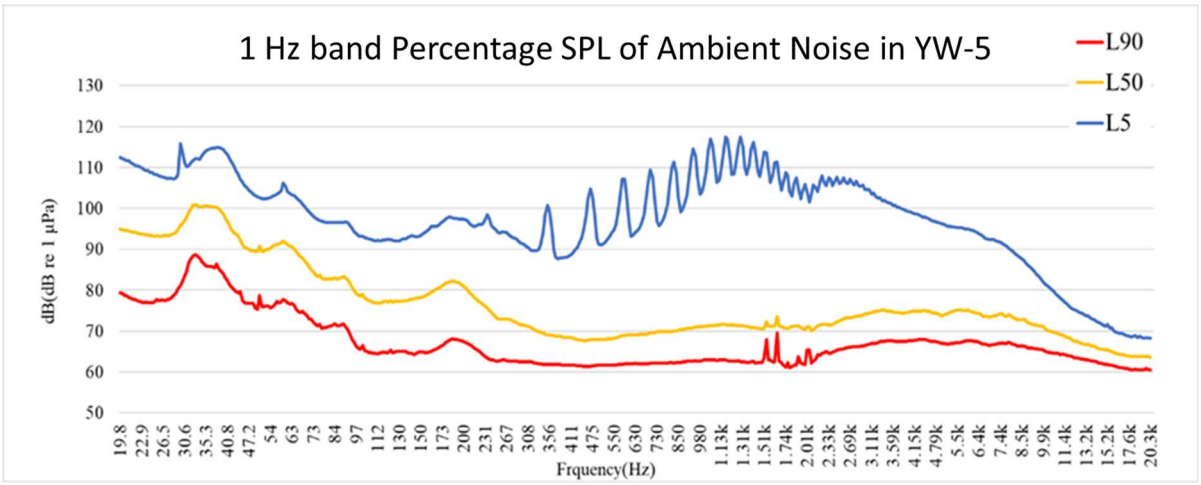


Time Domain and Spectrum of Ambient noise in YW-5

Figure 2.1.6-1 Time Domain and Spectrum of Ambient noise in YW-3 and YW-5



SPL of the Ambient Noise in YW-3



SPL of the Ambient Noise in YW-5

Figure 2.1.6-2 1- Hz band SPL of the Ambient Noise in YW-3 and YW-5

Table 2.1.6-2 SPL of Noise in YW-3 in this Quarter

Unit: 1-Hz SPL(dB re 1μPa)

Frequency (Hz)	20	100	500	1000	5000	10000	15000	20000
L_5	95.0	93.1	104.8	119.9	92.0	78.0	72.2	71.5
L_{50}	80.5	82.9	76.4	75.7	73.7	69.7	65.9	64.7
L_{90}	64.0	65.4	65.8	69.1	68.7	66.2	62.7	61.7

Table 2.1.6-3 SPL of Noise in YW-5 in this Quarter

Unit: 1-Hz SPL(dB re 1μPa)

Frequency (Hz)	20	100	500	1000	5000	10000	15000	20000
L_5	92.9	99.3	101.1	109.2	83.2	81.7	78.5	76.7
L_{50}	80.8	88.3	79.3	79.5	75.1	72.9	70.2	68.1
L_{90}	68.2	73.5	69.3	68.8	69.2	67.2	65.0	63.0

iii 1/3 Octave band Analysis

1/3 octave band analysis uses the hourly records of background noise in each spot to calculate the mean of energy in each of the 31 frequency band ranges of 1/3 octave band between 20Hz and 20kHz. Because each frequency band includes 24 data (hour). Presenting the 5%, 50%, and 95% statistics of each frequency band with percentages helps in the determination of fluctuation in each frequency band (details as shown in Figure 2.1.6-3). Each band level is shown in Table 2.1.6-4 and Table 2.1.6-5.

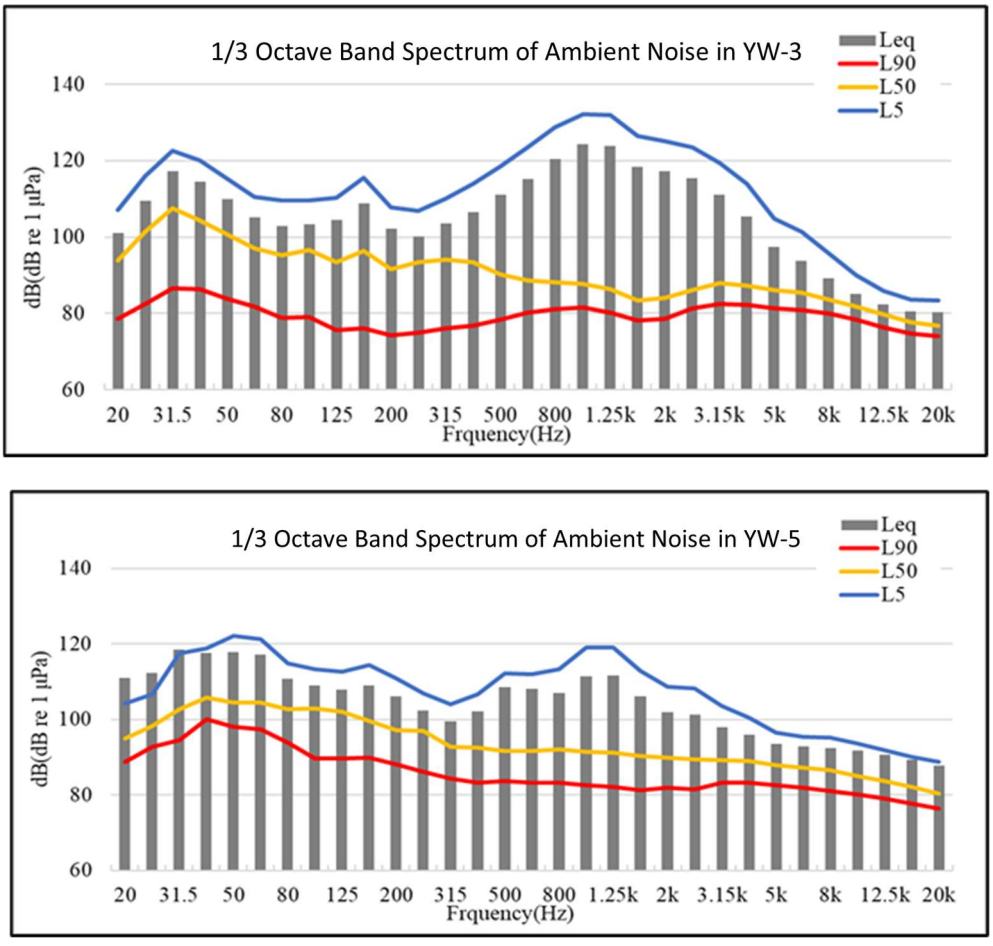


Figure 2.1.6-3 1/3 Octave band Spectrum of YW-3 and YW-5

Table 2.1.6-4 1/3 Octave band of YW-3 in this Quarter

Unit: dB re 1μPa

Frequency(Hz) / Percentage(%)	20	25	31.5	40	50	63	80	100
L_{eq}	101.1	109.5	117.3	114.5	109.9	105.2	102.8	103.3
L_5	107.2	115.9	122.7	120.1	115.2	110.6	109.5	109.5
L_{50}	93.9	101.3	107.5	104.4	100.8	97.0	95.2	96.7
L_{90}	78.7	82.6	86.7	86.4	83.9	81.7	78.9	79.1
Frequency(Hz) / Percentage(%)	125	160	200	250	315	400	500	630
L_{eq}	104.4	108.8	102.1	100.2	103.5	106.5	111.1	115.2
L_5	110.3	115.5	107.7	106.9	110.1	113.9	118.6	123.6
L_{50}	93.4	96.3	91.7	93.4	94.2	93.5	90.2	88.7
L_{90}	75.7	76.1	74.2	75.0	76.1	76.9	78.4	80.1
Frequency(Hz) / Percentage(%)	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k
L_{eq}	120.4	124.3	123.8	118.4	117.3	115.4	111.1	105.4
L_5	128.8	132.1	131.9	126.5	125.1	123.4	119.5	113.9
L_{50}	88.3	87.8	86.4	83.5	84.2	86.2	88.0	87.3
L_{90}	81.2	81.5	80.1	78.2	78.6	81.3	82.4	82.3
Frequency(Hz) / Percentage(%)	5k	6.3k	8k	10k	12.5k	16k	20k	
L_{eq}	97.4	93.8	89.3	85.2	82.4	80.5	80.3	
L_5	104.9	101.3	95.6	90.0	85.8	83.6	83.3	
L_{50}	86.2	85.4	83.6	81.8	79.7	77.6	76.9	
L_{90}	81.4	81.0	80.0	78.4	76.4	74.7	74.0	

Table 2.1.6-5 1/3 Octave band of YW-5 in this Quarter

Unit: dB re 1μPa

Frequency(Hz) / Percentage(%)	20	25	31.5	40	50	63	80	100
L_{eq}	111.0	112.4	118.5	117.7	117.9	117.1	110.7	109.0
L_5	104.2	106.7	117.5	118.9	122.1	121.3	114.9	113.4
L_{50}	94.9	98.4	102.8	105.9	104.6	104.5	102.7	103.0
L_{90}	88.8	92.7	94.5	100.0	98.1	97.4	93.8	89.7
Frequency(Hz) / Percentage(%)	125	160	200	250	315	400	500	630
L_{eq}	108.0	109.1	106.2	102.3	99.6	102.1	108.6	108.2
L_5	112.7	114.5	110.9	107.0	104.1	106.7	112.3	112.1
L_{50}	102.1	99.7	97.3	97.0	92.8	92.6	91.6	91.7
L_{90}	89.7	89.9	88.1	86.1	84.5	83.4	83.7	83.4
Frequency(Hz) / Percentage(%)	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k
L_{eq}	107.1	111.4	111.6	106.1	101.9	101.2	97.9	95.9
L_5	113.4	119.0	119.1	113.0	108.7	108.2	103.7	100.5
L_{50}	92.2	91.4	91.2	90.4	90.0	89.5	89.3	89.0
L_{90}	83.4	82.7	82.1	81.4	81.9	81.5	83.4	83.4
Frequency(Hz) / Percentage(%)	5k	6.3k	8k	10k	12.5k	16k	20k	
L_{eq}	93.5	92.8	92.5	91.8	90.8	89.3	87.9	
L_5	96.5	95.5	95.2	93.7	91.9	90.2	88.9	
L_{50}	87.9	87.3	86.5	85.1	83.7	82.1	80.5	
L_{90}	82.7	81.9	81.1	80.1	79.0	77.7	76.4	

II. Comprehensive Analysis

In this quarter, the flowing noise was mostly observed in low frequency, as shown in the spectrum 2.1.6-1. This is contributed by the sea currents flowing through the monitoring device during tidal changes and the busy vessel traffic in the monitoring period.

The result of 1-Hz band analysis is presented as 1/3 octave band, through which the noise frequency band in each sampling station can be identified. If compare value in YW-3 and YW-5 in Figure 2.1.6-3, in YW-3, the noise curve shows obvious peaks

under 64Hz. This is contributed by the busy vessel traffic and the noise as the water flew through the device during tidal changes. In YW-5, the noise curve shows obvious peaks under 31.9Hz. This is contributed by the busy vessel traffic and the sea currents flowing by the buoy and monitoring device. Unknown momentary ambient noise was observed between 400Hz-2kHz. Noise level in the two sampling stations is similar, and the patterns are generally identical.

2.1.7 Underwater Piling Noise

During the piling of each turbine, underwater piling noise will be monitored at 1 location 750m from the north side of the piling location. Piling of 5 foundations was carried out in this quarter. Piling noise monitoring was carried out by SGS. Result of the monitoring is shown as Table 2.1.7-1.

Table 2.1.7-1 Result of the Monitoring

WTG NO.	SPL_{peak} (dB re 1μPa)	SPL_{peak} Standard Value (dB re 1μPa)
YUN-23	183.5	190
YUN-19	178.2	
YUN-06A	185.0	
YUN-35	185.1	
YUN-34	187.9	

2.1.8 Electromagnetic Field

No electromagnetic field survey was conducted.

2.2 Onshore Construction Phase Monitoring

2.2.1 Air Quality

This environmental monitoring project is conducted according to suggestions stated in EIS document and review conclusion (official letter #1080100460). Since January 2020, monitoring spots for air quality have been changed from Anxi Temple, Yunlin Fisherman's Association and Kouhu Jr. High School to Anxi Temple, Residence in Kouhu Junior High School and Feisha Village.

Qir quality monitoring was conducted at Anxi Temple on October 17-18, 2023, and at Residence in Feisha Village and Kouhu Jr. High School on December 28-29, 2023. The monitoring items included TSP (total suspended particulate), $PM_{10,}$ $PM_{2.5}$, wind speed and wind direction. The monitoring results are summarized at Table 2.2.1-1. Hourly monitoring results are described in Appendix 4.3, location of sampling stations is listed in Figure 1.4-6.

I. Anxi Temple

Average wind speed of this sampling station was 0.6 m/s. The main wind direction was N. 24-hour value of TSP, day average value of PM_{10} and 24-hour value of $PM_{2.5}$ were 70 μg/m^3, 40 μg/m^3 and 28 μg/m^3, which respectively complied with air quality control standards. (PM_{10} is 100 μg/m³ and 24-hour value of $PM_{2.5}$ is 35 μg/m³) announced by the MOENV.

II. Kouhu Junior High School

Average wind speed of this sampling station was 0.9 m/s. The main wind direction was NNW. 24-hour value of TSP, day average value of PM_{10} and 24-hour value of $PM_{2.5}$ were 35 μg/m^3, 20 μg/m^3 and 14 μg/m^3, which respectively complied with air quality control standards. (PM_{10} is 100 μg/m³ and 24-hour value of $PM_{2.5}$ is 35 μg/m³) announced by the MOENV.

III. Residence in Feisha Village

Average wind speed of this sampling station was 1.3 m/s. The main wind direction was WNW. 24-hour value of TSP, day average value of PM_{10} and 24-hour value of $PM_{2.5}$ were 35 μg/m^3, 20 μg/m^3 and 14 μg/m^3, which respectively complied with air quality control standards. (PM_{10} is 100 μg/m³ and 24-hour value of $PM_{2.5}$ is 35 μg/m³) announced by the MOENV.

All monitoring result complied with the Air Quality Control Standard.

Table 2.2.1-1 Analysis Table of Air Quality Monitoring Results at this Quarter

Sampling Stations		Anxi Temple	Kouhu Junior High School	Residence in Feisha Village	Air Quality Standards
Dates of Monitoring		2023.10.17-18	2023.12.28-29	2023.12.28-29	
TSP (μg/m³)	Value of 24 hours	70	35	35	—
PM_{10} (μg/m³)	Equivalent Value of Daytime	40	20	20	100
$PM_{2.5}$ (μg/m³)	Value of 24 hours	28	14	14	35
Wind Speed(m/s)		0.6	0.9	1.3	—
Main Wind Direction		N	NNW	WNW	—
Temperature (℃)		26.1	19.8	19.9	—
Relative Humidity (%)		76	91	91	—

Remarks: Air quality standards are based on official letter 1010038913 issued by the MOENV, Executive Yuan on September 18, 2020. "*" indicates the monitoring value exceeds the air quality standard.

2.2.2 Noise Vibration

This environmental monitoring project is conducted according to suggestions stated in EIS document and review conclusion (official letter #1080100460). Since January 2020, monitoring spots for air quality have been changed from Taiwan Provincial Highway No.17/County Highway No.158 (Taixi Junior High School), Residency of Yugang Road and Section 1 Zhongzheng Road (Fire Bureau) to Residency of Yugang Road, Anxi Temple, and Residence in Feisha Village.

Noise vibration monitoring was conducted at Anxi Temple on October 17-18, 2023, and at Residence in Feisha Village and Kouhu Jr. High School on December 28-29, 2023. Noise monitoring items included equivalent volume at all time periods (L_{day}, L_{night}, $L_{midnight}$) and vibration monitoring items, included vibration level of daytime and nighttime (L_{day}, L_{night}). The monitoring results are summarized in Table 2.2.2-1 and Table 2.2.2-2. Hourly monitoring results is listed in Appendix 4.4, locations of sampling stations are listed in Table 1.4-6.

I. Noise

i Residency of Yugang Road

According to classification of noise control zone by MOENV, this sampling station was classified as Noise Control Standards of Second Type of Zone near roads more than 8m wide. Equivalent sound levels of all time periods in this quarter were 69.6dB(A), 58.6dB(A) and 57.3dB(A) for daytime, nighttime and midnight respectively, which complied with ambient volume standards (L_{day}=74 dB(A), L_{night}=70 dB(A) and $L_{midnight}$=67 dB(A)).

ii Anxi Temple

According to classification of noise control zone by MOENV, this sampling station was classified as Noise Control Standards of Second Type of Zone near roads more than 8m wide. Equivalent sound levels of all time periods in this quarter were 66.9dB(A), 59.3dB(A) and 57.9dB(A) for daytime, nighttime and midnight respectively, which complied with ambient volume standards (L_{day}=74 dB(A), L_{night}=70 dB(A) and $L_{midnight}$=67 dB(A)).

iii Residence in Feisha Village

According to classification of noise control zone by MOENV, this sampling station was classified as Noise Control Standards of Second Type of Zone near roads more than 8m wide. Equivalent sound levels of all time periods in this quarter were 66.8dB(A), 61.5dB(A) and 57.9dB(A) for daytime, nighttime and midnight respectively, which complied with ambient volume standards (L_{day}=74 dB(A), L_{night}=70 dB(A) and $L_{midnight}$=67 dB(A)).

In the synthesis of the above contents. All survey results in all stations in this quarter complied with Noise Control Standards of Third Type of Zone near roads more than 8m wide.

Table 2.2.2-1 Analysis Table of Noise Monitoring Results

Sampling Station	Date of Monitoring	Equivalent Energy of All Time Period (dB(A))		
		L_{day}	L_{night}	$L_{midnight}$
Residency of Yugang Road	2023.12.28~29	69.6	58.6	57.3
Anxi Temple	2023.10.17~18	66.9	59.3	57.9
Residence in Feisha Village	2023.12.28~29	66.8	61.5	57.9
Noise Control Standards of Second Type of Zone near roads more than 8m wide		74	70	67

Remarks: Noise vibration standards refer to official letter 0990006225D issued by MOENV on 21st January 2010.

Remarks: "*" indicates the value of Noise Control Standards of Second Type of Zone near roads more than 8m wide.

II. Vibration

Related regulations of ambient noise control have yet to be set up. Standards vibration assessment of road limits refer to Japan Vibration Regulations. Vibration monitoring results of this quarter are described as follows:

i Residency of Yugang Road

Equivalent vibration energy of each period was 34.9dB and 30.4dB for daytime and nighttime respectively which complied with control standards (L_{v10day}=65 dB and $L_{v10night}$=60 dB).

ii Anxi Temple

Equivalent vibration energy of each period was 34.1dB and 30.0dB for daytime and nighttime respectively which complied with control standards (L_{v10day}=65 dB and $L_{v10night}$=60 dB).

iii Residence in Feisha Village

Equivalent vibration energy of each period was 39.2dB and 33.8dB for daytime and nighttime respectively which complied with control standards (L_{v10day}=65 dB and $L_{v10night}$=60 dB).

In the synthesis of the above contents, vibration monitoring results at all stations complied with the referenced First Type Control Zone Standards in Japan Vibration Regulations.

Table 2.2.2-2 Analysis Table of Vibration Monitoring Results

Sampling Station	Dates of Monitoring	Equivalent Energy of All Time Period (dB)	
		L_{V10day}	$L_{V10night}$
Residency of Yugang Road	2023.12.28~29	34.9	30.4
Anxi Temple	2023.10.17~18	34.1	30.0
Residence in Feisha Village	2023.12.28~29	39.2	33.8
Control Standards of First Type of Zone (L_{v10})		65	65

Remarks: Refer to control standards of Japan Vibration Regulations. First type of zone is equivalent to first and second control zone of noise control zone of Taiwan; Second types of zone is equivalent to third and fourth zone of noise control zone in Taiwan.

2.2.3 Construction Noise

Construction of Taixi and Sihu booster stations started on June 2019. The monitoring began as the construction of booster stations started. Operation license of Sihu booster station has been obtained in July 2020. Operation license of Taixi booster station has been obtained in November 2022. Monitoring on construction noise was not carried out in this quarter.

I. Construction Noise

i Taixi Booster Station

Operation license of Taixi booster station has been obtained in November 2022. Monitoring on construction noise was not carried out in this quarter.

ii Sihu Booster Station

Operation license of Sihu booster station has been obtained in July 2020. Monitoring on construction noise was not carried out in this quarter.

II. Low-Frequency Construction Noise

This monitoring item is measured at the perimeter 1m from the construction site of booster station. Since both Taixi and Sihu booster station are in open spaces, therefore, measuring task of vibration is conducted outdoor. Since the country has only indoor low-frequency control standards, the measured results take reference of the second type construction noise control standards for indoor inspection (20Hz to 200Hz) for reference. The monitoring results of low frequency construction noise in this quarter are described below:

i Taixi Booster Station

Operation license of Taixi booster station has been obtained in November 2022. Monitoring on construction noise was not carried out in this quarter.

ii Sihu Booster Station

Operation license of Sihu booster station has been obtained in July 2020. Monitoring on low frequency construction noise was not carried out in this quarter.

2.2.4 Terrestrial Ecology

I. Plants

i Plant Species Survey

1. Analysis of Plant Attribute

78 families, 203 genera and 261 species were recorded within survey area (Appendix 4.6 Table 1 to Table 2). Among which, Pteridophyta constituted for 1 family, 1 genus and 1 species. 3 families, 4 genera and 4 species of Gymnosperm were documented. 60 families, 146 genera and 188 species of Dicotyledon were documented. 14 families, 52 genera and 68 species of Monocotyle were documented. According to growth form of plant, 71 species of arbor, 22 species of shrub, 5 species of wood climber, 26 species of herbaceous climber and 137 species of herb were documented. According to attribute of plant, 115 species of indigenous species, 95 species of naturalized species (including 24 species of invasive species), 51 species of cultivated species were documented, with indigenous species being the majority, accounting for 52.49%. From analysis of attribute, the majority growth form was constituted by herbaceous plants, accounting for 27.20%. It was then followed by arbor, accounting for 44.06%.

It was mostly constituted by grass family (36 species) and composite family (20 species). They mostly grew in grass-covered land and roadside.

There were 24 invasive species within the survey area (Appendix 4.6 Table 3). Composite family and grass family (5 species respectively) constituted the majority. Due to their rapid growths and diffusions, they competed with indigenous species. 5 invasive species was mostly distributed at grass-covered land and roadside, including Guinea Grass, Spanish Needles, Common Lantana, Para Grass and Morning Glory.

2. Distribution of Rare and Valuable Species

None of the recorded protophyta in survey area were rare and valuable species mentioned in Cultural Heritage Act. Rare and valuable plants listed in Technical Guidance for Plant Ecological Assessment announced by MOENV were not recorded, either. According to the Red List of Vascular Plants of Taiwan, 2017, wild vascular plants which are classified as National Threatened encompassed 2 species, which are Lanyu Podocarp and Japanese Spindle-tree with protected level Critically Endangered (CR). 3 endangered (EN) species were documented, including Common Garcinia, Looking Glass Tree and Dimorphic crab grass. 4 vulnerable species (VU) were documented, such as Powder-Puff Tree, Ivorywood, Winged Pluchea

and Fan Palm. Near Threatened species (NT) included yuedda hawthorn, Lumnitzera and formosan peacock-plume. Endemic vegetations of survey area were dimorphic crab grass, winged pluchea and formosan peacock-plume. The remaining species were artificial plant species (Appendix 4.6 Table 4).

Endemic rare plants in this survey were assessed according to rare and valuable plants defined in the Technical Guidance for Plant Ecological Assessment announced by MOENV and the national threatened and near threatened (NT) vascular plants listed in the 2017 Red List of Vascular Plants in Taiwan. Except for artificially planted species, 3 rare indigenous species were discovered within the survey area, including winged pulchea and formosan peacock-plume distributed at roadside and dimorphic crab grass distributed at outlaying area of roads. Location map and information of rare species were shown in Figure 2.2.4-1, Figure 2.2.4-2 and Table 4 in Appendix 4.6. Description of species as follows:

(1) Dimorphic Crab Grass

Based on national threatened species recorded in The Red List of Vascular Plants of Taiwan 2017, dimorphic crab grass is classified as national threatened species. They are found at the roadside of sea-front area in central part of Taiwan and south part of Taiwan. They grow in north part of roads in selected/non-selected land cable landing routes.

Dimorphic crab grass is perennial herb. Its leaves are 3 to 6cm wide and 5 to 15cm long. It has about 15cm long of raceme and triangle winged cobs. A pair of 4cm long spikelet, one has stalk, and another has not. The spikelet with stalk is coated densely with fur. On the other hand, the spikelet without stalk is not. Outer glume has no vein. Inner glume is spikelet which grows up to 1/2 with 3 veins. Epigyny lemma is leather-like greyish white.

(2) Pluchea Pteropoda

It is listed as Vulnerable Species (VU) in The Red List of Vascular Plants of Taiwan, 2017. It distributes in coastal area of southwest part of Taiwan. It grows at north part of ditch in selected land cable landing route.

It is annual herb or biennial herb. Hairless leaves have membranous leaf blades that are toothed, usually drop-shaped, and 2-5cm. Its tubular flowers develop in pink color, together in cluster. Pappus are on the top of xylodium.

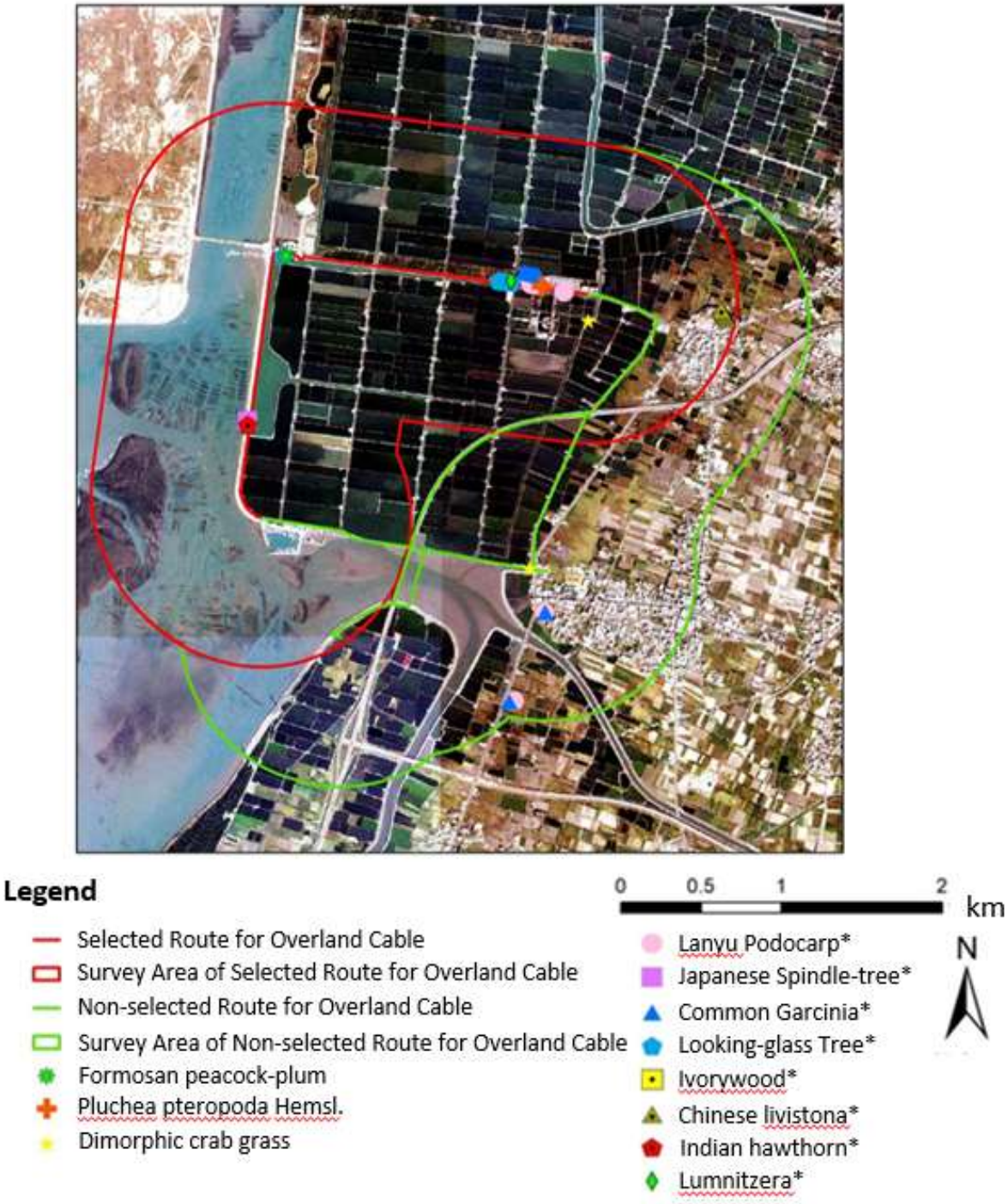
(3) Formosan Peacock-Plume

It is listed as Near Threatened Species (NT) in The Red List of Vascular Plants of Taiwan 2017. It is distributed in low altitude, sand land and roadside. It grows at north part of ditch in selected land cable landing route.

Formosan peacock-plume is annual herb. It has a hairless vertical culm with height about 20cm to 27cm. Leaves are 20cm long. Sheath is sparsely puberulous subglabrous, without auricle. It has triangle-shaped raceme with 1-2cm long and a vein. The vein is puberulent. Inner glume is oval-shaped and lanceolate, 2-3cm long. Upper tips grown with short awn or without awn. Grain is spindle-like and 2cm long.

3. Distribution Status of Protected Woods

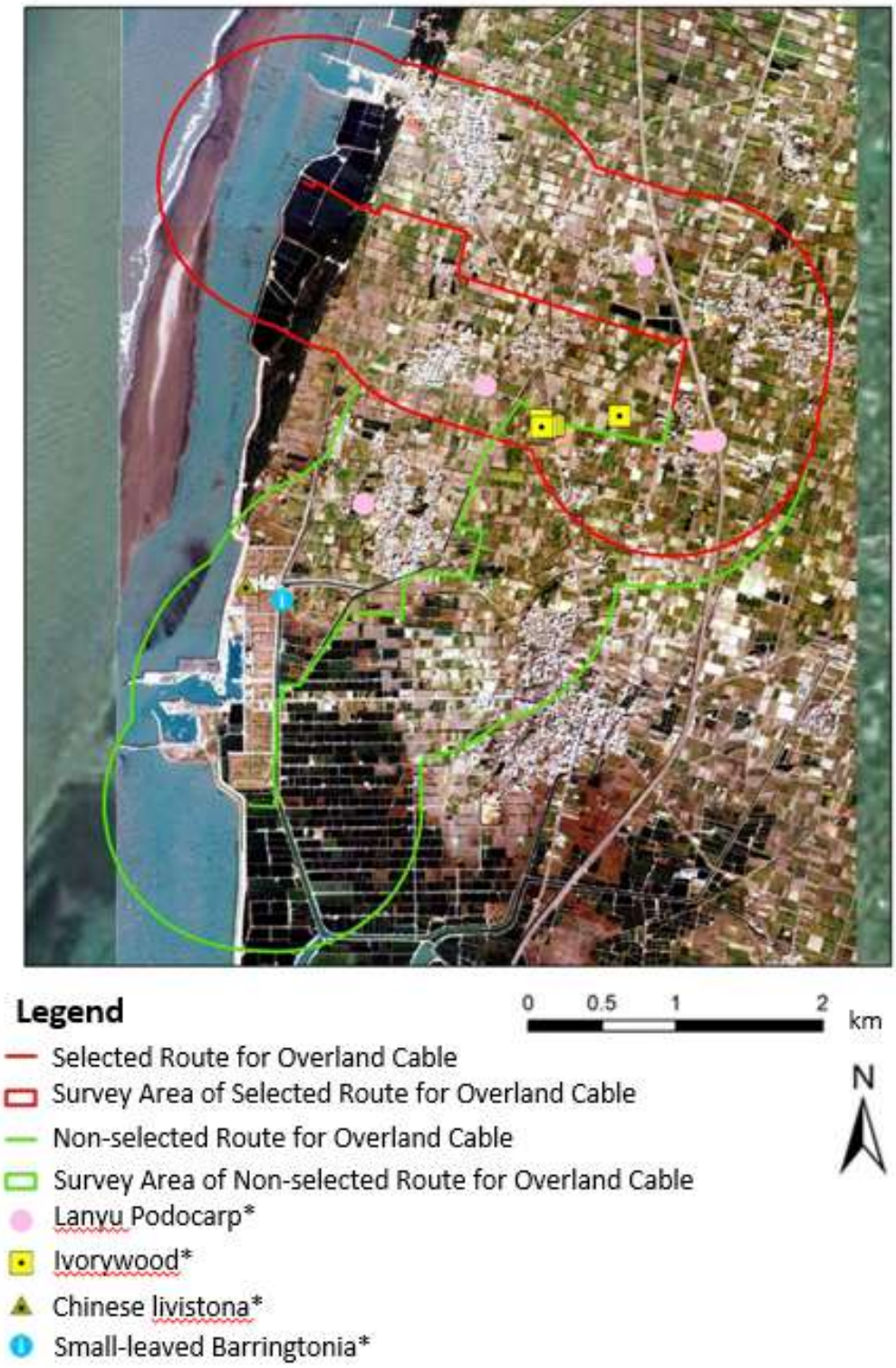
No recorded woods within survey area were protected woods mentioned in Article 2 of "Protected Wood Criteria Except For Forest" issued by Council of Agriculture, Executive Yuan (Council of Agriculture, Executive Yuan, 2016). As per Article 2, trees over 100-year-old or having diameter over 1.5m at breast height can be defined as the protected woods.



Remarks: 1. It is planned to have 4 landing points in EIS, 2 landing points are selected lastly.

2.“*” indicates cultivated species.

Figure 2.2.4-1 Distribution Map of Rare Plants at Taixi Landing Area (Northern Part)



Remarks: 1. It is planned to have 4 landing points in EIS, 2 landing points are selected lastly.

2.“*” indicates cultivated species.

Figure 2.2.4-2 Distribution Map of Rare Plants at Sihu Landing Area (Southern Part)

ii Types and Characteristics of Vegetation

Survey area was constituted by forest plantation and grass-covered vegetation, they are described as follows:

1. Forest Plantation

It distributed at coastal area of survey area for coastal wind-break forest. Main plantation is beef wood. Alexandrian laurel, rose and Lumnitzera are planted as well. Paper mulberry, sweet sop and wild tamarind grow in exposed region. Guinea Grass, Common Lantana and Spanish Needles grow as ground cover.

2. Grass-Covered Land

It is distributed at exposed region and roadside within survey area. The dominant species can be divided into 5 types:

(1) White Cogongrass

It is observed at exposed regions of roadside and are usually spotted in groups. It always grows with Spanish needles, Purple bean, Seahore vine Morning glory, Saltwater couch and Saltwater smut grass.

(2) Indian Pluchea

It is observed at exposed regions of roadside and are usually spotted in groups. It always grows with Common reed, Saltwater couch, Saltwater smut grass and Atriplex maximowicziana Makino.

(3) Twoflower Wedelia

It is observed at exposed regions of roadside and are usually spotted in small groups. It always grows with Spanish Needles and Natal Grass.

(4) Spanish Needles

It is observed at exposed regions of roadside and are usually spotted in groups. It always grows with Bearded golden beard, Beach pea, Purple bean and White cogongrass.

(5) Taiwan scouring rush

It is observed at exposed regions of roadside and are usually spotted in groups. It always grows with Spanish needles and Natal Grass.

iii Sample Plot Survey

1. Analysis of Dominance Composition

This survey area was mainly constituted by forest plantation and grass-covered land. It has been used since stage of EIS, 5 forest sample plots and 5 grass-covered land sample plots in total. T1 and T2 locate in the wind break forest at the south section of the selected land cable survey area. H1 and H2 sampling areas were located at south part of selected land cable survey area. H1 sampling area set up in EIS was damaged by planting crops. Therefore, a new sampling area was rearranged at similar vegetation in the vicinity (Figure 2.2.4-3). T3 and H4 locate at the north section of the selected land cable survey area. T4, T5 and H5 locate within north part of selected land cable survey area. H3 locates within non-selected survey area at an abandoned fish farm, as shown in Figure 2.2.4-4. Environmental factors of all sampling areas (Appendix 4.6 Table 5), floral composition and dominance analysis (Appendix 4.6 Table 6 to Table 9) are described as follows:

(1) Xylophyta of Forest Sampling Area

Dominant Xylophyta species in all 5 sampling areas is beef wood.

According to dominant results in sampling areas, 9 species of Xylophyta were recorded. Among which, Beef wood was the most dominant species (IV= 121.07). It had the highest number of plants and was the arbor with breast diameter up to 10cm and above. It was then followed by Linden Hibiscus (IV= 35.07), which is arbor with more branches. Overall, the dominant species were artificial planting species.

(2) Ground-Cover Plants at Forest Sampling Area

Floor stratum of sampling area was mostly constituted by dominant species. T1, T2, and T4 sampling areas were mostly constituted by Guinea grass. In T3, the dominant species were Linden Hibiscus， and Guinea Grass. In T5, the dominant species were Lumnitzera.

Analysis of relative dominance in the sampling area shows that 30 species of ground-cover plants were documented. Linden Hibiscus is the most dominant species, accounting for 8.63%. Other species were distributed in small area.

(3) Plants at Grass-Covered Land Sampling Area

With respect to dominant species in sampling area, dominant species of H1, H2, H4 and H5 was Spanish Needles. The dominant species of H3 is Indian Pluchea.

From relative dominance results of sampling areas, 13 species were recorded in grass-covered land. Spanish Needle constituted the majority with 55.88%. It was followed by Indian Pluchea (17.75%).

2. Index of Diversity Analysis

(1) Xylophyta of Forest Sampling Area

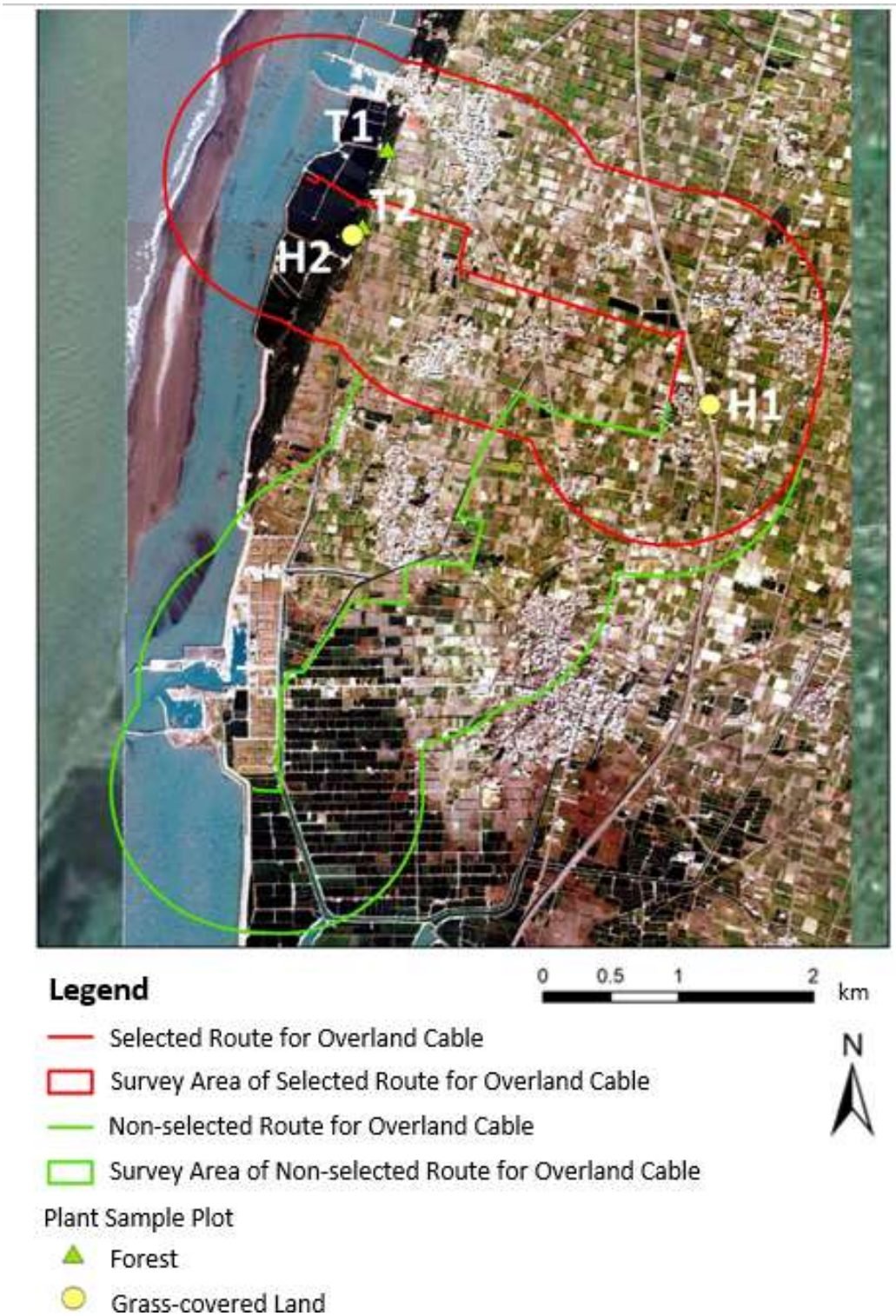
Wind-break Forest are mostly constituted by Xylophyta with lesser number of species. Index of Shannon-Wiener (*H'*) ranged between 0.55 and 1.19. With respect to Shannon-Wiener Index, T3 sampling area was higher for 1.19 which had a greater number of species. T5 sampling area was 0.55 lower than others, the species were mostly made up by dominant species. Index of E5 fell between 0.58 to 0.98 (Appendix 4.6, Table 9-1). For E5 index, T4 sampling area ranked the top with 0.98 index value indicating its even composition. T1 had index value with 0.58, indicating uneven composition with dominant species.

(2) Ground-Cover Plant at Forest Sampling Area

Species composition of ground cover was abundant. Shannon-Wiener Index (*H'*) ranged between 1.09 and 2.11. E5 Index fell between 0.43 to 0.74 (Appendix 4.6, Table 9-2). With respect to Shannon-Wiener (*H'*), T5 is higher (2.11), indicating that it had the most species, and coverage is even. *H'* in T1 is lower (1.09) , indicating it had the least species. As for E5 Index, T3 sampling area had higher value (0.74), indicating it had even composition. T1 sampling area had lower index value (0.43), indicating its uneven composition with dominant species.

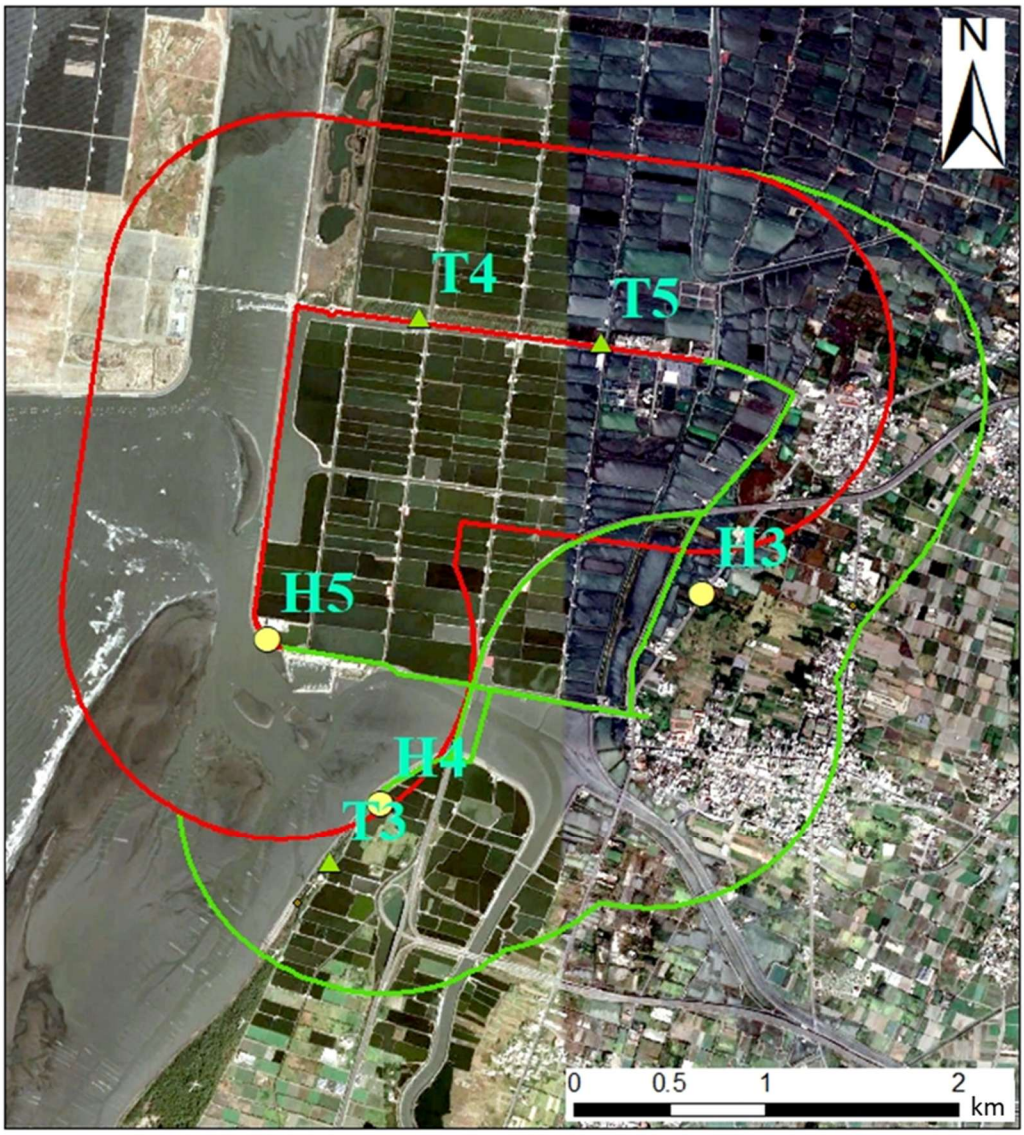
(3) Plant at Grass-Covered Land Sampling Area

Grass-covered land had tough topography; it was made up of few species with lower abundance. Shannon-Wiener Index (*H'*) ranged between 0.43 to 1.51. E5 Index fell between 0.46 to 0.86 (Appendix 4.6, Table 9-3). As for Shannon-Wiener Index (*H'*), H2 sampling area had higher Shannon Wiener Index (1.51), indicating its higher number of species and even coverage. H3 sampling area had lower index (0.43), indicating lower number of species. With respect to *E5*, H4 sampling area had the highest index value (0.86), indicating even coverage. H3 sampling area had a lower index value of 0.46, indicating the species composition is uneven and there are obvious dominant species.



Remarks: It is planned to have 4 landing points in EIS, 2 landing points are selected lastly.

Figure 2.2.4-3 Location Map of Plant Sampling Area (Southern Part) at Sihu Booster Station



Remarks: It is planned to have 4 landing points in EIS, 2 landing points are selected lastly.

Figure 2.2.4-4 Location Map of Plant Sampling Area (Northern Part) at Taixi Booster Station

II. Terrestrial Animal

i Mammal

1. Composition of Species

5 order, 6 family, 9 species of mammals were discovered in this quarter of survey. 4 order, 5 family, 7 species were documented at selected land cable landing route and 3 order, 4 family, 5 species were documented at non-selected land cable landing route (Appendix 4.6 Table 10). Recorded species encompassed Brown Rat, Brown country rat, Red-bellied tree squirrel, House Shrew, Gem-faced civet, Miniopterus schreibersii fuliginosus, Japanese house bat, Yellow bat and Formosan hare. Brown Rat and Brown country rat were captured by mousetraps. Red-bellied tree squirrel were recorded on tree. Bat recorder recorded 3 bats, including Miniopterus schreibersii fuliginosus, Japanese house bat and Yellow bat. Japanese house bat were also sighted. Infrared auto camera recorded Gem-faced civet and Formosan hare.

2. Introduction of Bats

3 bat species were recorded in the survey, which are Japanese house bat, Miniopterus schreibersii fuliginosus and Yellow bat. The species were recorded by ultra-sonic recorder.

(1) Japanese house bat

Japanese house bat is a small insectivorous bat that feeds on insects. They mainly inhabit in crevices of man-made structures, such as attics, plywood, walls, and wooden houses. They can usually be found around residential areas.

(2) Miniopterus schreibersii fuliginosus

Miniopterus schreibersii fuliginosus inhabits natural caves or artificial tunnels at various altitudes, mostly in secondary broad-leaved forests, mixed forests or reclaimed land, and is a typical cave bat. They are insectivorous bats and will also feed on spiders.

(3) Yellow bat

Yellow bats are widely distributed at low altitudes and are medium-sized insectivorous bats. They mainly inhabit the dead leaves of the palms or in the attics and crevices of buildings. They used to stay together and their excretion can be found in large numbers under the trees they inhabit.

3. Endemism

3 endemic subspecies (Red-bellied tree squirrel, Gem-faced civet, and Formosan hare) was documented in this quarter.

4. Protected Level

No protected species were discovered based on survey results.

5. Dominant Species

38 individuals were documented in this quarter, Japanese house bat were recorded with 24 individuals (63.16%), the rest of the species were recorded with1-8 individuals.

A total of 22 individuals were documented in land cable landing route, Japanese house bat were recorded with 13 individuals (59.09%), the rest of the species were recorded with1-6 individuals.

16 individuals were recorded in non-selected land cable landing route, Japanese house bat were recorded with 11 individuals (68.75%), the rest of the species were recorded with1-2 individuals.

6. Index Analysis

Diversity index of selected land cable landing route was 1.02, uniformity index was 0.74; Diversity index of non-selected land cable landing route was 0.95, and uniformity index of non-landing cable route was 0.69. The composition of species in the two routes was similar, so the H' were also similar. Moreover, both routes were affected by the dominant species Japanese house bat, which resulted in an uneven distribution of the number of species, and thus the J' indices of the two routes were both lower.

ii Terrestrial Bird

1. Composition of Species

10 orders, 28 families, 55 species were discovered in the survey results of this quarter. 10 orders, 26 families and 49 species were listed in selected land cable landing route; 8 orders, 23 families and 40 species were documented in non-selected land cable landing route (Appendix 4.6 Table 11). 55 species were recorded, including Black-winged stilt, Pied Avocet, Common Greenshank, Common Sandpiper, Dunlin, Common Redshank, Marsh Sandpiper, Wood Sandpiper, Long-toed Stint, Red-necked Stint, Whiskered tern, Kentish Plover, Little Ringed Plover, Greater Sand-Plover, Lesser Sand-Plover, Barred Button Quail, Painted Snipe, Red-collared Dove, Rock Pigeon, Spotted Dove, little egret, Black-crowned Night Heron, cattle egret, Great Egret, Grey Heron, Intermediate Egret, Common Moorhen,

White-breasted Water Hen, Little Grebe, Black-winged Kite, Common Kestrel, Common kingfisher, Savanna Nightjar, Javan Myna, Common Myna, Brown Shrike, Black drongo, Plain Prinia, Yellow-bellied Prinia, Zitting Cisticola, sparrow, Pacific Swallow, Barn swallow, Plain Martin, Striated Swallow, Swinhoe's White-eye, Chinese Bulbul, White Wagtail, Grey Wagtail, Oriental Magpie-Robin, Oriental Skylark, Vinous-throated Parrotbill, Nutmeg Mannikin, Grey Treepie and Oriental Magpie.

Among which, 4 species including Javan Myna, Black drongo, Red-collared Dove and Spotted Dove were observed on wires. 1 species Sparrow were observed on trees. 2 species, including Black-winged kite and Whiskered tern, were observed flying. 3 species, including Common Myna, Common Sandpiper and cattle egret, were observed on roads and farmlands. 4 species, including Little egret, Black-crowned night heron, Marsh sandpiper and Great egret, were seen in water area. Infrared auto camera recorded 1 species, which is Spotted Dove.

2. Endemism

No endemic species and 7 endemic subspecies (Barred Button Quail, Savanna Nightjar, Black drongo, Plain Prinia, Chinese Bulbul, Vinous-throated Parrotbill and Grey Treepie) were documented. The endemic species/subspecies account for 12.73%.

3. Protected Level

3 species of protected wildlife (Painted Snipe, Black-winged Kite and Common Kestrel) and 1 Protection-deserving Wildlife (Brown Shrike) were recorded. Black-winged Kite and Common Kestrel were recorded flying at the selected and perching non-selected land cable landing route. Painted Snipe were observed perching at the non-selected land cable landing route. Brown Shrike were observed perching at the selected and non-selected land cable, as shown in Figure 2.2.4-5 to Figure 2.2.4-6.

4. Migratory Habit

23 species of resident birds were documented in this survey, accounting for 41.82%. 18 species were with retained nature (including passage) (32.73%); 9 species were both with retained nature and resident (including passage) (16.36%%); 5 species were introduced (9.09%).

5. Dominant Species

1,589 individuals were recorded in this survey. Sparrow constituted the majority with 165 individuals, accounting for 10.38%. It was followed by Black-winged stilt (123 individuals; 7.74%).

872 individuals were documented in selected land cable landing route. It was mostly constituted by Sparrow with 77 individuals, accounting for 8.83%. It was followed by Black-winged stilt (70 individuals; 8.03%).

717 individuals were recorded in non-selected land cable landing route. Among which, sparrow constituted the majority with 88 individuals, accounting for 12.27% respectively. It was followed by Black-winged stilt and little egret (53 individuals; 7.39%).

6. Index Analysis

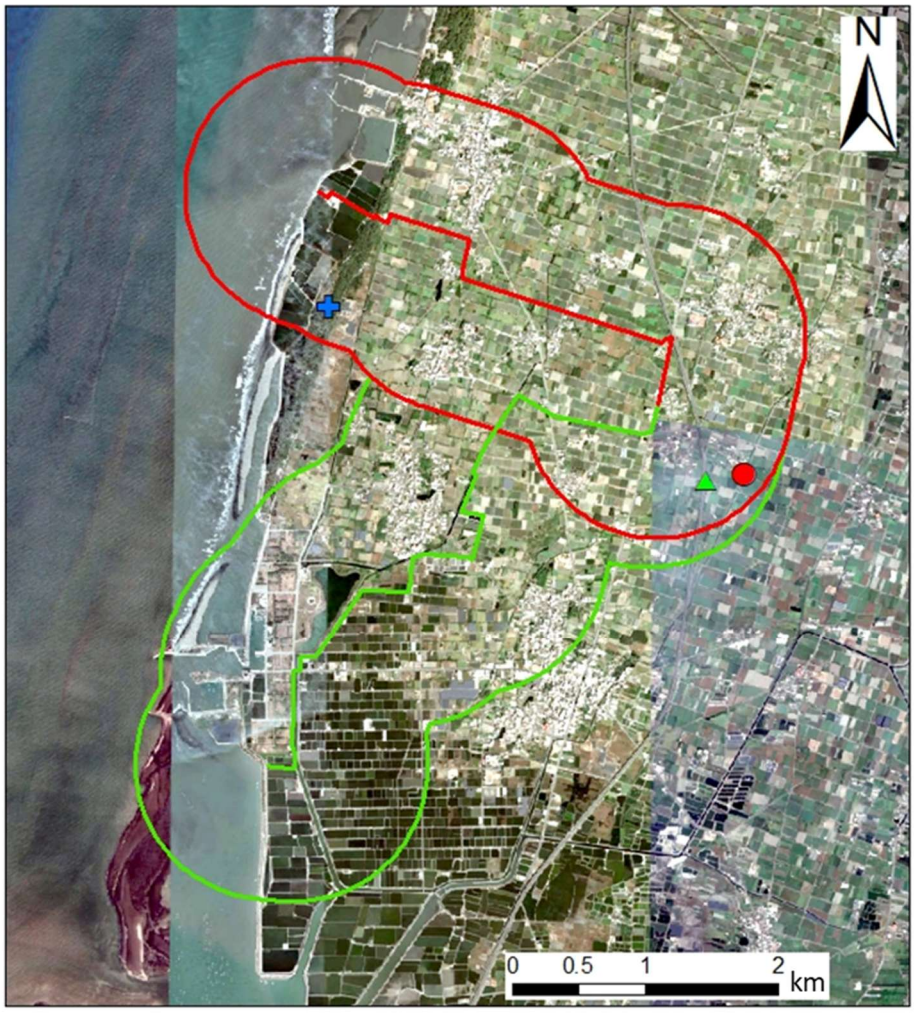
Diversity index of selected land cable landing route was 3.58 and uniformity index was 0.92; Diversity index of non-selected land cable landing route was 3.48 and uniformity index was 0.90. The diversity index and uniformity index indicate abundant species in these 2 areas and no distinctive dominant species. The diversity index on the selected land cable landing route was not affected by the dominant species, the species distribution is even.

Legend

- Selected Route for Overland Cable
- Survey Area of Selected Route for Overland Cable
- Non-selected Route for Overland Cable
- Survey Area of Non-selected Route for Overland Cable
- Greater painted-snipe (3)
- Brown shrike

Remarks:1. Numbers within () indicate number of the species.

Figure 2.2.4-5 Distribution of Protected Species at Taixi Landing Point (North Part)



Legend

- Selected Route for Overland Cable
- Survey Area of Selected Route for Overland Cable
- Non-selected Route for Overland Cable
- Survey Area of Non-selected Route for Overland Cable
- Common kestrel
- Black winged kite
- Brown shrike

Remarks:1. It is planned to have 4 landing points in EIS, 2 landing points are selected lastly.

2. Numbers within () indicate number of the species.

Figure 2.2.4-6 Distribution of Protected Species at Sihu Landing Point (South Part)

iii Amphibian

1. Composition of Species

1 order, 2 families, 2 species were discovered in survey of this quarter (Appendix 4.7 Table 12). 1 order, 2 families, 2 species were documented in the selected and 1 order, 2 families, 2 species were documented in non-selected land cable landing route. Recorded species include Rice field frog and Spectacled toad. Species were mostly recorded in the ditches or the water area of paddy lands.

2. Endemism

General indigenous species were discovered, based on survey results.

3. Protected Level

No protected species were documented based on survey results.

4. Dominant Species

26 individuals were documented in survey of this quarter, Paddy frog were recorded with 11 individuals, Spectacled toadwere recorded with 15 individuals .

15 individuals were documented in selected land cable landing route, which are Paddy frog (5 individuals) and Black-spectacled toad (10 individuals).

11 individuals were documented in non-selected land cable landing route, which are Paddy frog (6 individuals) and Black-spectacled toad (5 individuals).

5. Index Analysis

From survey results of the selected landing cable route, diversity index was 0.64, and uniformity index was 0.92. For non-selected landing cable route, diversity index was 0.69 and uniformity index was 0.99. Diversity index indicates a poor species number in both sampling area. Uniformity index indicates that species distribution in both sampling area are even, no dominant species is observed, and the index is high.

iv Reptile

1. Composition of Species

1 order, 4 families, 6 species of reptile were recorded. 1 order, 3 families and 4 species were documented in selected and 1 order, 3 families, 5 species were documented in non-selected land cable landing route. (Appendix 4.6 Table 13). 6 recorded species include Bowring's Gecko, Common House

Gecko, *Eutropis longicaudata*, *Eutropis multifasciata*, Taiwan stink snake and Swinhoe's tree lizard. Among which, Common house gecko were sighted in buildings. *Eutropis longicaudata*, *Eutropis multifasciata* and Swinhoe's tree lizard were recorded in forest.

2. Endemism

1 endemic species (Swinhoe's tree lizard) and 1 introduced species (*Eutropis multifasciata*) were discovered, based on survey results.

3. Protected Level

No protected species were recorded.

4. Dominant Species

61 individuals were recorded in this survey. It was mostly constituted by Oriental leaf-toed gecko with 31 individuals, accounting for 50.82%, followed by Bowring's Gecko (12 individuals, 19.67%) and *Eutropis multifasciata* (10 individuals, 16.39%).

20 individuals were documented in selected land cable landing route, no dominant species were recorded. All species were recorded with 2-8 individuals.

41 individuals were recorded in non-selected land cable landing route. It was mostly constituted by Common house gecko with 23 individuals, accounting for 56.10%, other species were recorded with 1-7 individuals.

5. Index Analysis

Diversity index calculated from survey results of selected land cable landing route was 1.25, uniformity index of selected landing cable route was 0.90; Diversity index of non-selected land cable landing route was 1.23 uniformity index of non-selected cable route was 0.76. The uniformity index shows that the species contribution both routes are uneven, and the *H'* is low. The *J'* in the non-selected land cable landing route is low; the individuals of each species is uneven.

v Butterfly

1. Composition of Species

Based on survey results, 1 order, 5 families, 17 species were discovered. 1 order, 5 families and 15 species were documented in selected land cable landing route; 1 order, 4 families and 11 species were documented in non-selected land cable landing route (Appendix 4.6 Table 14). 17 recorded species included Small White, *Eurema blanda arsakia*, Emigrant, Wood

white, Indian Cabbage White, Common Sailer, Glassy Tiger, Golden-C Comma, Eggfly, Angled Castor, Pale Grass Blue, *Jamides alecto dromicus*, Formosan Swift, Lime Butterfly, Blue Triangle, The spangle and Great Mormon. Most of the species were documented in farmland and uncultivated grass land.

2. Endemism

General indigenous species were recorded in survey results.

3. Protected Level

No protected species were recorded in survey results.

4. Dominant Species

166 individuals were recorded in this survey. Among which, White butterfly constituted the most, with 30 individuals documented, accounting for 18.07%. It was then followed by *Eurema blanda arsakia*, Pale Grass Blue and Wood white (20 individuals, 12.05%).

99 individuals were recorded in selected land cable landing route. Small White had the majority with 17 individuals (17.17%). It was then followed by *Eurema blanda arsakia* (15 individuals, 15.15%).

67 individuals were documented in non-selected land cable landing route, White butterfly had the majority (13 individuals; 19.40%). It was then followed by Wood white and Pale Grass Blue (10 individuals, 14.93% respectively).

5. Index Analysis

Diversity index calculated from survey results of selected landing cable route was 2.47, uniformity index of selected land cable landing route was 0.91; Diversity index of non-selected land cable landing route was 2.26, uniformity index of non-selected cable route was 0.94. Diversity index indicates an abundant number of species in the selected 2 areas. Uniformity index in both areas indicates that both areas are not affected by dominant species, species distribution is even.

Chapter 3 Review and Recommendations

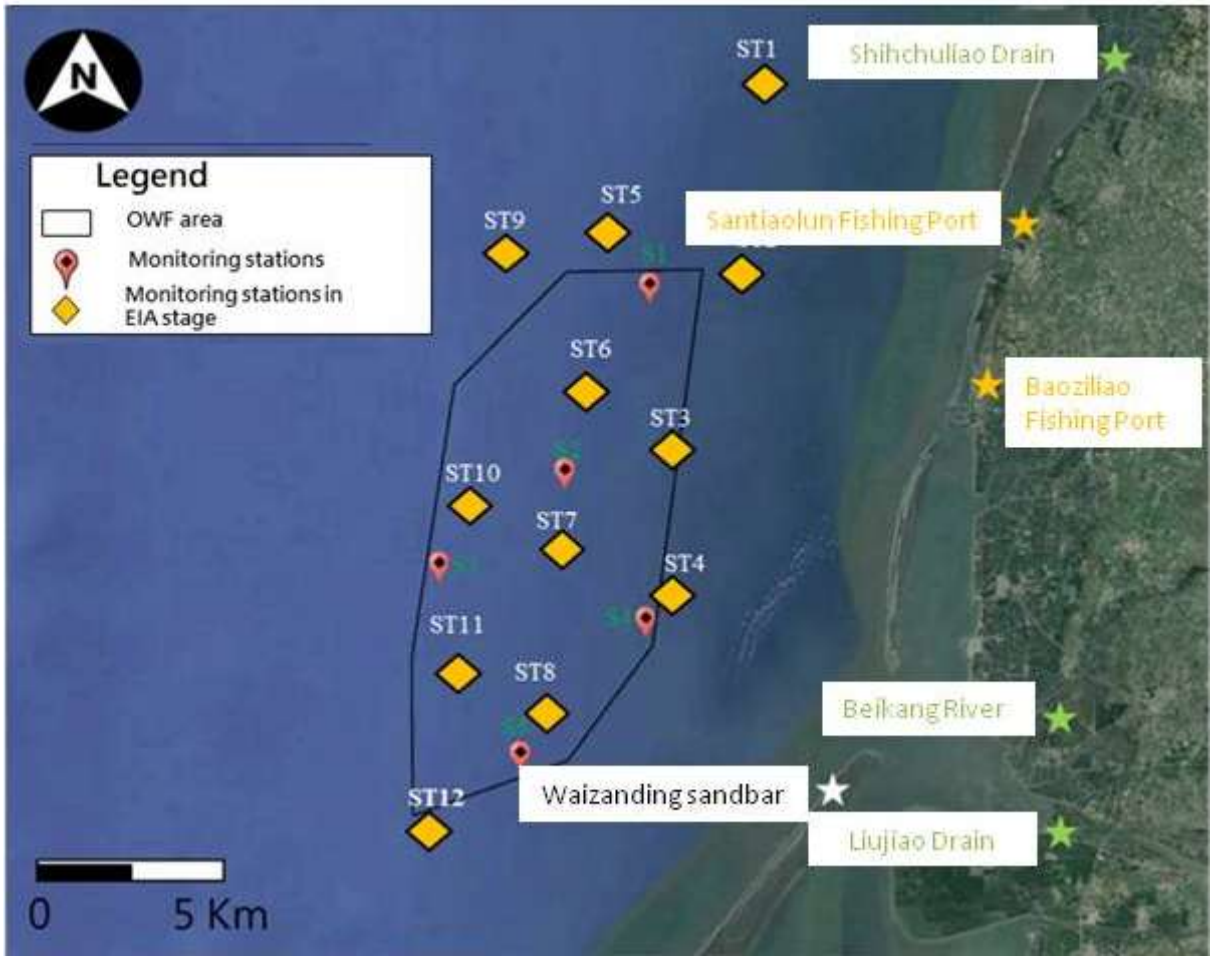
3.1 Review of Monitoring Results and Response Plan

3.1.1 Comprehensive Review and Analysis of Monitoring Results

I. Marine Water Quality

12 sampling stations were applied for marine water quality survey during the EIA period (July 2016), but as the wind farm area has been reduced, during the EIA review period, the original allocation of sampling stations are no longer apropos of the principles in conducting uniform sampling of marine water quality in the wind farm area finally approved. As such the 5 marine water quality measuring points have been adjusted in accordance with the environmental monitoring plan. Past marine water quality monitoring results were only able to be compared to EIA period measurements in nearby sampling stations for reference, as shown in Figure 3.1.1-1. Marine water quality survey results during the EIA period all comply with Marine Environmental Quality Standard for A type Marine Area.

Survey results in the remaining stations comply with Marine Environmental Quality Standard for A type Marine Area standards. For historical surveys, except for the value of Coliform group in the surface layer of S2 in 2022 Q1 and the middle layer of S5 in 2020 Q1, all other values comply with the standards. As the piling has not started in 2020 Q1 and there was no exceedance during following piling operations, it is inferred that the exceedance is the background value. It is inferred that the exceedance may be due to the near-shore industrial activities, such as the sewage coming from the animal husbandry. In addition, the siltation from Bozailiao Fishing Port to Waizanding sandbar results in a poor exchange effect of seawater in the area. The pollution may be washed into the sea during heavy rains, which may affect the water quality of the neighboring waters. Previous marine water quality monitoring results are as shown in Table 3.1.1-1.



Note: The exceedance of E. coli was observed on April 30 20202 and May 25 2022.

Figure 3.1.1-1 Monitoring Locations for Marine Water Quality in the EIS stage and Current Stage

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (1/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S1	EIA 2016 July (ST2)	Surface	29.5	8.3	0.8	33.6	6.4	ND	—	—	ND	5.1	—	<10
		Middle	29.3	8.3	0.8	33.5	6.4	ND	—	—	ND	8.3	—	<10
		Bottom	29.3	8.3	0.8	33.5	6.3	0.02	—	—	ND	16.5	—	<10
	2020 Q1 (2020.03-05)	Surface	25.4	8.2	<1.0	33.5	5.4	ND	ND	ND	0.028	4.2	<0.1	<10
		Middle	25.1	8.2	<1.0	33.5	5.3	ND	ND	ND	0.015	6.4	0.7	<10
		Bottom	24.9	8.2	<1.0	33.6	5.2	ND	ND	<0.01	<0.015	4.2	<0.1	35
	2020 Q2 (2020.06-08)	Surface	28.8	8.2	<1.0	32.8	5.2	<0.05	<0.05	<0.01	0.049	6.6	1.2	<10
		Middle	28.7	8.2	<1.0	32.8	5.1	<0.05	<0.05	<0.01	0.049	6.4	0.6	<10
		Bottom	28.6	8.2	<1.0	32.7	5.1	<0.05	<0.05	<0.01	0.046	6.5	1.0	<10
	2020 Q3 (2020.09-11)	Surface	30.1	8.1	<1.0	33.1	6.1	<0.05	<0.05	0.01	0.043	6.4	1.5	25
		Middle	29.8	8.1	<1.0	33.1	6.0	ND	<0.05	0.01	0.046	6.7	1.5	<10
		Bottom	29.5	8.1	<1.0	33.2	5.8	<0.05	<0.05	0.01	0.052	6.3	1.8	<10
	2020 Q4 (2020.12-2021.02)	Surface	21.1	8.3	<1.0	34.0	7.4	ND	<0.05	0.01	0.028	16.2	1.5	15
		Middle	21.0	8.3	<1.0	34.0	7.2	ND	<0.05	<0.01	0.031	16.4	1.2	10
		Bottom	20.8	8.2	<1.0	34.0	7.1	ND	<0.05	<0.01	0.028	15.4	1.8	25
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (2/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S1	2021 Q1 (2020.03-2021.05)	Surface	26.2	8.2	<1.0	33.4	6.7	ND	ND	<0.01	<0.015	7.6	0.6	100
		Middle	25.8	8.2	<1.0	33.5	6.6	ND	<0.05	<0.01	<0.015	11.5	0.3	<10
		Bottom	25.4	8.3	<1.0	33.6	6.6	ND	<0.05	<0.01	<0.015	11.4	0.3	<10
	2021 Q2 (2020.06-2021.08)	Surface	30.2	8.2	<1.0	33.4	7.1	ND	<0.05	<0.01	0.025	7.8	1.5	150
		Middle	30.1	8.2	<1.0	33.3	6.9	ND	<0.05	<0.01	0.018	6.2	0.9	150
		Bottom	29.9	8.2	<1.0	33.3	6.5	ND	<0.05	<0.01	0.021	7.7	0.9	300
	2021 Q3 (2020.09-2021.11)	Surface	30.2	8.2	<1.0	33.5	6.2	ND	<0.05	<0.01	<0.015	3.7	2.7	<10
		Middle	30.1	8.2	<1.0	33.5	6.2	ND	<0.05	<0.01	<0.015	3.8	2.7	<10
		Bottom	29.9	8.2	<1.0	33.6	6.2	ND	<0.05	<0.01	0.018	4.0	2.7	<10
	2021 Q4 (2021.12-2022.02)	Surface	21.4	8.2	<1.0	33.6	6.8	ND	0.05	<0.01	0.029	9.0	<0.1	300
		Middle	21.3	8.2	<1.0	33.6	6.7	ND	0.05	<0.01	0.034	10.0	<0.1	<10
		Bottom	21.2	8.2	<1.0	33.6	6.5	ND	0.05	<0.01	0.031	9.6	0.6	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (3/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S1	2022 Q1 (2022.03-2022.05)	Surface	25.9	8.2	<1.0	32.9	6.7	ND	<0.04	ND	<0.015	3.4	1.8	130
		Middle	25.7	8.2	<1.0	32.9	6.5	ND	<0.04	ND	<0.015	4.4	3.0	50
		Bottom	25.5	8.2	<1.0	33.0	6.4	ND	<0.04	ND	<0.015	2.7	3.0	85
	2022 Q2 (2022.06-08)	Surface	29.1	8.2	<1.0	32.6	6.2	<0.10	<0.04	ND	<0.015	4.5	0.9	<10
		Middle	28.9	8.2	<1.0	32.6	6.1	ND	<0.04	ND	<0.015	4.6	0.9	<10
		Bottom	28.8	8.2	<1.0	32.6	6.1	<0.10	<0.04	ND	<0.015	4.4	0.6	<10
	2022 Q3 (2022.09-11)	Surface	28.9	8.2	<1.0	32.1	6.4	<0.10	0.06	0.03	ND	27.0	0.5	70
		Middle	28.7	8.2	<1.0	32.2	6.3	<0.10	0.06	0.02	ND	3.4	0.5	110
		Bottom	28.4	8.2	<1.0	32.3	6.2	<0.10	0.06	0.02	<0.005	7.6	0.5	25
	2022 Q4 (2022.11-2023.02)	Surface	24.8	8.3	<1.0	34.0	6.8	<0.10	<0.04	<0.01	<0.015	4.6	0.9	210
		Middle	24.8	8.3	<1.0	34.0	6.8	<0.10	<0.04	<0.01	<0.015	4.6	<0.1	<10
		Bottom	24.7	8.3	<1.0	34.0	6.8	<0.10	<0.04	<0.01	<0.015	3.0	0.3	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A)

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (4/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S1	2023 Q1 (2023.03-05)	Surface	25.9	8.3	<1.0	32.1	6.6	0.07	<0.05	ND	<0.005	13.9	1.11	35
		Middle	25.6	8.3	<1.0	32.1	6.4	0.08	<0.05	ND	<0.005	11.8	1.46	40
		Bottom	25.3	8.3	<1.0	32.2	6.2	0.07	<0.05	ND	ND	4.8	0.87	35
	2023 Q2 (2023.06-08)	Surface	30.5	8.2	<1.0	32.5	6.4	0.08	<0.05	ND	0.007	7	2.44	10
		Middle	30.2	8.2	<1.0	32.6	6.2	0.06	<0.05	ND	0.007	13.3	2.63	50
		Bottom	29.8	8.2	<1.0	32.8	6.1	0.06	<0.05	ND	0.006	11	0.98	30
	2023 Q3 (2023.09-11)	Surface	26.9	8.2	<1.0	33.5	6.1	0.15	<0.05	0.01	<0.005	11.3	0.18	<10
		Middle	26.9	8.2	<1.0	33.5	6.0	0.15	0.05	ND	<0.005	10.3	0.25	<10
		Bottom	26.7	8.2	<1.0	33.5	5.8	0.19	<0.05	0.01	<0.005	10.0	0.19	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A)

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (5/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S2	EIA 2016 July (ST6)	Surface	29.9	8.2	0.6	33.5	6.6	ND	—	—	ND	2.9	—	<10
		Middle	29.7	8.2	0.6	33.6	6.5	ND	—	—	ND	2.7	—	<10
		Bottom	29.5	8.2	0.5	33.6	6.5	ND	—	—	ND	3.5	—	<10
	2020 Q1 (2020.03-05)	Surface	25.6	8.2	<1.0	33.5	5.5	ND	ND	<0.01	<0.015	11.4	0.6	25
		Middle	25.3	8.2	<1.0	33.7	5.3	ND	ND	ND	0.034	3.4	0.6	<10
		Bottom	25.0	8.2	<1.0	33.7	5.2	ND	ND	<0.01	0.015	7.3	<0.1	<10
	2020 Q2 (2020.06-08)	Surface	28.7	8.2	<1.0	32.8	5.2	<0.05	<0.05	<0.01	0.049	6.4	0.6	<10
		Middle	28.7	8.2	<1.0	32.9	5.1	<0.05	<0.05	<0.01	0.049	6.4	0.6	<10
		Bottom	28.6	8.2	<1.0	32.9	5.0	<0.05	<0.05	<0.01	0.052	7.6	0.5	<10
	2020 Q3 (2020.09-11)	Surface	29.9	8.1	<1.0	33.4	6.0	ND	<0.05	0.01	0.034	10.0	1.8	<10
		Middle	29.6	8.1	<1.0	33.3	5.8	ND	<0.05	0.01	0.037	12.1	1.5	15
		Bottom	29.4	8.2	<1.0	33.4	5.7	ND	<0.05	0.01	0.049	5.2	1.5	<10
	2020 Q4 (2020.12-2021.02)	Surface	22.1	8.3	<1.0	34.0	7.5	ND	<0.05	ND	0.015	7.6	1.2	40
		Middle	22.0	8.3	<1.0	34.0	7.2	ND	<0.05	ND	0.018	7.4	1.5	25
		Bottom	21.8	8.2	<1.0	34.0	7.2	ND	<0.05	ND	0.018	10.0	1.5	15
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (6/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S2	2021 Q1 (2020.03-2021.05)	Surface	24.7	8.3	<1.0	33.6	6.5	ND	<0.05	<0.01	0.018	7.6	0.3	<10
		Middle	24.6	8.3	<1.0	33.6	6.5	ND	<0.05	<0.01	0.021	7.1	<0.1	<10
		Bottom	24.2	8.3	<1.0	33.6	6.4	ND	<0.05	<0.01	0.018	7.0	0.9	<10
	2021 Q2 (2020.06-2021.08)	Surface	30.1	8.2	<1.0	33.5	7.0	ND	ND	<0.01	<0.015	2.6	0.3	<10
		Middle	30.0	8.2	<1.0	33.4	6.8	ND	ND	<0.01	<0.015	2.6	0.6	<10
		Bottom	29.9	8.2	<1.0	33.4	6.5	ND	<0.05	<0.01	<0.015	2.6	0.6	<10
	2021 Q3 (2020.09-2021.11)	Surface	30.1	8.2	<1.0	33.3	6.3	<0.05	<0.05	<0.01	0.028	4.9	3.0	<10
		Middle	30.0	8.2	<1.0	33.3	6.2	ND	<0.05	<0.01	0.031	4.6	3.8	<10
		Bottom	29.9	8.2	<1.0	33.3	6.2	ND	<0.05	<0.01	0.028	5.0	4.2	<10
	2021 Q4 (2021.12-2022.02)	Surface	21.4	8.2	<1.0	33.7	6.7	ND	<0.05	<0.01	0.033	13.4	1.2	<10
		Middle	21.3	8.2	<1.0	33.7	6.6	ND	<0.05	<0.01	0.030	12.2	0.6	<10
		Bottom	21.2	8.2	<1.0	33.7	6.5	ND	<0.05	<0.01	0.026	12.6	0.3	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (7/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S2	2022 Q1 (2022.03-2022.05)	Surface	26.1	8.2	<1.0	33.2	6.6	<0.10	ND	ND	ND	2.6	1.5	1300
		Middle	25.9	8.2	<1.0	33.2	6.4	<0.10	ND	ND	ND	2.6	1.5	30
		Bottom	25.7	8.2	<1.0	33.3	6.3	<0.10	ND	ND	<0.015	2.6	1.5	30
	2022 Q2 (2022.06-08)	Surface	29.0	8.2	<1.0	32.5	6.1	ND	ND	ND	0.000	4.2	0.6	<10
		Middle	28.8	8.2	<1.0	32.5	6.1	ND	<0.04	ND	0.000	4.4	0.6	<10
		Bottom	28.6	8.2	<1.0	32.5	6.0	ND	ND	ND	<0.015	3.7	0.6	<10
	2022 Q3 (2022.09-11)	Surface	29.0	8.2	<1.0	32.2	6.4	<0.10	0.07	0.08	<0.015	16.8	2.2	30
		Middle	28.7	8.2	<1.0	32.3	6.3	<0.10	0.06	0.08	<0.015	6.6	1.9	10
		Bottom	28.5	8.2	<1.0	32.3	6.1	<0.10	0.05	0.07	<0.015	20.4	1.9	<10
	2022 Q4 (2022.11-2023.02)	Surface	24.8	8.3	<1.0	34.1	6.7	ND	<0.04	<0.01	<0.015	6.6	0.9	65
		Middle	24.8	8.3	<1.0	34.1	6.7	<0.10	<0.04	<0.01	<0.015	11.1	0.9	<10
		Bottom	24.7	8.3	<1.0	34.1	6.8	<0.10	<0.04	<0.01	<0.015	11.3	1.2	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (8/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S2	2023 Q1 (2023.03-2023.05)	Surface	25.8	8.3	<1.0	32.0	6.6	<0.05	<0.05	ND	<0.005	13.6	1.13	45
		Middle	25.3	8.3	<1.0	32.1	6.4	0.05	<0.05	ND	<0.005	11.9	1.02	45
		Bottom	25.0	8.3	<1.0	32.2	6.2	<0.05	<0.05	ND	ND	4.7	0.97	80
	2023 Q2 (2023.06-2023.08)	Surface	29.8	8.2	<1.0	32.6	6.4	0.08	<0.05	ND	<0.005	8.3	0.57	<10
		Middle	29.5	8.2	<1.0	32.7	6.3	0.11	<0.05	ND	0.006	16.8	0.78	180
		Bottom	29.2	8.2	<1.0	32.9	6.2	0.12	<0.05	ND	<0.005	14.6	0.90	35
	2023 Q3 (2023.09-11)	Surface	26.9	8.2	<1.0	33.5	6.2	0.15	<0.05	ND	<0.005	6.6	0.22	<10
		Middle	26.8	8.2	<1.0	33.5	6.0	0.12	0.05	ND	<0.005	9.0	0.18	<10
		Bottom	26.6	8.2	<1.0	33.5	5.8	0.12	<0.05	0.01	<0.005	8.2	0.26	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (9/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S3	EIA 2016 July (ST11)	Surface	30.1	8.3	0.6	33.2	6.8	ND	—	—	0.030	4.3	—	<10
		Middle	29.8	8.2	0.7	33.2	6.7	ND	—	—	0.025	2.8	—	<10
		Bottom	29.7	8.3	0.6	33.4	6.8	ND	—	—	ND	4.0	—	<10
	2020 Q1 (2020.03-05)	Surface	26.1	8.2	<1.0	33.5	5.5	ND	ND	ND	<0.015	3.1	<0.1	160
		Middle	25.7	8.2	<1.0	33.5	5.4	ND	ND	ND	0.018	4.2	<0.1	250
		Bottom	25.5	8.2	<1.0	33.6	5.2	ND	ND	ND	<0.015	3.0	<0.1	130
	2020 Q2 (2020.06-08)	Surface	28.5	8.2	<1.0	33.3	5.6	<0.05	<0.05	<0.05	0.031	7.8	0.6	<10
		Middle	28.4	8.2	<1.0	33.4	5.5	<0.05	<0.05	<0.05	0.034	9.2	1.1	<10
		Bottom	28.3	8.2	<1.0	33.3	5.5	<0.05	<0.05	<0.05	0.034	6.2	0.6	<10
	2020 Q3 (2020.09-11)	Surface	29.8	8.1	<1.0	33.7	6.2	ND	<0.05	0.01	0.025	4.2	1.2	15
		Middle	29.6	8.2	<1.0	33.7	5.9	ND	<0.05	<0.01	0.021	4.8	0.9	25
		Bottom	29.3	8.2	<1.0	33.7	5.6	ND	<0.05	0.01	0.034	1.8	0.6	<10
	2020 Q4 (2020.12-2021.02)	Surface	22.0	8.3	<1.0	34.0	7.5	ND	ND	ND	0.031	5.6	1.8	<10
		Middle	21.8	8.3	<1.0	34.0	7.4	ND	0.01	ND	<0.015	7.2	1.2	<10
		Bottom	21.5	8.2	<1.0	34.0	7.3	ND	<0.05	ND	<0.015	9.6	1.8	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (10/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S3	2021 Q1 (2020.03-2021.05)	Surface	26.6	8.3	<1.0	33.6	6.6	ND	ND	<0.01	0.015	4.4	0.3	<10
		Middle	26.4	8.3	<1.0	33.6	6.5	ND	ND	<0.01	0.018	3.9	<0.1	<10
		Bottom	26.2	8.3	<1.0	33.7	6.4	<0.05	ND	<0.01	<0.015	4.0	<0.1	<10
	2021 Q2 (2020.06-2021.08)	Surface	30.1	8.2	<1.0	33.3	7.8	ND	<0.05	<0.01	<0.015	2.8	0.6	35
		Middle	29.9	8.2	<1.0	33.3	7.3	<0.05	<0.05	<0.01	<0.015	3.0	0.3	15
		Bottom	29.7	8.2	<1.0	33.3	7.0	<0.05	<0.05	<0.01	<0.015	2.9	0.3	10
	2021 Q3 (2020.09-2021.11)	Surface	30.1	8.2	<1.0	33.8	6.2	ND	<0.05	<0.01	<0.015	2.1	0.3	<10
		Middle	29.9	8.2	<1.0	33.8	6.2	ND	<0.05	<0.01	<0.015	2.4	1.2	<10
		Bottom	29.7	8.2	<1.0	33.9	6.2	ND	<0.05	<0.01	<0.015	2.4	0.6	<10
	2021 Q4 (2021.12-2022.02)	Surface	23.0	8.2	<1.0	33.7	6.8	ND	<0.05	<0.01	0.030	14.2	1.5	400
		Middle	22.8	8.2	<1.0	33.7	6.6	ND	<0.05	<0.01	0.033	13.1	1.2	200
		Bottom	22.8	8.2	<1.0	33.7	6.5	ND	<0.05	<0.01	0.025	14.0	1.2	350
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (11/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S3	2022 Q1 (2022.03-2022.05)	Surface	25.7	8.2	<1.0	33.3	6.6	<0.10	ND	ND	<0.015	3.5	2.4	45
		Middle	25.5	8.2	<1.0	33.4	6.5	<0.10	ND	ND	ND	4.4	1.8	40
		Bottom	25.3	8.2	<1.0	33.3	6.3	<0.10	ND	ND	ND	2.8	1.2	30
	2022 Q2 (2022.06-08)	Surface	29.0	8.3	<1.0	32.5	6.1	ND	ND	ND	<0.015	4.4	0.3	75
		Middle	28.7	8.2	<1.0	32.5	6.1	<0.10	ND	ND	0.016	4.8	0.3	140
		Bottom	28.5	8.2	<1.0	32.6	6.0	ND	ND	ND	<0.015	4.6	0.6	130
	2022 Q3 (2022.09-11)	Surface	29.4	8.2	<1.0	32.1	6.4	ND	0.06	0.02	ND	19.6	0.3	35
		Middle	29.1	8.2	<1.0	32.2	6.2	ND	<0.04	0.02	ND	13.6	0.2	<10
		Bottom	28.8	8.2	<1.0	32.3	6.1	<0.10	<0.04	0.02	ND	25.1	0.3	20
	2022 Q4 (2022.11-2023.02)	Surface	25.1	8.3	<1.0	34.1	6.7	<0.10	ND	ND	<0.015	<1.0	<0.1	<10
		Middle	25.1	8.3	<1.0	34.1	6.8	<0.10	ND	ND	<0.015	2.6	0.3	95
		Bottom	25.0	8.3	<1.0	34.1	6.8	<0.10	ND	ND	<0.015	3.4	0.3	35
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A)

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (12/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S3	2023 Q1 (2023.03-2023.05)	Surface	25.6	8.3	<1.0	32.2	6.6	<0.05	<0.05	ND	ND	14.0	1.04	55
		Middle	25.2	8.3	<1.0	32.2	6.4	<0.05	<0.05	ND	<0.005	14.6	1.08	40
		Bottom	24.8	8.3	<1.0	32.3	6.3	ND	<0.05	ND	<0.005	5.1	0.85	90
	2023 Q2 (2023.06-2023.08)	Surface	30.5	8.2	<1.0	32.5	6.5	<0.05	<0.05	ND	<0.005	3.2	0.34	<10
		Middle	29.9	8.2	<1.0	32.6	6.4	0.05	<0.05	ND	<0.005	3.6	0.16	65
		Bottom	29.5	8.2	<1.0	32.8	6.2	0.06	<0.05	ND	0.006	7.2	0.29	15
	2023 Q3 (2023.09-11)	Surface	27.4	8.0	<1.0	33.5	6.1	0.11	<0.05	ND	ND	5.1	0.19	<10
		Middle	27.3	8.2	<1.0	33.5	5.9	0.12	<0.05	0.01	ND	4.6	0.09	<10
		Bottom	27	8.2	<1.0	33.5	5.8	0.07	<0.05	0.01	<0.005	4.8	0.21	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A)

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (13/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S4	EIA 2016 July (ST4)	Surface	29.4	8.2	0.8	33.5	6.4	ND	—	—	ND	7.4	—	<10
		Middle	29.3	8.2	0.7	33.4	6.5	ND	—	—	ND	4.5	—	<10
		Bottom	29.3	8.3	0.7	33.4	6.5	ND	—	—	ND	4.8	—	<10
	2020 Q1 (2020.03-05)	Surface	24.9	8.2	<1.0	33.5	5.6	ND	ND	ND	<0.015	5.1	0.7	400
		Middle	24.7	8.2	<1.0	33.6	5.3	ND	ND	ND	<0.015	4.0	<0.1	<10
		Bottom	24.4	8.2	<1.0	33.6	5.1	ND	ND	ND	<0.015	4.4	1.5	<10
	2020 Q2 (2020.06-08)	Surface	28.4	8.1	<1.0	33.1	5.8	<0.05	<0.01	<0.05	0.043	9.4	0.6	<10
		Middle	28.3	8.1	<1.0	33.0	5.7	<0.05	<0.01	<0.05	0.046	14.6	1.3	150
		Bottom	28.3	8.2	<1.0	33.0	5.5	<0.05	<0.01	<0.05	0.049	11.6	0.6	<10
	2020 Q3 (2020.09-11)	Surface	29.7	8.1	<1.0	33.2	6.1	ND	0.05	0.01	0.046	10.2	1.8	<10
		Middle	29.5	8.1	<1.0	33.2	5.9	ND	<0.05	0.01	0.061	13.6	2.1	<10
		Bottom	29.4	8.1	<1.0	33.1	5.7	ND	0.05	0.01	0.046	12.2	2.1	<10
	2020 Q4 (2020.12-2021.02)	Surface	20.9	8.3	<1.0	34.0	7.5	ND	0.06	0.01	0.061	12.2	1.5	<10
		Middle	20.7	8.3	<1.0	33.9	7.4	ND	0.06	0.01	0.049	12.4	1.8	<10
		Bottom	20.6	8.2	<1.0	34.0	7.2	ND	0.06	0.01	0.052	13.0	1.8	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (14/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S4	2021 Q1 (2020.03-2021.05)	Surface	25.2	8.2	<1.0	33.5	6.8	<0.05	ND	<0.01	0.018	5.6	0.6	<10
		Middle	25.2	8.3	<1.0	33.5	6.7	<0.05	<0.05	<0.01	0.025	5.4	0.6	<10
		Bottom	25.0	8.3	<1.0	33.6	6.5	ND	<0.05	<0.01	0.025	5.6	0.3	<10
	2021 Q2 (2020.06-2021.08)	Surface	30.8	8.2	<1.0	33.3	6.7	<0.05	ND	<0.01	<0.015	9.3	1.5	<10
		Middle	30.9	8.2	<1.0	33.2	6.5	ND	ND	<0.01	<0.015	9.0	2.4	<10
		Bottom	30.7	8.2	<1.0	33.2	6.7	ND	ND	<0.01	<0.015	9.8	2.4	<10
	2021 Q3 (2020.09-2021.11)	Surface	30.8	8.2	<1.0	33.6	6.3	ND	<0.05	<0.01	0.018	2.6	2.4	<10
		Middle	30.9	8.2	<1.0	33.6	6.2	ND	<0.05	<0.01	0.015	2.2	2.1	<10
		Bottom	30.7	8.2	<1.0	33.6	6.2	<0.05	<0.05	<0.01	<0.015	3.4	2.1	<10
	2021 Q4 (2021.12-2022.02)	Surface	18.6	8.2	<1.0	32.7	6.6	ND	0.14	0.01	0.065	34.3	0.6	<10
		Middle	18.6	8.2	<1.0	32.7	6.4	ND	0.14	0.01	0.071	34.9	0.3	350
		Bottom	18.6	8.2	<1.0	32.7	6.4	ND	0.15	0.01	0.075	33.9	0.3	300
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (15/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S4	2022 Q1 (2022.03-2022.05)	Surface	25.5	8.2	<1.0	33.2	6.5	<0.10	ND	ND	ND	1.8	1.5	25
		Middle	25.3	8.2	<1.0	33.3	6.4	0.11	<0.04	ND	ND	2.6	2.1	25
		Bottom	25.0	8.2	<1.0	33.4	6.3	<0.10	<0.04	<0.01	<0.015	2.2	2.1	25
	2022 Q2 (2022.06-08)	Surface	28.9	8.2	<1.0	32.5	6.1	ND	<0.04	ND	0.021	4.6	1.5	900
		Middle	28.8	8.2	<1.0	32.5	6.1	ND	<0.04	ND	0.024	4.3	1.5	<10
		Bottom	28.6	8.2	<1.0	32.5	6.0	ND	ND	ND	0.027	11.5	1.8	<10
	2022 Q3 (2022.09-11)	Surface	28.6	8.2	<1.0	31.6	6.4	ND	0.04	0.02	ND	2.2	0.7	25
		Middle	28.4	8.2	<1.0	31.7	6.2	ND	<0.04	0.02	ND	8.2	0.4	<10
		Bottom	28.2	8.2	<1.0	31.7	6.1	ND	<0.04	0.02	ND	20.2	0.4	20
	2022 Q4 (2022.11-2023.02)	Surface	23.8	8.2	<1.0	34.0	6.9	<0.10	<0.04	ND	<0.015	2.6	0.3	40
		Middle	23.8	8.2	<1.0	34.0	6.9	<0.10	<0.04	ND	<0.015	<1.0	0.3	75
		Bottom	23.7	8.2	<1.0	34.0	6.9	<0.10	ND	ND	<0.015	1.7	0.6	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (16/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S4	2023 Q1 (2023.03-2023.05)	Surface	25.7	8.3	<1.0	32.0	6.4	<0.05	<0.05	ND	<0.005	4.8	0.76	70
		Middle	25.5	8.3	<1.0	32.1	6.2	ND	<0.05	ND	<0.005	14.4	1.63	90
		Bottom	25.3	8.3	<1.0	32.1	6.1	<0.05	<0.05	ND	0.006	12.2	0.93	70
	2023 Q2 (2023.06-2023.08)	Surface	30.9	8.2	<1.0	32.7	6.1	0.07	<0.05	ND	0.011	13.1	2.30	<10
		Middle	30.7	8.2	<1.0	32.8	5.8	0.07	<0.05	ND	0.013	36.3	2.77	15
		Bottom	30.5	8.2	<1.0	32.7	5.7	0.10	<0.05	ND	0.014	38.4	1.75	15
	2023 Q3 (2023.09-11)	Surface	26.8	8.2	<1.0	33.3	6.1	0.07	<0.05	0.01	0.007	25.4	0.09	<10
		Middle	26.8	8.2	<1.0	33.3	5.9	0.12	0.06	0.01	0.007	22.8	0.15	<10
		Bottom	26.7	8.2	<1.0	33.3	5.8	0.14	0.06	0.01	0.007	25.0	0.24	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.

Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (17/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S5	EIA 2016 July (ST8)	Surface	30.1	8.2	0.6	33.4	6.6	ND	—	—	ND	2.8	—	<10
		Middle	29.8	8.3	0.6	33.2	6.6	ND	—	—	ND	3.0	—	<10
		Bottom	29.7	8.3	0.6	33.2	6.5	ND	—	—	ND	4.4	—	<10
	2020 Q1 (2020.03-05)	Surface	26.1	8.0	<1.0	33.6	5.4	ND	ND	ND	0.021	3.2	0.7	750
		Middle	25.8	8.0	<1.0	33.7	5.2	ND	ND	ND	0.031	4.6	0.7	1,200*
		Bottom	25.2	8.0	<1.0	33.7	5.1	ND	ND	ND	0.018	2.6	<0.1	670
	2020 Q2 (2020.06-08)	Surface	28.6	8.0	<1.0	33.3	6.1	<0.05	<0.01	<0.05	0.040	9.8	0.5	<10
		Middle	28.5	8.0	<1.0	33.3	6.0	<0.05	<0.01	<0.05	0.043	9.0	<0.1	<10
		Bottom	28.5	8.1	<1.0	33.2	5.9	<0.05	<0.01	<0.05	0.040	9.8	0.5	<10
	2020 Q3 (2020.09-11)	Surface	29.9	8.1	<1.0	33.6	6.2	ND	<0.05	<0.01	0.043	14.4	1.2	10
		Middle	29.7	8.2	<1.0	33.7	6.0	ND	<0.05	<0.01	0.031	18.4	1.2	<10
		Bottom	29.4	8.1	<1.0	33.6	5.8	ND	<0.05	<0.01	0.031	15.2	1.5	10
	2020 Q4 (2020.12-2021.02)	Surface	22.3	8.3	<1.0	34.0	7.4	ND	<0.05	<0.01	0.018	11.0	1.8	<10
		Middle	22.1	8.3	<1.0	34.0	7.3	ND	<0.05	<0.01	0.018	24.6	2.4	<10
		Bottom	21.9	8.2	<1.0	34.0	7.2	ND	<0.05	<0.01	0.018	14.0	2.4	<10
Water Quality Standard of Marine Waterbody (Class A)			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (18/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S5	2021 Q1 (2020.03-2021.05)	Surface	25.4	8.3	<1.0	33.6	6.7	ND	<0.05	<0.01	0.025	8.2	0.9	<10
		Middle	25.2	8.3	<1.0	33.5	6.6	ND	<0.05	<0.01	0.025	8.0	0.6	<10
		Bottom	25.0	8.3	<1.0	33.6	6.6	ND	<0.05	<0.01	0.018	7.4	<0.1	130
	2021 Q2 (2020.06-2021.08)	Surface	31.0	8.2	<1.0	33.2	6.7	ND	ND	<0.01	<0.015	2.6	1.5	<10
		Middle	31.0	8.2	<1.0	33.2	6.6	ND	ND	<0.01	<0.015	2.6	1.5	<10
		Bottom	30.8	8.2	<1.0	33.2	6.6	ND	ND	<0.01	<0.015	2.7	1.5	<10
	2021 Q3 (2020.09-2021.11)	Surface	31.0	8.2	<1.0	33.7	6.3	ND	<0.05	<0.01	0.015	3.6	2.4	10
		Middle	31.0	8.2	<1.0	33.7	6.2	ND	<0.05	<0.01	0.015	3.0	3.0	<10
		Bottom	30.8	8.2	<1.0	33.7	6.2	ND	<0.05	<0.01	<0.015	3.1	2.4	100
	2021 Q4 (2021.12-2022.02)	Surface	20.5	8.2	<1.0	33.2	6.6	ND	0.09	<0.01	0.058	27.0	1.8	650
		Middle	20.4	8.2	<1.0	33.2	6.5	ND	0.10	<0.01	0.057	28.3	0.6	500
		Bottom	20.4	8.2	<1.0	33.2	6.4	ND	0.10	<0.01	0.052	26.0	0.9	500
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (19/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S5	2022 Q1 (2022.03-2022.05)	Surface	25.5	8.2	<1.0	33.2	6.5	<0.10	ND	ND	0.022	5.6	4.4	<10
		Middle	25.4	8.1	<1.0	33.2	6.4	<0.10	<0.04	<0.01	0.026	8.2	4.2	<10
		Bottom	25.3	8.1	<1.0	33.3	6.3	<0.10	<0.04	<0.01	0.026	8.6	6.8	<10
	2022 Q2 (2022.06-08)	Surface	28.9	8.2	<1.0	32.5	6.2	ND	<0.04	ND	0.016	4.5	0.6	<10
		Middle	28.7	8.2	<1.0	32.6	6.1	<0.10	<0.04	ND	0.017	4.8	0.6	<10
		Bottom	28.6	8.2	<1.0	32.6	6.1	<0.10	<0.04	ND	<0.015	4.7	0.3	<10
	2022 Q3 (2022.09-11)	Surface	29.0	8.2	<1.0	31.8	6.4	<0.10	0.05	0.02	<0.015	4.6	1.3	<10
		Middle	28.7	8.2	<1.0	31.9	6.2	<0.10	0.04	0.02	<0.015	14.6	1.3	45
		Bottom	28.5	8.2	<1.0	31.9	6.1	<0.10	0.05	0.02	<0.015	5.4	1.3	60
	2022 Q4 (2022.11-2023.02)	Surface	23.9	8.2	<1.0	34.1	6.9	<0.10	<0.04	<0.01	<0.015	2.8	0.3	50
		Middle	23.9	8.2	<1.0	34.1	6.9	<0.10	<0.04	<0.01	<0.015	3.0	0.6	30
		Bottom	23.8	8.2	<1.0	34.1	6.9	<0.10	<0.04	<0.01	<0.015	3.0	0.3	15
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.
Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

Table 3.1.1-1 Analysis of Previous Marine Water Quality Monitoring (20/20)

Monitoring Spot	Monitoring Date	Item	Water temperature	pH	BOD	Salinity	Dissolved Oxygen	Ammonia-N	Nitrite Nitrogen	Nitrite Nitrogen	Orthophosphate	Suspended Solid	Chlorophyll a	Coliform group
		Unit	℃	—	mg/L	psu	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μg/L	CFU/100mL
S5	2023 Q1 (2023.03-2023.05)	Surface	25.5	8.3	<1.0	31.7	6.5	<0.05	<0.05	ND	<0.005	13.9	4.11	85
		Middle	25.2	8.3	<1.0	31.8	6.3	0.08	<0.05	ND	<0.005	15.8	2.45	95
		Bottom	24.9	8.3	<1.0	31.8	6.2	0.05	0.05	ND	<0.005	13.2	2.80	70
	2023 Q2 (2023.06-2023.08)	Surface	30.4	8.1	<1.0	32.5	6.2	0.09	<0.05	ND	0.014	6.6	0.68	<10
		Middle	30	8.1	<1.0	32.6	6.1	0.11	<0.05	ND	0.008	12.9	0.43	45
		Bottom	29.7	8.2	<1.0	32.7	6	0.08	<0.05	ND	0.012	10.8	0.88	<10
	2023 Q3 (2023.09-11)	Surface	26.9	8.2	<1.0	33.4	6.1	0.10	<0.05	ND	<0.005	11.2	0.20	<10
		Middle	26.9	8.2	<1.0	33.4	5.9	0.10	<0.05	0.01	<0.005	10.2	0.18	<10
		Bottom	26.4	8.2	<1.0	33.4	5.8	0.08	<0.05	0.01	<0.005	9.9	0.22	<10
Marine Environmental Quality Standard for A type Marine Area			—	7.5-8.5	<2.0	—	>5.0	<3.0	—	—	—	—	—	< 1,000

Remark 1: "＜" indicates the value is lower than limit of quantification; "ND" indicates the value is lower than limit of device detection.

Remark 2: "*" indicates the value exceeds Water Quality Standard of Marine Waterbody (Class A).

II. Bird Ecology

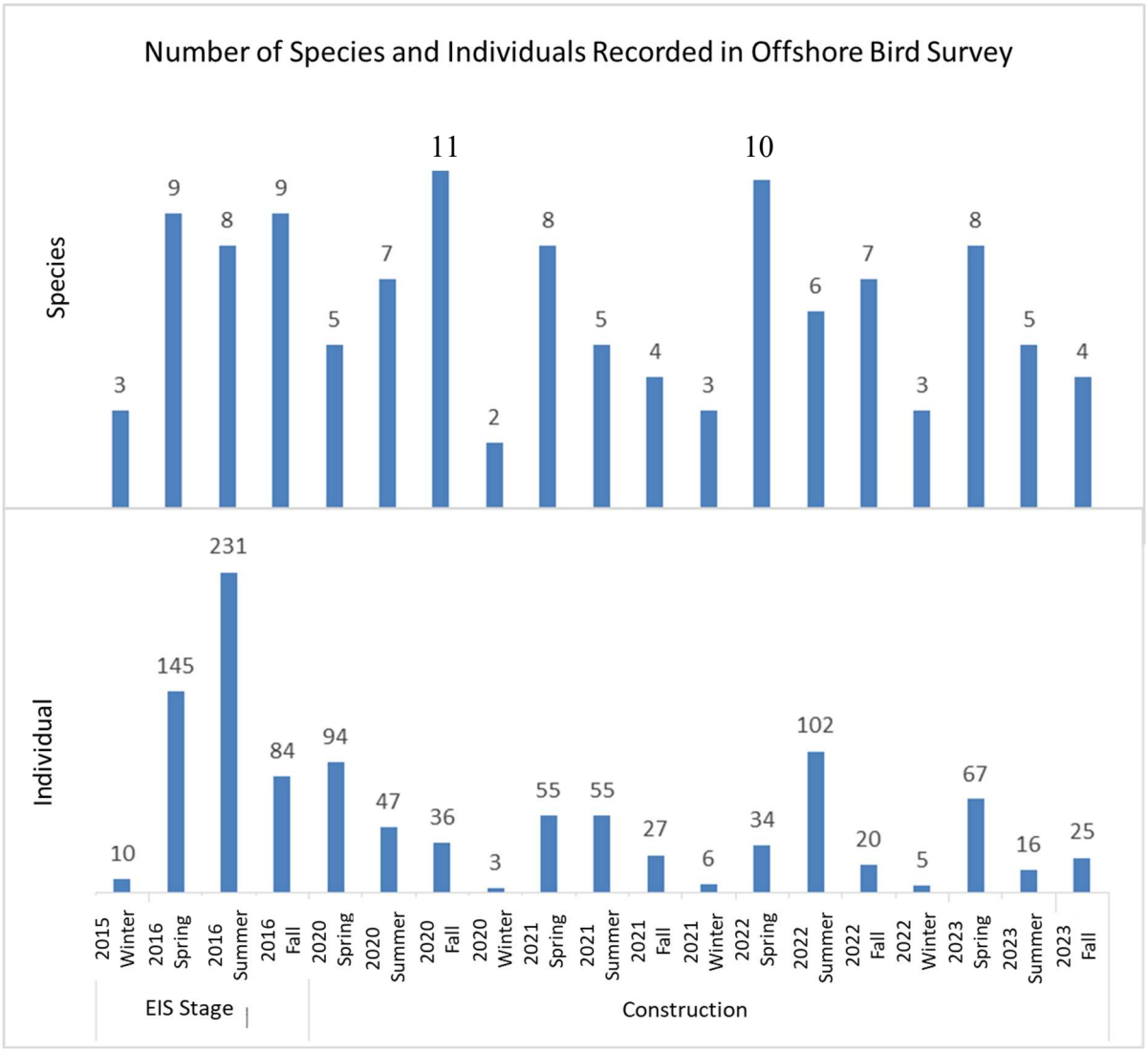
i Offshore Bird Ecology

In the same quarter in the EIS stage (2016 September-November), 5 orders, 7 families and 13 species were recorded, excluding wild pigeons. In comparison, no species were added in this quarter, and 9 species (Bridled Tern, Unknkow Tern, Gull-billed Tern, Unknow Laridae, Tern, Hydrobatidae, Brown Booby, Anatidae and sparrow) were not recorded in this quarter. There dominant species is Whiskered tern in EIS stage and Barn swallow in this quarter.

As per historical records, 2-11 coastal bird species were documented during the offshore construction phase in each quarter, and the number is between 3-102 individuals. For species, in 2020, fall recorded the most species, followed by summer; in 2021, spring recorded the most species, followed by summer. Compare spring and summer in 2022, spring recorded more species.

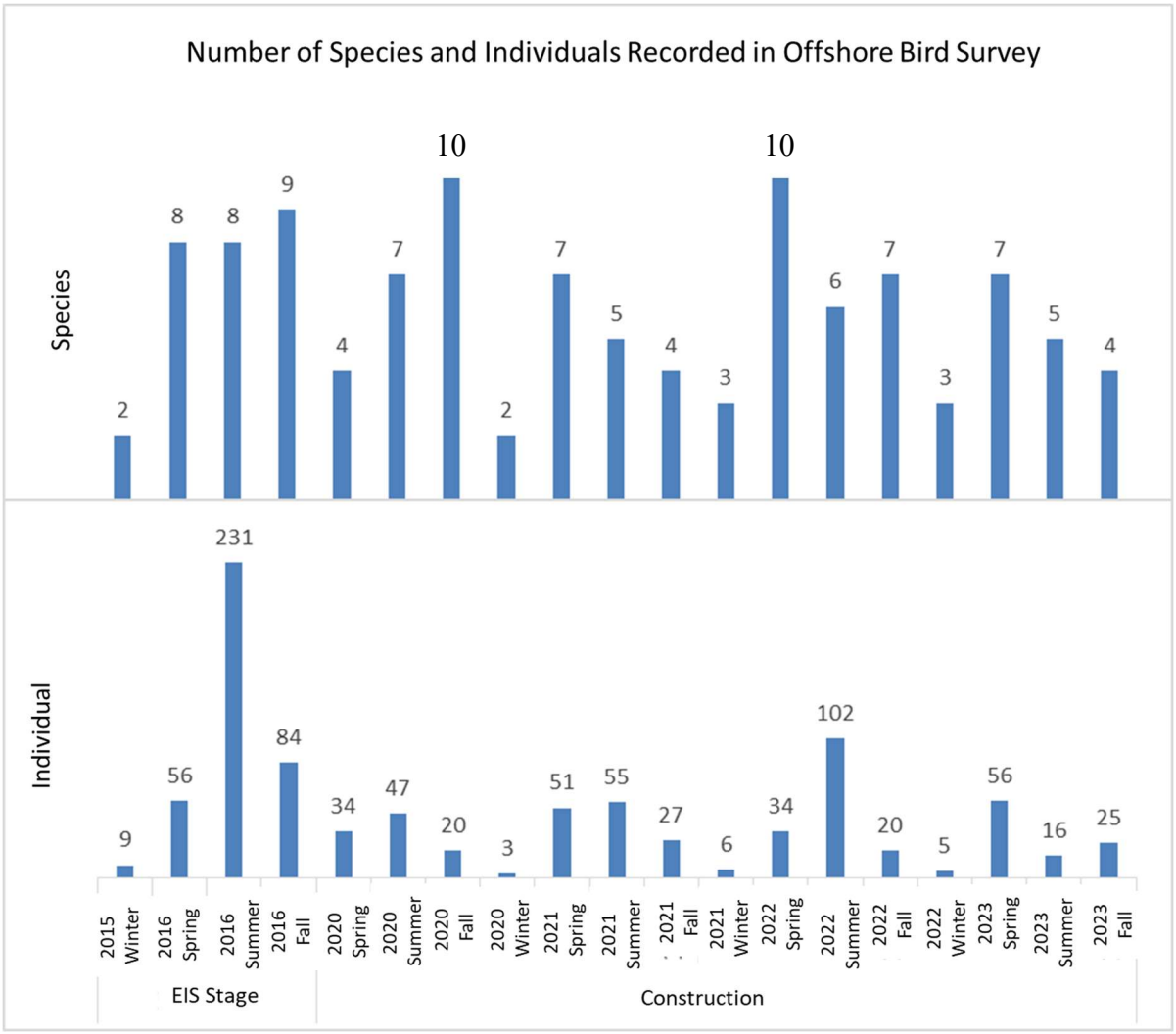
For individuals, in 2020, spring recorded the most individuals, followed by summer. In 2021, spring and summer recorded the most individuals. Compare spring and summer in 2023, spring recorded more species than in summer. As spring and summer are birds' migratory seasons, more species were recorded if compared with fall and winter. The overview of offshore bird species and individuals documented in the surveys are listed as Table 3.1.1-2 and Figure 3.1.1-2.

In addition, wild pigeons were recorded in the spring and winter of 2016, spring and fall of 2020, spring of 2021, and spring of 2023. They are inferred to be racing pigeons. After excluding the wild pigeons recorded in the surveys, 2-10 species and 3-102 individuals were recorded in the historical offshore bird surveys. The historical offshore bird survey data is shown as Figure 3.1.1-3 and Table 3.1.1-3.



Note: In the EIS stage, 1 survey was carried out in winter, 3 in spring, 2 in summer, and 3 in fall. In the construction phase, 3 surveys were carried out respectively in spring, summer and fall; 1 survey was carried out in winter.

Figure 3.1.1-2 Species and Number of Offshore Birds Recorded in the Historical Surveys



Note: In the EIS stage, 1 survey was carried out in winter, 3 in spring, 2 in summer, and 3 in fall. In the construction phase, 3 surveys were carried out respectively in spring, summer and fall; 1 survey was carried out in winter.

Figure 3.1.1-3 Species and Number of Offshore Birds Recorded in the Historical Surveys (Wild Pigeons were Excluded)

Table 3.1.1-2 Species and Number of Offshore Birds

Quarter		Species	Individual	Density
EIA	2015 Winter	3	10	-
	2016 Spring	9	145	
	2016 Summer	8	231	
	2016 Fall	9	84	
Construction	2020 Spring	5	94	1.033
	2020 Summer	7	47	0.516
	2020 Fall	11	36	0.791
	2020 Winter	2	3	0.099
	2021 Spring	8	55	0.604
	2021 Summer	5	55	0.604
	2021 Fall	4	27	0.297
	2021 Winter	3	6	0.198
	2022 Spring	10	34	0.373
	2022 Summer	6	102	1.120
	2022 Fall	7	20	0.220
	2022 Winter	3	5	0.165
	2023 Spring	8	67	0.737
	2023 Summer	5	16	0.351
	2023 Fall	4	25	0.275

Note: Offshore bird density is one of the analyses in the construction phase monitoring.

Table 3.1.1-3 Species and Number of Offshore Birds (Wild Pigeons Excluded)

Quarter		Species	Individual	Density
EIA	2015 Winter	2	9	-
	2016 Spring	8	56	
	2016 Summer	8	231	
	2016 Fall	9	84	
Construction	2020 Spring	4	34	0.923
	2020 Summer	7	47	0.373
	2020 Fall	10	20	0.527
	2020 Winter	2	3	0.099
	2021 Spring	7	51	0.560
	2021 Summer	5	55	0.604
	2021 Fall	4	27	0.297
	2021 Winter	3	6	0.198
	2022 Spring	10	34	0.373
	2022 Summer	6	102	1.120
	2022 Fall	7	20	0.220
	2022 Winter	3	5	0.165
	2023 Spring	7	56	0.737
	2023 Summer	5	16	0.351
	2023 fall	4	25	0.275

Note: Offshore bird density is one of the analyses in the construction phase monitoring.

ii Coastal Bird Ecology

The landing point for submarine cable was not yet decided during the EIS period, as such survey area during said period was the coastline of Yunlin County. That area does not completely align with the current monitoring location for landing point of submarine cable in environmental monitoring plan. During the EIS period in the same quarter (2016 September-November) a total of 9 orders, 16 families and 51 species were recorded, with unknown common snipe and unknown tern also recorded. 35 species were newly recorded in this quarter comparing to the EIS period, including Barred Button Quail, Oriental Pratincole, Red-collared Dove, Spotted Dove, Rock Pigeon, Striated Heron, Yellow Bittern, White-breasted Water Hen, House Swift, Savanna Nightjar, Common Kestrel, Javan Myna, Common Myna, Long-tailed Shrike, Black drongo, Plain Prinia, Yellow-bellied Prinia, Zitting Cisticola, sparrow, Pacific Swallow, Striated Swallow, Barn Swallow, Plain Martin, Swinhoe's White-eye, Chinese Bulbul, Nutmeg Mannikin, Indian Silverbill, Gray-streaked Flycatcher, White-rumped Shama, Streak-breasted Scimitar Babbler, Oriental Skylark, Vinous-throated Parrotbill, Eastern Yellow Wagtail, White Wagtail and Black-naped Blue Monarch. 19

species were not recorded in this quarter, including Northern Shoveler, Northern Pintail, Sharp-tailed Sandpiper, Broad-billed sandpiper, Curlew Sandpiper, Ruddy Turnstone, Bar-tailed Godwit, Pied Avocet, Black-headed Gull, Caspian Tern, Greater crested tern, Gull-billed Tern, White-winged Tern, Lesser Sand-Plover, Grey Plover, African Sacred Ibis, Osprey, Great Cormorant and Crested Myna. The species newly recorded in this quarter are mostly residents that have stronger adaptability to human activities.

As per historical records, 52-88 coastal bird species were documented during the offshore construction phase in each quarter, and the number is between 1,183-5,156 individuals. 26-48 bird species and 239-1,161 individuals were recorded on the Taixi selected landing cable route, 24-46 bird species and 183-527 individuals were recorded on the Sihu selected landing cable route. 24-51 bird species and 225-645 individuals were recorded on the Taixi non-selected landing cable route, 29-52 bird species and 227-440 individuals were recorded on the Sihu non-selected landing cable route.

For coastal birds, no obvious difference was found in species and individuals regarding seasons.

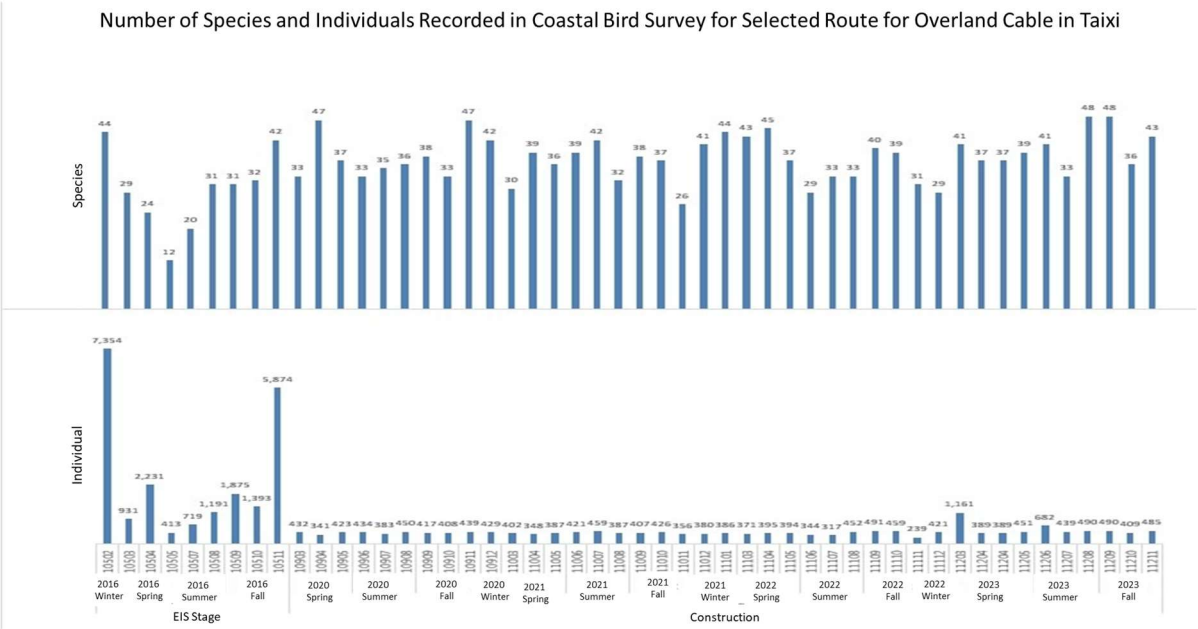
For Taixi selected landing cable route, 2023 March recorded the most individuals. For species and individuals, no obvious seasonal difference is found.

For Sihu selected landing cable route, 2021 October recorded the most individuals. For species and individuals, no obvious seasonal difference is found.

For Taixi non-selected landing cable route, March 2020 and 2021 recorded the most individuals, no obvious difference was found in the rest of the seasons. For species, November 2020, January and March 2022, and August 2023 recorded the most species.

For Sihu non-selected landing cable route, January and March 2022 recorded the most species, no obvious difference was found in the rest of the seasons. For species, no seasonal difference is found.

The overview of coastal bird species and individuals documented in the surveys are listed as Figure 3.1.1-4 and Figure 3.1.1-4.



Note: In the EIS stage, 1 survey was carried out in winter, 3 in spring, 2 in summer, and 3 in fall. In the construction phase, 3 surveys were carried out respectively in spring, summer and fall; 1 survey was carried out in winter. Selected/non-selected route is not identified in the EIA stage.

Figure 3.1.1-4.1 Species and Number of Coastal Birds Recorded in the Historical Surveys (Selected Route in Taixi)

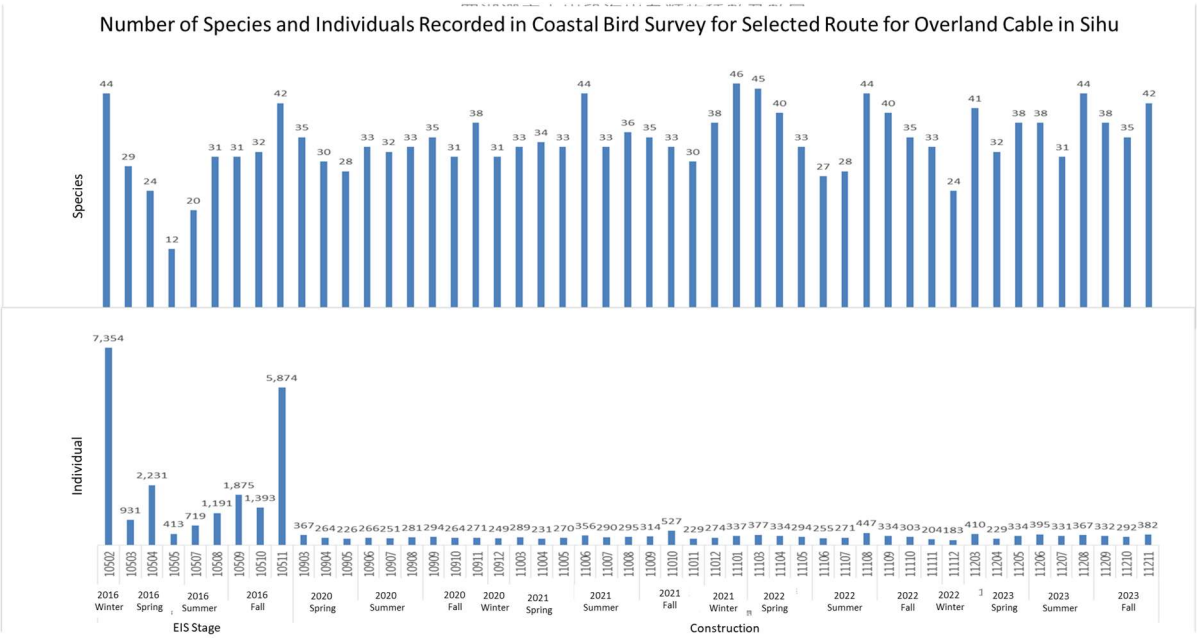
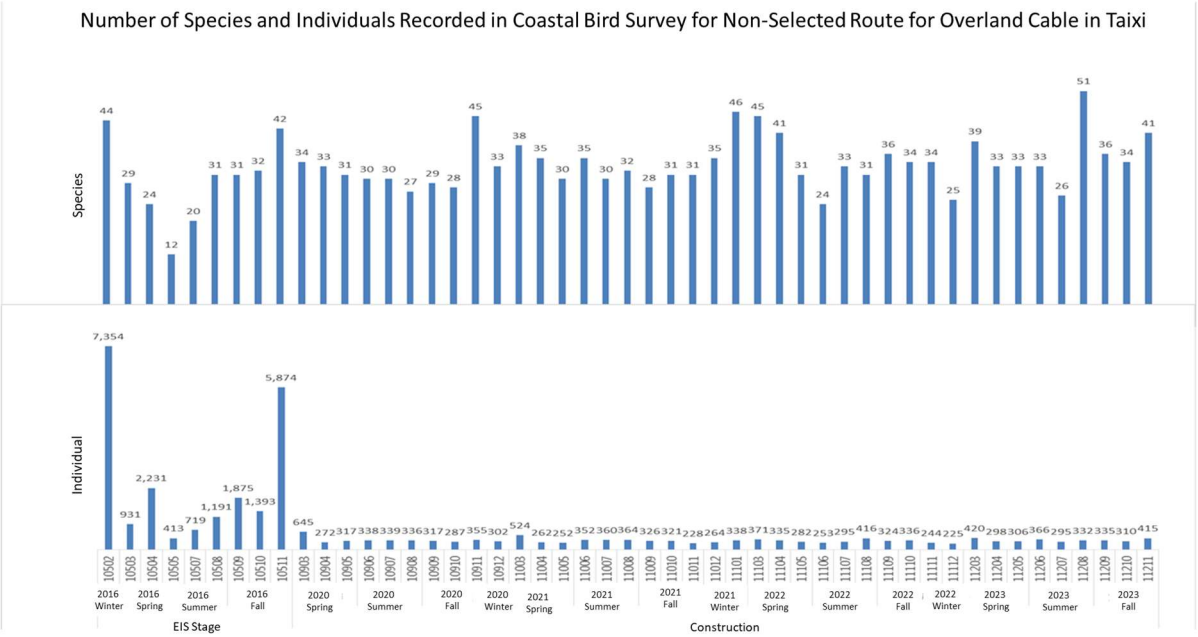
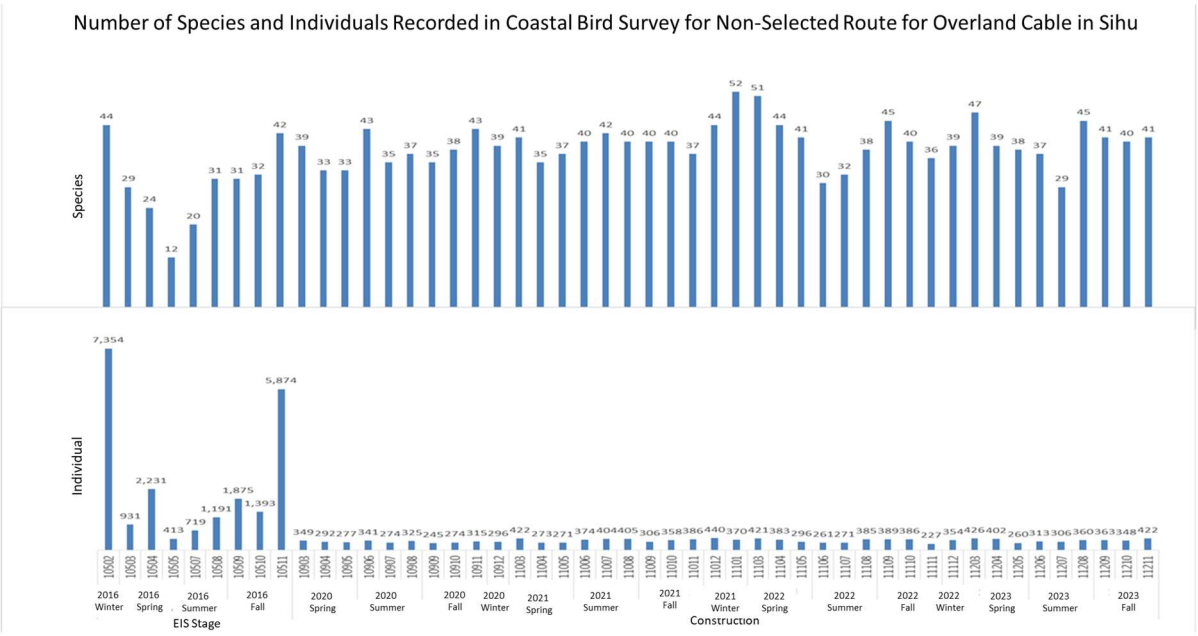


Figure 3.1.1-4.2 Species and Number of Coastal Birds Recorded in the Historical Surveys (Selected Route in Sihu)



Note: In the EIS stage, 1 survey was carried out in winter, 3 in spring, 2 in summer, and 3 in fall. In the construction phase, 3 surveys were carried out respectively in spring, summer and fall; 1 survey was carried out in winter. Selected/non-selected route is not identified in the EIA stage.

Figure 3.1.1-4.3 Species and Number of Coastal Birds Recorded in the Historical Surveys (Non-selected Route in Taixi)



Note: In the EIS stage, 1 survey was carried out in winter, 3 in spring, 2 in summer, and 3 in fall. In the construction phase, 3 surveys were carried out respectively in spring, summer and fall; 1 survey was carried out in winter. Selected/non-selected route is not identified in the EIA stage.

Figure 3.1.1-4.4 Species and Number of Coastal Birds Recorded in the Historical Surveys (Non-selected Route in Sihu)

Table 3.1.1-4.1 Species and Number of Coastal Birds (Selected Route in Taixi)

Quarter			Species	Number
EIA	2016 Winter	2016/02	44	7,354
	2016 Spring	2016/03	29	931
		2016/04	24	2,231
		2016/05	12	413
	2016 Summer	2016/07	20	719
		2016/08	31	1,191
	2016 Fall	2016/09	31	1,875
		2016/10	32	1,393
		2016/11	42	5,874
Construction	2020 Spring	2020/03	33	432
		2020/04	47	341
		2020/05	37	423
	2020 Summer	2020/06	33	434
		2020/07	35	383
		2020/08	36	450
	2020 Fall	2020/09	38	417
		2020/10	33	408
		2020/11	47	439
	2020 Winter	2020/12	42	429
	2021 Spring	2021/03	30	402
		2021/04	39	348
		2021/05	36	387
	2021 Summer	2021/06	39	421
		2021/07	42	459
		2021/08	32	387
	2021 Fall	2021/09	38	407
		2021/10	37	426
		2021/11	26	356
	2021 Winter	2021/12	41	380
		2022/1	44	386
	2022 Spring	2022/3	43	371
		2022/4	45	395
		2022/5	37	394
	2022 Summer	2022/6	29	344
		2022/7	33	317
		2022/8	33	452
	2022 Fall	2022/9	40	491
		2022/10	39	459
		2022/11	31	239
	2022 Winter	2022/12	29	421
	2023 Spring	2023/3	41	1,161
		2023/4	37	389
		2023/5	39	451
	2023 Summer	2023/06	41	682
		2023/07	33	439
		2023/08	48	490
	2023 Fall	11209	48	490
		11210	36	409
		11211	43	485

Table 3.1.1-4.2 Species and Number of Coastal Birds (Selected Route in Sihu)

Quarter			Species	Number
EIA	2016 Winter	2016/02	44	7,354
	2016 Spring	2016/03	29	931
		2016/04	24	2,231
		2016/05	12	413
	2016 Summer	2016/07	20	719
		2016/08	31	1,191
	2016 Fall	2016/09	31	1,875
		2016/10	32	1,393
		2016/11	42	5,874
Construction	2020 Spring	2020/03	35	367
		2020/04	30	264
		2020/05	28	226
	2020 Summer	2020/06	33	266
		2020/07	32	251
		2020/08	33	281
	2020 Fall	2020/09	35	294
		2020/10	31	264
		2020/11	38	271
	2020 Winter	2020/12	31	249
	2021 Spring	2021/03	33	289
		2021/04	34	231
		2021/05	33	270
	2021 Summer	2021/06	44	356
		2021/07	33	290
		2021/08	36	295
	2021 Fall	2021/09	35	314
		2021/10	33	527
		2021/11	30	229
	2021 Winter	2021/12	38	274
		2022/1	46	337
	2022 Spring	2022/3	45	377
		2022/4	40	334
		2022/5	33	294
	2022 Summer	2022/6	27	255
		2022/7	28	271
		2022/8	44	447
	2022 Fall	2022/9	40	334
		2022/10	35	303
		2022/11	33	204
	2022 Winter	2022/12	24	183
	2023 Spring	2023/3	41	410
		2023/4	32	229
		2023/5	38	334
	2023 Summer	2023/06	38	395
		2023/07	31	331
		2023/08	44	367
	2023 fall	11209	38	332
		11210	35	292
		11211	42	382

Table 3.1.1-4.3 Species and Number of Coastal Birds (Non-selected Route in Taixi)

Quarter			Species	Number
EIA	2016 Winter	2016/02	44	7,354
	2016 Spring	2016/03	29	931
		2016/04	24	2,231
		2016/05	12	413
	2016 Summer	2016/07	20	719
		2016/08	31	1,191
	2016 Fall	2016/09	31	1,875
		2016/10	32	1,393
		2016/11	42	5,874
Construction	2020 Spring	2020/03	34	645
		2020/04	33	272
		2020/05	31	317
	2020 Summer	2020/06	30	338
		2020/07	30	339
		2020/08	27	336
	2020 Fall	2020/09	29	317
		2020/10	28	287
		2020/11	45	355
	2020 Winter	2020/12	33	302
	2021 Spring	2021/03	38	524
		2021/04	35	262
		2021/05	30	252
	2021 Summer	2021/06	35	352
		2021/07	30	360
		2021/08	32	364
	2021 Fall	2021/09	28	326
		2021/10	31	321
		2021/11	31	228
	2021 Winter	2021/12	35	264
		2022/1	46	338
	2022 Spring	2022/3	45	371
		2022/4	41	335
		2022/5	31	282
	2022 Summer	2022/6	24	253
		2022/7	33	295
		2022/8	31	416
	2022 Fall	2022/9	36	324
		2022/10	34	336
		2022/11	34	244
	2022 Winter	2022/12	25	225
	2023 Spring	2023/3	39	420
		2023/4	33	298
		2023/5	33	306
	2023 Summer	2023/06	33	366
		2023/07	26	295
		2023/08	51	332
	2023 Fall	11209	36	335
		11210	34	310
		11211	41	415

Table 3.1.1-4.3 Species and Number of Coastal Birds (Non-selected Route in Sihu)

Quarter			Species	Number
EIA	2016 Winter	2016/02	44	7,354
	2016 Spring	2016/03	29	931
		2016/04	24	2,231
		2016/05	12	413
	2016 Summer	2016/07	20	719
		2016/08	31	1,191
	2016 Fall	2016/09	31	1,875
		2016/10	32	1,393
		2016/11	42	5,874
Construction	2020 Spring	2020/03	39	349
		2020/04	33	292
		2020/05	33	277
	2020 Summer	2020/06	43	341
		2020/07	35	274
		2020/08	37	325
	2020 Fall	2020/09	35	245
		2020/10	38	274
		2020/11	43	315
	2020 Winter	2020/12	39	296
	2021 Spring	2021/03	41	422
		2021/04	35	273
		2021/05	37	271
	2021 Summer	2021/06	40	374
		2021/07	42	404
		2021/08	40	405
	2021 Fall	2021/09	40	306
		2021/10	40	358
		2021/11	37	386
	2021 Winter	2021/12	44	440
		2022/1	52	370
	2022 Spring	2022/3	51	421
		2022/4	44	383
		2022/5	41	296
	2022 Summer	2022/6	30	261
		2022/7	32	271
		2022/8	38	385
	2022 Fall	2022/9	45	389
		2022/10	40	386
		2022/11	36	227
	2022 Winter	2022/12	39	354
	2023 Spring	2023/3	47	426
		2023/4	39	402
		2023/5	38	260
	2023 Summer	2023/06	37	313
		2023/07	29	306
		2023/08	45	360
	2023 Fall	11209	41	363
		11210	40	348
		11211	41	422

iii Difference in Coastal Birds and Offshore Birds

During the offshore construction monitoring phase (March 2020 to November 2023, 15 quarters), 14 orders, 40 families and 126 species were recorded in coastal bird surveys; 6 orders, 12 families and 24 species were recorded in offshore bird surveys (excluding wild pigeons).

1. Coastal bird

The survey route covers fish farms, grassland and trees that shelter many non-water birds. Therefore, besides water birds, more Passeriformes and Columbiformes were documented.

2. Bird species only documented in the offshore surveys

9 species, Bridled tern, Tern, Roseate tern, Stercorarius pomarinus, Long-tailed jaeger, Red-necked phalarope, Bulwer's Petrel, Streaked Shearwater and Wedge-tailed shearwater were only documented in the offshore surveys. 5 species, Stercorarius pomarinus, Long-tailed jaeger, Bulwer's Petrel, Streaked Shearwater and Wedge-tailed shearwater were sea birds and are usually seen in the marine area around Taiwan.

3. Bird species documented in both coastal and offshore surveys

13 species were documented in both surveys, including Kentish plover, Little tern, Greater crested tern, Caspian tern, Whiskered tern, Black-headed gull, European herring gull, Barn swallow, Light-vented bulbul, Great cormorant, Cattle egret, Great egret and Osprey. The 11 water birds species (species that exclude Barn swallow and Light-vented bulbul) are mostly migratory birds. They were documented mainly during the migratory seasons and may possibly flying through the wind farm.

III. Marine Ecology

A landing point for submarine cable was not yet decided during the EIS period, as such the intertidal survey points at the time were distributed across the coast of Yunlin County. This is different from the 50m perimeter on both sides of the landing point for the submarine cable in the current environment monitoring plans. In addition, 12 sampling stations were applied for marine ecological survey during the EIS period, but as the wind farm area has been reduced, during the EIS review period, the original allocation of sampling stations are no longer apropos of the principles in conducting uniform sampling of marine water quality in the wind farm area finally approved. Monitoring stations will be reallocated according to the environmental monitoring plan (as shown in Figure 3.1.1-1). Previous marine ecological survey results can only be compared with nearby stations in EIS period.

i Intertidal Ecology

In the same quarter of the EIS period (May 2016), 14 orders, 25 families and 36 species were recorded. 81~178 individuals were recorded in each station. In comparison with EIS period surveys, 18 species were newly recorded this quarter, including: *Gaetice depressus*, *Helicana doerjesi*, *Gelasimus borealis*, *Ocypode ceratophthalmus*, *Austruca lactea*, *Austruca perplexa*, *Ocypode stimpsoni*, *Mictyris brevidactylus*, *Diogenes nitidimanus*, *Pagurus angustus*, *Austinogebia edulis*, *Echinolittorina trochoides*, *Perna viridis*, *Plicarcularia pullus*, *Mactra veneriformis*, *Chaetopterus* spp., *Natica gualteriana and Platorchestia* spp. 17 species were not recorded in this quarter, including *Metaplax elegans*, *Hemigrapsus penicillatus*, *Uca lactea*, *Uca arcuata*, *Grapsus albolineatus*, *Thalamita crenata*, *Thalamita danae*, Gen. sp. (Alpheidae), *Nerita undata*, *Notoacmea concinna*, *Cellana toreuma*, *Phasianella solida*, *Modiolus metcalfei*, *Saccostrea mordax*, *Laternula anatina*, *Cyclina sinensis* and *Pyramidella sulcata*. The dominant species for both surveys are Amphibalanus amphitrite.

As per historical records, 26-43 coastal bird species were documented during the monitoring of offshore construction phase in each quarter, and the number is between 868-1,794 individuals. For intertidal ecology, least species and individuals were recorded in 2023 Q1. The tide level of the low tide in this survey was relatively higher among the historical surveys, so less species were observed. Therefore, less species were documented in this quarter. The species and number of intertidal organisms in the historical surveys are listed as Figure 3.1.1-5 and Table 3.1.1-5.

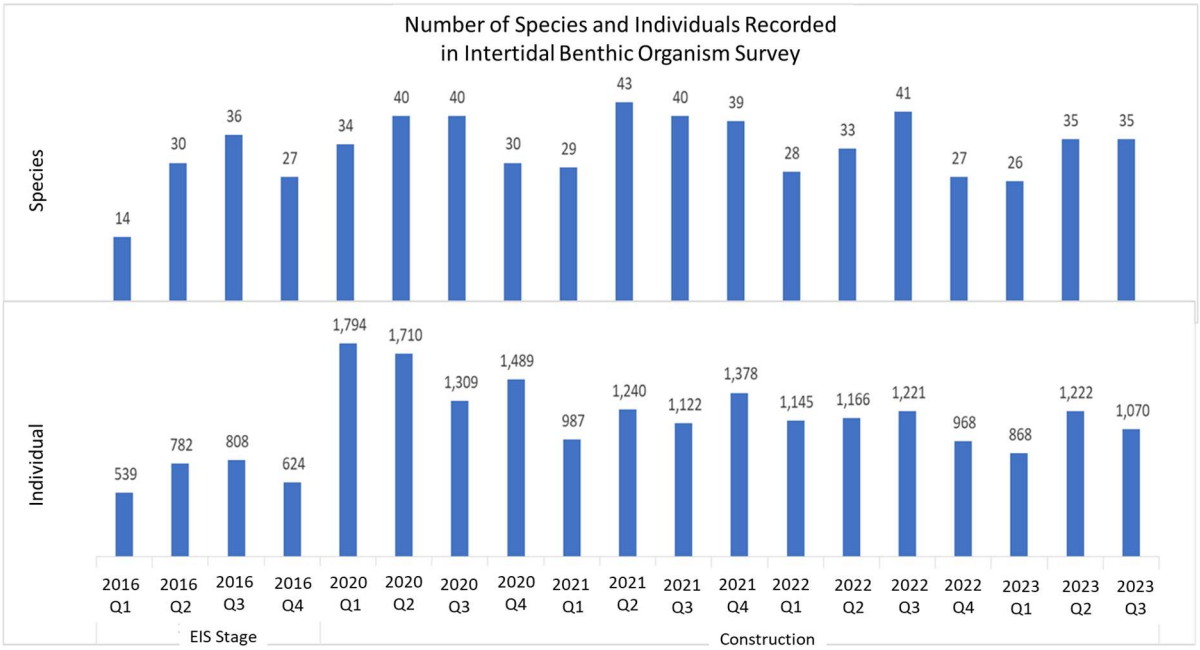


Figure 3.1.1-5 Species and Number of Intertidal Ecology Recorded in the Historical Surveys

Table 3.1.1-5 Species and Number of Intertidal Benthic Organism

Quarter		Species	Number
EIA	2016 Q1	14	539
	2016 Q2	30	782
	2016 Q3	36	808
	2016 Q4	27	624
Construction	2020 Q1	34	1,794
	2020 Q2	40	1,710
	2020 Q3	40	1,309
	2020 Q4	30	1,489
	2021 Q1	29	987
	2021 Q2	43	1,240
	2021 Q3	40	1,122
	2021 Q4	39	1,378
	2022 Q1	28	1,145
	2022 Q2	33	1,166
	2022 Q3	41	1,221
	2022 Q4	27	968
	2023 Q1	25	847
	2023 Q2	35	1,222
	2023 Q3	35	1,070

ii Phytoplankton

In the same quarter of the EIS period (May 2016), 4 phylum, 38 genus and 42 species were recorded. Abundance in each station/water layer is between 45,265~288,288 Cells/L, the dominant species was *Chaetoceros* spp. of the Chaetoceros genus. 58 genre were newly recorded in this quarter, including *Alexandrium*, *Archaeperidinium*, *Diplopsalis*, *Gonyaulax*, *Coronosphaera*, *Reticulofenestra*, *Scyphosphaera*, *Umbilicosphaera*, *Achnanthes*, *Actinoptychus*, *Asterolampra*, *Bacillaria*, *Caloneis*, *Cerataulus*, *Cocconeis*, *Cyclotella*, *Cymbella*, *Diatoma*, *Ditylum*, *Fallacia*, *Fogedia*, *Gomphonema*, *Grammatophora*, *Gyrosigma*, *Halamphora*, *Hantzschia*, *Haslea*, *Hemiaulus*, *Lithodesmium*, *Luticola*, *Lyrella*, *Mastogloia*, *Melosira*, *Moreneis*, *Orthoseira*, *Paralia*, *Pinnularia*, *Plagiogramma*, *Plagiolemma*, *Plagiotropis*, *Planktoniella*, *Podosira*, *Psammodictyon*, *Pseudictyota*, *Rhoicosphenia*, *Rhopalodia*, *Roperia*, *Sellaphora*, *Stephanopyxis*, *Surirella*, *Thalassiothrix*, *Trachyneis*, *Tryblionella*, *Trybliоptychus*, *Ulnaria*, *Dictyocha*, *Distephanus* and *Scenedesmus*. 9 genre were not recorded in this quarter, including *Eutreptia*, *Gymnodinium*, *Peridinium*, *Protoperidinium*, *Bacteriastrum*, *Cerataulina*, *Helicotheca*, *Meuniera* and *Striatella*. More algae were recorded in this quarter comparing to EIS stage.

As per the historical data in the offshore construction phase, the species of phytoplankton is between 84-192; and the number is between 62,108-1,653,260 Cells/L. The surveys in 2023 Q2 recorded the most abundance of phytoplankton, and 2020 Q3 recorded the least.

The monitoring results showed that the abundance in the EIS stage was higher than that in the construction stage. This may be due to the fact that phytoplankton are susceptible to short-term environmental changes such as currents, water, nutrients, water temperature and sunlight. This results in a greater variation in abundance, so the survey results may vary significantly from site to site. In order to ensure this tendency is normal, we compared the survey data of other wind farms, and same tendency is found. Also, the survey result shows that the abundance of phytoplankton increased obviously compared to last quarter. The species and number of Phytoplankton in the historical surveys are listed as Figure 3.1.1-6 and Table 3.1.1-6.

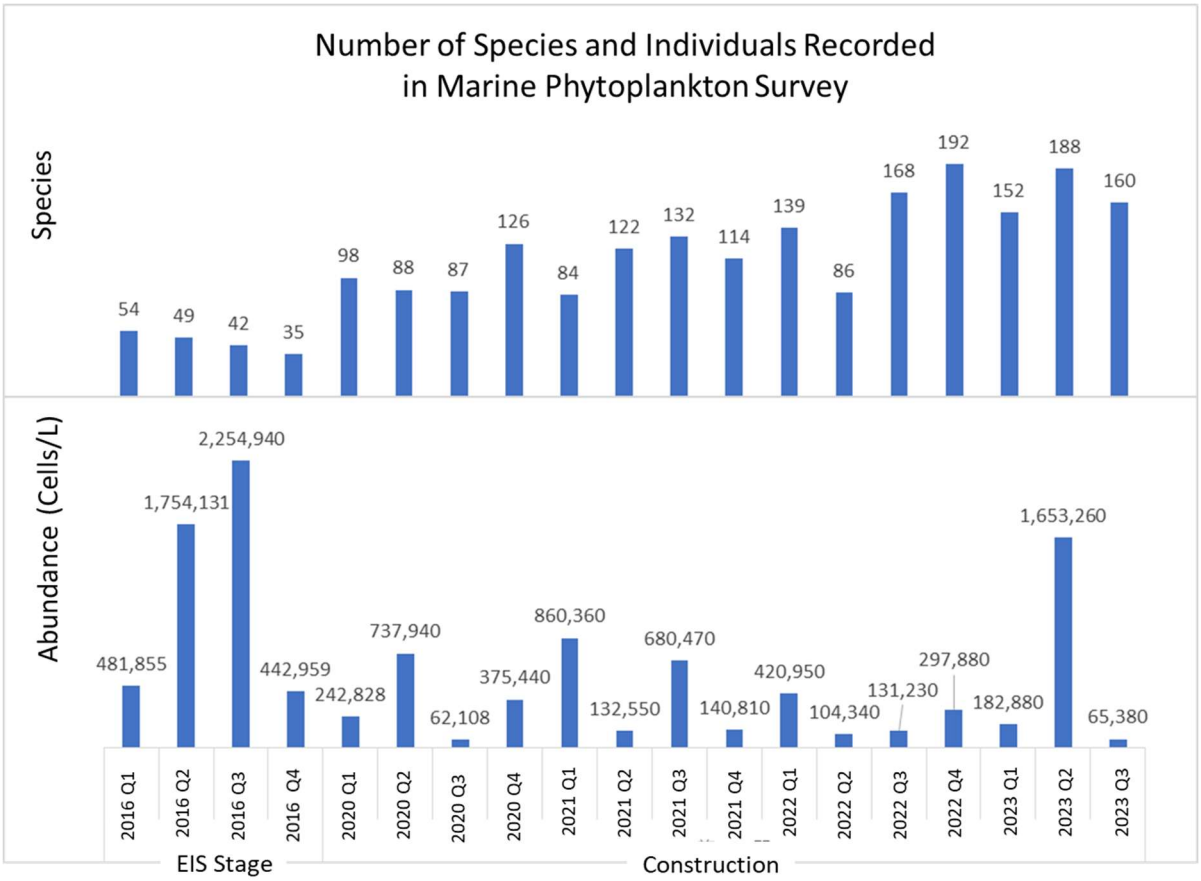


Figure 3.1.1-6 Species and Number of Phytoplankton Recorded in the Historical Surveys

Table 3.1.1-6 Species and Number of Phytoplankton in the Marine Area

Quarter		Species	Number
EIA	2016 Q1	54	481,855
	2016 Q2	49	1,754,131
	2016 Q3	42	2,254,940
	2016 Q4	35	442,959
Construction	2020 Q1	98	242,828
	2020 Q2	88	737,940
	2020 Q3	87	62,108
	2020 Q4	126	375,440
	2021 Q1	84	860,360
	2021 Q2	122	132,550
	2021 Q3	132	680,470
	2021 Q4	114	140,810
	2022 Q1	139	420,950
	2022 Q2	86	104,340
	2022 Q3	168	131,230
	2022 Q4	192	297,880
	2023 Q1	152	182,880
	2023 Q2	188	1,653,260
	2023 Q3	160	65,380

iii Zooplankton

In the same quarter of the EIS period (August 2016), 8 phylum and 22 genres

were recorded. Abundance in each station/water layer is between 3,684,322~ 77,028,189 Cells/L. In comparison with EIS period surveys, 1 Genre were newly recorded this quarter, which is Bryozoan larvae. 11 genres including Foraminifera, Radiolaria, Barnacle larvae, Copepoda nauplius, Harpacticoida, Luciferidae, Mysidacea, Polychaeta, Bivalve larvae, Appendicularia and Fish larvae were not recorded in this survey. The monitoring results showed that the abundance in the EIS stage was higher than that in the construction stage. This may be due to the fact that Phytoplankton are susceptible to short-term environmental changes such as currents, water, nutrients, water temperature and sunlight. This results in a greater variation in abundance, so the survey results may vary significantly from site to site. In order to ensure this tendency is normal, we compared the survey data of other wind farms, and same tendency is found. Species recorded in both quarters are normal zooplankton, with Caudata and Calanoida as the dominant species.

As per the historical data in the offshore construction phase, the genre of Zooplankton is between 12~36; and the number is between 130,645~12,920,105 inds./1,000 m^3. The surveys in 2020 Q2 recorded the most abundance of zooplankton, and 2023 Q3 recorded the least abundance of zooplankton. The species and number of Phytoplankton in the historical surveys are listed as Figure 3.1.1-7 and Table 3.1.1-7.

iv Benthic Organism in the Marine Area

In the same quarter of the EIS period (August 2016), 7 orders, 10 families and 12 species were recorded. 2-4 individuals were recorded in each station. In comparison with EIS period surveys, 10 species were newly recorded this quarter, including: *Diogenes nitidimanus*, Gen. spp. (Diogenidae), *Parapenaeopsis tenella*, *Metapenaeus ensis*, Gen. sp. (Sergestidae), Gen. spp. (Crangonidae), Gen. spp. (Pasiphaeidae), Gen. spp. (Tellinidae), spionidae and *Sinaechinocyamus mai*. 11 species that were not recorded this quarter include: *Diogenes* spp., *Parapenaeopsis hardwickii*, Matuta victor, *Rhinoclavis sinensis*, *Cerithidea cingulata*, Pitarina sulfureum, *Meretrix lusoria*, Gomphina aequilatera, Gen. spp. (Nereididae), *Amphiura* spp. And *Solea ovata*. The dominant species in the EIA stage is *Diogenes* spp., and there is no dominant species in in this quarter.

As per the historical data in the offshore construction phase, the species of Benthic Organism is between 4-12; and the abundance is between 7-50. The surveys in 2020 summer recorded the most abundance of Benthic Organism. Benthic Organism only move within a certain area, and the sampling area of bottom trawling is limited. The species and number of Benthic Organism in the historical surveys are listed as Figure 3.1.1-8 and Table 3.1.1-8.

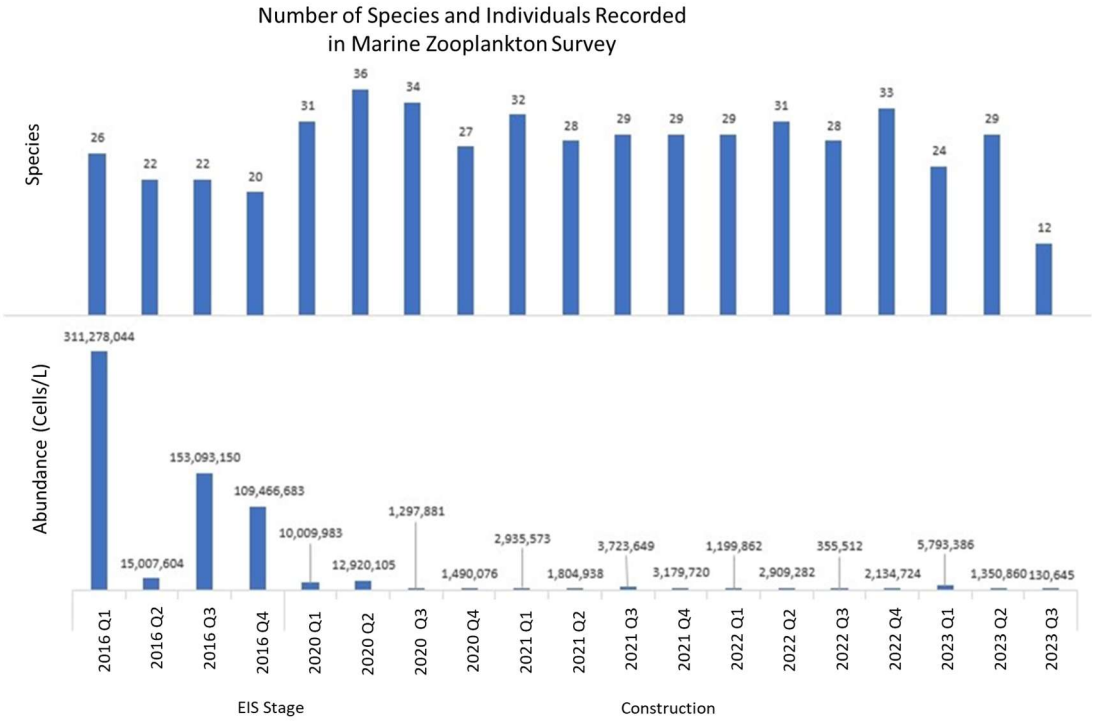


Figure 3.1.1-7 Species and Number of Zooplankton Recorded in the Historical Surveys

Table 3.1.1-7 Species and Number of Zooplankton in the Marine Area

Quarter		Species	Number
EIA	2016 Q1	26	311,278,044
	2016 Q2	22	15,007,604
	2016 Q3	22	153,093,150
	2016 Q4	20	109,466,683
Construction	2020 Q1	31	10,009,983
	2020 Q2	36	12,920,105
	2020 Q3	34	1,297,881
	2020 Q4	27	1,490,076
	2021 Q1	32	2,935,573
	2021 Q2	28	1,804,938
	2021 Q3	29	3,723,649
	2021 Q4	29	3,179,720
	2022 Q1	29	1,199,862
	2022 Q2	31	2,909,282
	2022 Q3	28	355,512
	2022 Q4	33	2,134,724
	2023 Q1	24	5,793,386
	2023 Q2	29	1,350,860
	2023 Q3	12	130,645

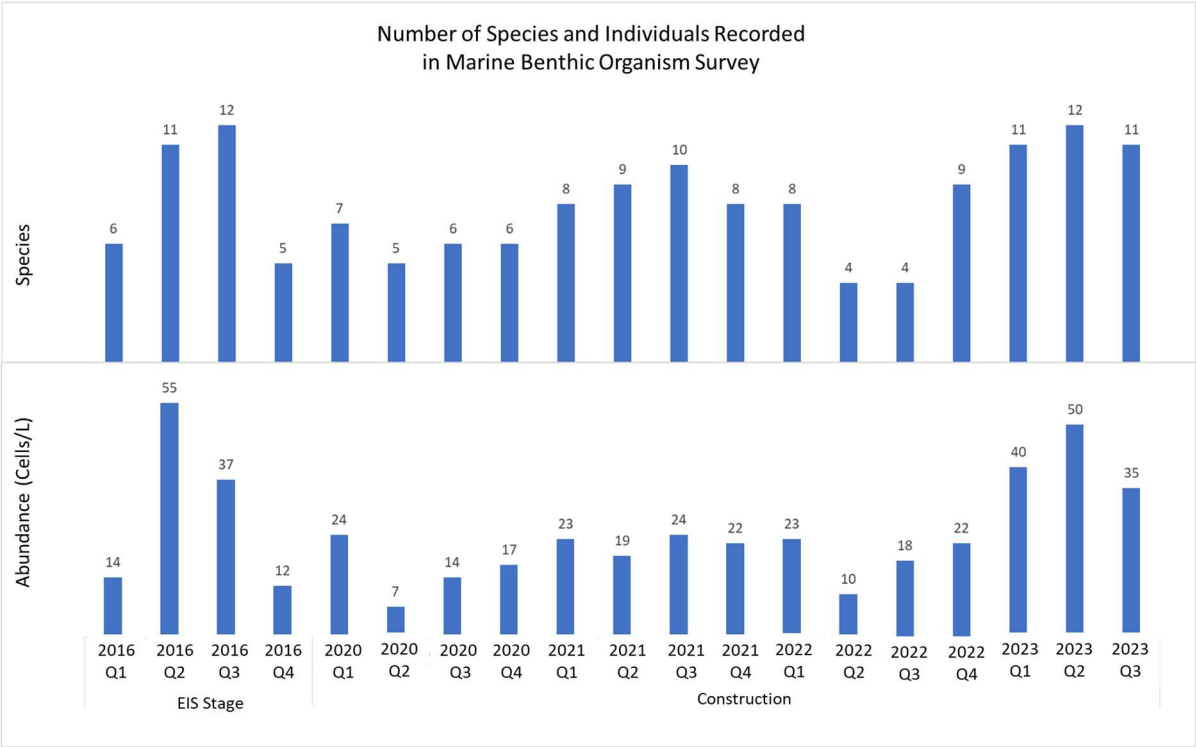


Figure 3.1.1-8 Species and Number of Benthic Organism Recorded in the Historical Surveys

Table 3.1.1-8 Species and Number of Benthic Organism in the Marine Area

Quarter		Species	Number
EIA	2016 Q1	6	14
	2016 Q2	11	55
	2016 Q3	12	37
	2016 Q4	5	12
Construction	2020 Q1	7	24
	2020 Q2	5	7
	2020 Q3	6	14
	2020 Q4	6	17
	2021 Q1	8	23
	2021 Q2	9	19
	2021 Q3	10	24
	2021 Q4	8	22
	2022 Q1	8	23
	2022 Q2	4	10
	2022 Q3	4	18
	2022 Q4	9	22
	2023 Q1	11	40
	2023 Q2	12	50
	2023 Q3	11	35

v Fish

1. Adult Fish

To prevent overlapping with the "Important Habitat of Chinese White Dolphin," the monitoring locations in the EIS stage and in current stage are different (as shown in Figure 3.1.1-9). As the survey vessel has to keep a safety distance with the working vessels and the turbine foundations, the length of the net and time of capturing are different in the construction phase. The length of the net has been changed from 1,200m to 300m, and the time of capturing has been changed from 3 hours to 1 hour. Also, the sampling water depth is changed from 19m, 18m, 23m (T1, T2, T3) in 2016 to 18m, 22m, 15m (T1, T2, T3) in 2020. These variations have led to the difference in the survey results in the EIS stage and in the offshore construction phase.

The species composition of fish in Taiwan marine area has obvious seasonal change. Therefore, if we want to compare the species composition or changes in the dominant species in different years, we should compare the catches of the same season in different years. This survey result can be compared to the fall surveys in 3 years, which are fall in 2016 (application phase), 2020 to 2021 (construction phase).

As the sampling condition from 2020 to 2022 are identical, the survey results can be compared in a precise manner (Table 3.1.1-9). 220 individuals were recorded in 2016 fall, 20 individuals in 2020 fall, 63 individuals in 2021 fall, and 58 in 2022 fall. in this quarter, 54 individuals were recorded. The individuals caught in this survey is less than that caught in fall 2016. It is mainly caused by the length of the net (300m), which is shorter than that used in 2016 (1200m). Also, the net stayed in the water for only 1 hour, which is shorter than the 2016 survey (3 hours). Therefore, the on-effort is only 1/12 (1/4x1/3) of the 2016 survey. 1/12 of the harvest in 2016 220 individuals) is 18.3 individuals. It is inferred that more individuals were caught in this year (54 individuals) comparing to 2016 fall (18.3 individuals).

Comparing to surveys in 2016, 2020, 2021, and 2022, 4 species were added into this quarter, including *Ilisha melastoma*, *Netuma thalassina*, *Johnius borneensis* and *Johnius trewavasae*. 26 species in EIS stage were not recorded in this quarter, including *Rhinobatos schlegelii*, *Platyrhina tangi*, *Telatrygon zugei*, *Ilisha elongata*, *Saurida elongata*, *Saurida undosquamis*, *Trachinocephalus myops*, *Grammoplites scaber*, *Sillago sihama*, *Alectis ciliaris*, *Megalaspis cordyla*, *Leiognathus equulus*, *Secutor ruconius*, *Lobotes surinamensis*, *Plectorhinchus flavomaculatus*, *Pomadasys maculatus*, *Polydactylus sextarius*, *Atrobucca nibe*, *Johnius belangerii*, *Johnius distinctus*, *Drepane punctata*, *Ephippus orbis*,

Trichiurus japonicus, *Pseudorhombus elevatus*, *Paraplagusia blochii* and *Ostracion cubicus*. The individuals caught in this survey is less than that caught in fall 2016. It is mainly caused by the length of the net (300m), which is shorter than that used in 2016 (1,200m). Also, the net stayed in the water for only 1 hour, which is shorter than the 2016 survey (3 hours). The other cause contributing to this phenomenon is the sampling location. The sampling location in 2016 was closer to shore, while the location in this survey is further. Generally speaking, density of fish population is higher in the marine area closer to shore.

In addition, regarding fish species recorded in this quarter were also recorded in 2016, 2020, 2021 and 2022 fall, no species were recorded in the fall of all 5 years. Commonly seen non-seasonal travelling species such as *Pennahia pawak and Cynoglossus bilineatus* were recorded in 3 of the 5 years (2021, 2022 and 2023). This shows that in the same season, the species composition of fish in the Yunlin OWF is similar even in different years. In addition to factors such as season and month, interviews with local fishers also suggested that fish catch and species captured are affected by marine conditions such as temperature, tides, sea currents, and turbidity.

Overall, the fish species recorded in the wind farm area since the beginning of the EIA survey and up to this season were mostly economic fish common in the west coast of Taiwan, indicating that the changes in fish catches and species composition are closely related to local fishery economic activities. Therefore, long-term studies on the species composition and fish catch in the sample area are needed to understand the changes in local fishery resources and their possible causes.

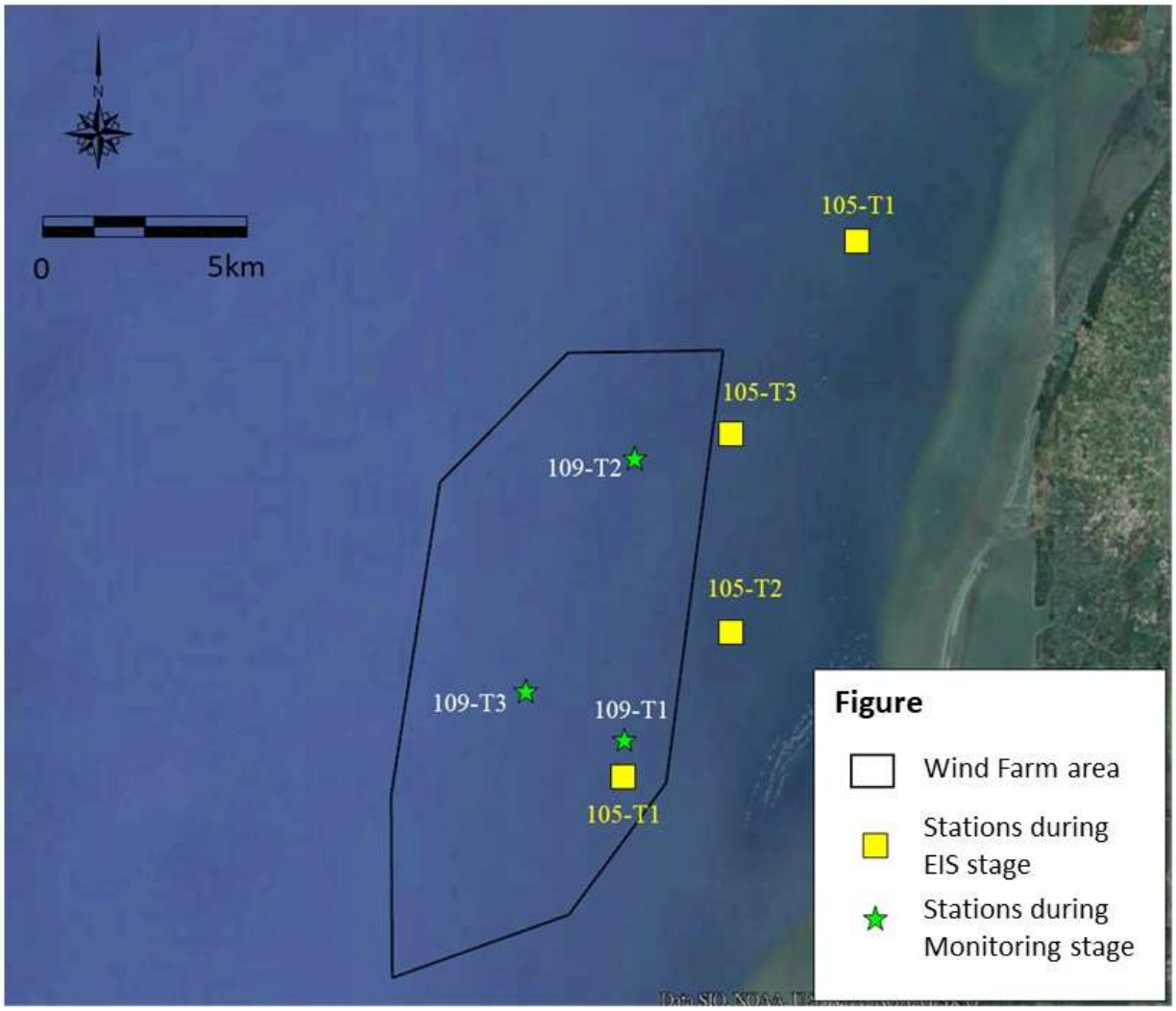


Figure 3.1.1-9 Sampling Stations of Fish Survey in the EIS stage and the Construction phase

Table 3.1.1-9 Historical Surveys on Adult Fish (Fall)

Sampling Date			2016.08.14	2020.10.26	2021.9.18	2022.9.9	2023.9.7
Family Name	Scientific Name	Chinese Name	No.	No.	No.	No.	No.
Carcharhinidae	*Scoliodon laticaudus*	寬尾斜齒鯊	3				1
Rhinobatidae	*Rhinobatos schlegelii*	薛氏琵琶鱏			1		
Platyrhinidae	*Platyrhina tangi*	湯氏黃點鯆		1			
Dasyatidae	*Neotrygon kuhlii*	古氏新魟			19	1	2
Dasyatidae	*Telatrygon zugei*	尖嘴魟			2	6	
Pristigasteridae	*Ilisha elongata*	長鰳	1				
Pristigasteridae	*Ilisha melastoma*	黑口鰳					2
Engraulidae	*Thryssa hamiltonii*	漢氏稜鯷		1			2
Ariidae	*Arius maculatus*	斑海鯰		1		2	21
Ariidae	*Netuma thalassina*	大頭多齒海鯰					8
Synodontidae	*Saurida elongata*	長體蛇鯔			6	7	
Synodontidae	*Saurida undosquamis*	花斑蛇鯔			1		
Synodontidae	*Trachinocephalus myops*	準大頭狗母魚			1		
Platycephalidae	*Grammoplites scaber*	橫帶棘線牛尾魚			1		
Sillaginidae	*Sillago sihama*	多鱗沙鮻	11				
Carangidae	*Alectis ciliaris*	絲鯵			1		
Carangidae	*Megalaspis cordyla*	大甲鯵	6				
Leiognathidae	*Leiognathus equulus*	短棘鰏	1				
Leiognathidae	*Secutor ruconius*	仰口鰏	2				
Lobotidae	*Lobotes surinamensis*	松鯛		1			
Haemulidae	*Plectorhinchus flavomaculatus*	黃點胡椒鯛				1	
Haemulidae	*Pomadasys kaakan*	星雞魚			1	3	2
Haemulidae	*Pomadasys maculatus*	斑雞魚				2	
Polynemidae	*Polydactylus sextarius*	六指多指馬鮁	5				
Sciaenidae	*Atrobucca nibe*	黑鮸	26				
Sciaenidae	*Chrysochir aureus*	黃金鰭鮸	3			2	1
Sciaenidae	*Johnius belangerii*	皮氏叫姑魚				1	
Sciaenidae	*Johnius borneensis*	婆羅洲叫姑魚					2
Sciaenidae	*Johnius distinctus*	鱗鰭叫姑魚	104	8			
Sciaenidae	*Johnius trewavasae*	屈氏叫姑魚					1
Sciaenidae	*Pennahia macrocephalus*	大頭白姑魚	42	7			3
Sciaenidae	*Pennahia pawak*	斑鰭白姑魚		1	3	11	5
Drepaneidae	*Drepane punctata*	斑點雞籠鯧				9	
Uranoscopidae	*Ichthyscopus lebeck*	披肩騰				1	1
Ephippidae	*Ephippus orbis*	圓白鯧	2		8	2	
Trichiuridae	*Trichiurus japonicus*	日本帶魚	7				

Paralichthyidae	*Pseudorhombus elevatus*	高體斑鮃			1	3	
Cynoglossidae	*Cynoglossus bilineatus*	雙線舌鰨	7		16	7	3
Cynoglossidae	*Paraplagusia blochii*	布氏鬚鰨			1		
Ostraciidae	*Ostracion cubicus*	粒突箱鮏			1		
Individual			220	20	63	58	54
Species			14	7	15	15	14

2. Fish Egg and Fish Larva

Fall survey result during the construction phase is compared to the winter survey conducted in the EIS stage. As there were 12 survey stations in the EIS stage but only 5 in this survey, the sampling frequency of the two surveys are very different. Therefore, only the species with higher abundance were compared, as shown in Table 3.1.1-10.

In August 2016 (fall), 2,830 eggs and 75 fish larva were collected. For the composition, 13 family and 15 genre and 1 unknown genre were identified (total abundance 10,556 egg/100 m^3), with *Secutor ruconius* as the dominant species, followed by *Sillago japonica*, *Kumococius rodericensis*, *Cynoglossus bilineatus*, Engraulidae sp.. For fish larva, 7 families and 10 genre were identified (total abundance 44 ind./100 m^3). Abundance of each species were under 3 ind./100 m^3, with Megalonibea fusca as the dominant species, followed by *Sardinella jussieu*, *Omobranchus* sp., *Ambassis* sp..

In November 2020 (fall), 241 eggs and 16 fish larva were collected. For the composition, 7 family and 9 genre were identified (total abundance 232 egg/100 m^3), with *Chrysochir aureus* as the dominant species, followed by *Pomadasys kaakan*, Mugilidae sp.. For fish larva, 5 families and 5 genre were identified (total abundance 22 ind./100 m^3), with *Scolopsis taenioptera* as the dominant species, followed by *Chrysochir aureus*.

In September 2021 (fall), 3,159 eggs and no fish larva were collected. For the egg composition, 7 family and 7 genre were identified (total abundance 7,909 egg/100 m^3), with *Encrasicholina heteroloba* as the dominant species, followed by *Epinephelus coioides* and *Secutor ruconius*. For the fish larva composition, no species were identified.

In November 2022 (fall), 11 eggs and 6 fish larva were collected. For the composition, 4 family and 4 genre were identified (total abundance 12 egg/100 m^3), with *Chrysochir aureus* as the dominant species, followed by Ophichthidae sp.. For fish larva, 2 families and 2 genre were identified (total abundance 6 ind./100 $m^{3)}$, with *Chrysochir aureus*, *Pelates quadrilineatus* as the dominant species.

Regarding fish egg, comparing to the EIS stage, the number and species decreases. For fish larva, comparing to the EIS stage, the abundance increases, and the species decrease. However, this may be owing to the decrease of sampling stations or sampling bias. Like plankton, fish eggs and fish larva that lack swim ability only float in water and usually distribute in patch. Therefore, the harvests vary a lot. The population structure and spatial distribution of fish larva may be impacted shortly by the local sea currents, upwelling current or unstable sea currents. Also, as the surveys were only

carried out for 4 years, the trend may be temporary and needs to be confirmed by longer monitoring. If compare the fall survey result in the EIA stage and construction phase, for fish egg, no species were observed in 5 years, *Chrysochir aureus* were observed in 3 years except for 2021 and 2023. For fish larva, no species is observed in all the 4 years. It is also possible that due to relatively low capture rates, there are no species that have been repeatedly caught.

Table 3.1.1-10 Composition and Abundance of Fish Egg in Historical Fall Surveys (1/2)

Taxa\Station	Chinese Name	2016/08	2020/11	2021/09	2022/11	2023/10
Carangidae						
Megalaspis cordyla	大甲鰺			3		
Clupeidae						
Sardinella gibbosa	隆背小沙丁魚	2				
Coryphaenidae						
Coryphaena hippurus	鬼頭刀			3	1	
Cynoglossidae						
Cynoglossidae sp.	舌鰨科					297
Cynoglossus bilineatus	雙線舌鰨	243				
Paraplagusia blochii	布氏鬚鰨		1			
Engraulidae						
Encrasicholina heteroloba	異葉半稜鯷			2,989	1	
Engraulidae sp.	鯷科 sp.	156	19			
Stolephorus commersonnii	康氏側帶小公魚					38
Thryssa dussumieri	杜氏稜鯷	17				
Ephippidae						
Ephippus orbis	圓白鯧	4				
Haemulidae						
Pomadasys kaakan	星雞魚		58			
Leiognathidae						
Secutor ruconius	仰口鯧	8,100		2,378		
Mugilidae						
Moolgarda perusii	佩氏莫鯔			33		
Mugilidae sp.	鯔科		53			
Ophichthidae						
Brachysomophis cirrocheilos	鬚唇短體蛇鰻		2			
Ophichthidae sp.	蛇鰻科				3	
Platycephalidae						
Kumococius rodericensis	凹鰭牛尾魚	619				
Scatophagidae						
Scatophagus argus	金錢魚	2				
Sciaenidae						
Chrysochir aureus	黃金鰭鰔	13	94		7	
Nibea albiflora	黃姑魚		1			

Table 3.1.1-10 Composition and Abundance of Fish Egg in Historical Fall Surveys (2/2)

Taxa\Station	Chinese Name	2016/08	2020/11	2021/09	2022/11	2023/10
Pennahia macrocephalus	大頭白姑魚		1			156
Pennahia pawak	斑鰭白姑魚	66				
Serranidae						
Epinephelus coioides	點帶石斑魚			2,496		
Sillaginidae						
Sillago japonica	日本沙鮻	1,280				
Soleidae						
Liachirus melanospilos	黑斑圓鱗鰨			7		
Pardachirus pavoninus	眼斑豹鰨	17				
Synodontidae						
Trachinocephalus myops	準大頭狗母魚	2				
Trichiuridae						
Lepturacanthus savala	沙帶魚	7				
Trichiurus sp.	帶魚屬		3			
Uranoscopidae						
Ichthyscopus lebeck	披肩騰	38				
Abundance (egg/100m^3)		**10,566**	**232**	**7,909**	**12**	**491**
Taxa		13	7	7	4	3
Genre		15	9	7	4	3
Actual eggs collected		**2,830**	**241**	**3,159**	**11**	**489**

Table 3.1.1-11 Composition and Abundance of Fish Larva in Historical Fall Surveys (1/2)

Taxa\Station	Chinese name	2016/08	2020/11	2021/09	2022/11	2023/10
Ambassidae						
Ambassis sp.	雙邊魚屬	7				
Blenniidae						
Omobranchus sp.	肩鰓鰌屬	8				
Clupeidae						
Clupeidae sp.	鯡科					2
Sardinella jussieu	裘氏小沙丁魚	16				
Cynoglossidae						
Cynoglossus bilineatus	雙線舌鰨	5				
Paraplagusia blochii	布氏鬚鰨	1				
Gobiidae						
Gobiidae sp.	鰕虎科		2			
Gonostomatidae						
Gonostomatidae sp.	鑽光魚科	2				
Leiognathidae						
Gazza minuta	小牙鯧		1			
Secutor insidiator	長吻仰口鯧		1			
Secutor ruconius	仰口鯧	1				
Leiognathidae						
Photopectoralis aureus	金黃光胸鯧					2
Nemipteridae						
Scolopsis taenioptera	條紋眶棘鱸		12			
Sciaenidae						
Chrysochir aureus	黃金鰭鰄		3		5	
Sillaginidae						
Sillago aeolus	星沙鮻	4				
Sillago sp.	沙鮻屬	42				
Terapontidae						
Pelates quadrilineatus	四帶牙鯻		3		1	
Trichiuridae						
Trichiurus sp.	帶魚屬					1
Abundance (egg/100m^3)		**86**	**22**	**0**	**6**	**5**
Taxa		7	5	0	2	3
Genre		10	5	0	2	3
Actual larva collected		**75**	**16**	**0**	**6**	**3**

Table 3.1.1-11 Composition and Abundance of Fish Larva in Historical Fall Surveys (2/2)

Taxa\Station	Chinese name	2016/08	2020/11	2021/09	2022/11	2023/10
Ambassidae						
Ambassis sp.	雙邊魚屬	7				
Blenniidae						
Omobranchus sp.	肩鰓鰌屬	8				
Clupeidae						
Clupeidae sp.	鯡科					2
Sardinella jussieu	裘氏小沙丁魚	16				
Cynoglossidae						
Cynoglossus bilineatus	雙線舌鰨	5				
Paraplagusia blochii	布氏鬚鰨	1				
Gobiidae						
Gobiidae sp.	鰕虎科		2			
Gonostomatidae						
Gonostomatidae sp.	鑽光魚科	2				
Leiognathidae						
Gazza minuta	小牙鯧		1			
Secutor insidiator	長吻仰口鯧		1			
Secutor ruconius	仰口鯧	1				
Leiognathidae						
Photopectoralis aureus	金黃光胸鯧					2
Nemipteridae						
Scolopsis taenioptera	條紋眶棘鱸		12			
Sciaenidae						
Chrysochir aureus	黃金鰭鰄		3		5	
Sillaginidae						
Sillago aeolus	星沙鮻	4				
Sillago sp.	沙鮻屬	42				
Terapontidae						
Pelates quadrilineatus	四帶牙鯚		3		1	
Trichiuridae						
Trichiurus sp.	帶魚屬					1
Abundance (ind./100m^3)		**86**	**22**	**0**	**6**	**5**
Taxa		7	5	0	2	3
Genre		10	5	0	2	3
Actual eggs collected		**75**	**16**	**0**	**6**	**3**

vi Underwater filming

The Project has begun using ROVs for underwater photographic surveys since May 2022. To date, four survey batches have been conducted. The results of these surveys are detailed in Table 3.1.1-12, which are explained as follows:

In the first survey (May 10-12 2022, 9 WTG), 2 orders, 12 families and 16 species were recorded. The species resource table is shown as Table 3.1.1-12. A group of Stromateidae swam by in the first survey, therefore YUN64 recorded the most Stromateidae. In the first survey, no species were recorded in YUN38, 1-9 species were recorded in the rest of the locations. YUN37 and YUN53 recorded the most species.

In the second survey (August 17-18 2022, 6 WTG), 2 orders, 2 families and 2 species were recorded. The species resource table is shown as Table 3.1.1-12. No species were recorded in YUN49, YUN57, YUN78 and YUN79, 1 species were recorded in the rest of the locations.

In the third survey (February 12-13 2023, 5 WTG), 2 orders, 2 families and 2 species were recorded. The species resource table is shown as Table 3.1.1-12. No species were recorded in YUN50, YUN71, YUN 73 and YUN77. 2 species were recorded at the bottom layer of YUN63.

In the fourth survey (September 19-20 2023, 5 WTG), 1 orders, 4 families and 4 species were recorded. The species resource table is shown as Table 3.1.1-12. 1 *Plectorhinchus cinctus*, 6 *Abudefduf vaigiensis*, 8 *Pterocaesio digramma* were observed in the middle layer and 1 Apogonidae were observed in the bottom layer of YUN20; 7 *Pterocaesio digramma* were observed in the middle layer of YUN62. No species were recorded in YUN12, YUN21 and YUN74.

Conclusion: During construction activities such as pile driving and wind turbine assembly, frequent human and vessel activities may cause the wildlife to move away from the area, which is considered a normal behavioral response. Once the pioneer species establish stable growth, they will gradually attract fish for foraging. During the operation phase, the artificial reef effect is expected to increase both the number and variety of fish species around the wind turbine foundations compared to the areas outside the wind farm. Various human activities have the potential to affect the ecosystem; therefore, long-term monitoring is required to understand the impact of the Project on the ecological environment.

Table 3.1.1-12 Fish Species Composition in the Historical Underwater Filming Surveys

Foundation NO.				YUN37			YUN38			YUN42			YUN51			YUN52			YUN53			YUN64			YUN76			YUN80			YUN43			YUN45			YUN49			YUN57			YUN78			YUN79		
Foundation Completed on				2021.07.10			2021.02.21			2021.06.16			2021.05.04			2021.05.29			2020.11.19			2021.06.09			2021.03.16			2021.02.07			2021.09.18			2021.10.05			2021.09.22			2021.09.30			2021.06.25			2021.06.13		
Underwater filming conducted on				2022.05.10-12																											2022.08.17-18																
Order	Family	Chinese name	Scientific name	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom	le	middle	bottom
Decapoda	Penaeidae	對蝦科	Gen. sp. (Penaeidae)																										5																			
	Haemulidae	石鱸科	Gen. sp. (Haemulidae)		1						1			2		2				2																												
		花尾胡椒鯛	Plectorhinchus cinctus		1																																										
		密點少棘胡椒鯛	Diagramma pictum		7																													1													
	Sphyraenidae	金梭魚科	Gen. sp. (Sphyraenidae)		5															1						2																					
Perciformes	Nemipteridae	伏氏眶棘鱸	*Scolopsis vosmeri*		2												1			1																												
	Siganidae	褐臭肚魚	*Siganus fuscescens*		2																																									
	Lutjanidae	勒氏笛鯛	*Lutjanus russellii*		1																																									
	Pomacentridae	藍黑新雀鯛	*Neopomacentrus cyanomos*																	1																												
	Labridae	裂唇魚	*Labroides dimidiatus*																	3																												
		藍豬齒魚	*Choerodon azurio*													2				1																												

Table 3.1.1-12 Fish Species Composition in the Historical Underwater Filming Surveys

Foundation NO.				YUN37		YUN38		YUN42		YUN51		YUN52		YUN53		YUN64		YUN76		YUN80		YUN43		YUN45		YUN49		YUN57		YUN78		YUN79	
Foundation Completed on				2021.07.10		2021.02.21		2021.06.16		2021.05.04		2021.05.29		2020.11.19		2021.06.09		2021.03.16		2021.02.07		2021.09.18		2021.10.05		2021.09.22		2021.09.30		2021.06.25		2021.06.13	
Underwater filming conducted on				2022.05.10-12																		2022.08.17-18									
Order	Family	Chinese name	Scientific name	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom
Perciformes	Serranidae	鮨科	Gen. sp. (Serranidae)						1						1																		
		點帶石斑魚	*Epinephelus coioides*		1				2						2																		
	Stromateidae	鯧科	Gen. sp. (Stromateidae)													6	10																
	Blenniidae	鰨科	Gen. sp. (Blenniidae)		1																												
	Gobiidae	鰕虎科	Gen. sp. (Gobiidae)										4		2																		
Myliobatiformes	Dasyatidae	魟	*Hemitrygon* sp.																				1										
Total				0	21	0	0	0	4	0	2	4	5	0	14	6	10	0	2	0	5	0	1	0	1	0	0	0	0	0	0	0	0

Table 3.1.1-12 Fish Species Composition in the Historical Underwater Filming Surveys

Foundation NO.				YUN50		YUN63		YUN71		YUN73		YUN77	
Foundation Completed on				2022.08.08		2022.07.02		2022.09.18		2022.08.16		2022.10.03	
Underwater filming conducted on				2023.02.12-13									
Order	Family	Chinese name	Scientific name	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom
Perciformes	Haemulidae	花尾胡椒鯛	*Plectorhinchus cinctus*				2						
	Oplegnathidae	條石鯛	*Oplegnathus fasciatus*				1						
Total				0	0	0	3	0	0	0	0	0	0

Table 3.1.1-12 Fish Species Composition in the Historical Underwater Filming Surveys

Foundation NO.				YUN12		YUN20		YUN21		YUN62		YUN74	
Foundation Completed on				2023.05.22		2023.05.14		2023.05.05		2023.05.18		2022.08.23	
Underwater filming conducted on				2023.09.19~20									
Order	Family	Chinese name	Scientific name	middle	bottom	middle	bottom	middle	bottom	middle	bottom	middle	bottom
Perciformes	Haemulidae	花尾胡椒鯛	*Plectorhinchus cinctus*			1							
	Pomacentridae	條紋豆娘魚	*Abudefduf vaigiensis*			6							
	Caesionidae	雙帶鱗鰭烏尾鮗	*Pterocaesio digramma*			8				7			
	Apogonidae	天竺鯛科	Gen. sp. (Apogonidae)				1						
Total						15	1			7			

IV. Underwater Acoustic Survey of Cetacean Ecology

The underwater acoustic survey was conducted from March 2019 to February 2020, and the survey was completed in all seasons of the year before the offshore construction in March 2020. Survey result in every quarter is shown as Table 3.1.1-13 to Table 3.1.1-14 and Figure 3.1.1-10. Day/night distribution of the detections is shown as Figure 3.1.1-11 and Figure 3.1.1-12. The analysis is as follows.

i Number detected in each station/quarter

1. Whistles

In terms of the overall annual analysis in 2018, Q2 (June to August) had more detections, followed by Q1 (March to May) and Q4 (December to February), while Q3 (September to November) had relatively fewer whistle detections. It is inferred that cetacean activities are relatively higher in summer, followed by spring and winter.

If we compare the whistles at each location, YW-1, YW-2, and YW-3 have more whistles, while YW-4 and YW-5 have the least whistles, indicating that there are more cetaceans in the north than in the south, and more near shore than far shore.

In terms of the overall annual analysis in 2019, Q2 (June to August) had more detections, followed by Q1 (March to May) and Q4 (December to February), while Q3 (September to November) had relatively fewer whistle detections. It is inferred that cetacean activities are relatively higher in summer, followed by spring and winter.

If we compare the whistles at each location, YW-1, YW-2, and YW-3 have more whistles, while YW-4 and YW-5 have the least whistles, indicating that there are more cetaceans in the north than in the south, and more near shore than far shore.

In terms of the overall annual analysis in 2020, Q4 (December to February) had more detections, followed by Q3 (September to November), while no whistle was detected in Q1 (March to May) and Q2 (June to August). It is inferred that cetacean activities are relatively higher in winter, followed by fall.

If we compare the whistles at each location, YW-4 have more whistles, followed by YW-3 and YW-1, while YW-2, have the least whistles, indicating that there are more cetaceans in the center and the north parts, and more in the far shore than near shore.

In terms of the overall annual analysis in 2021, YW-3 and YW-4 have more whistles. YW-4 had more detection, and YW-1, YW-2 and YW-5 had no detection. In Q2 (June-August), whistles were detected in YW-3, but no whistles were detected in YW-1, YW-2, YW-4 and YW-5. In Q3 (September-November), no whistle is detected in YW-1 to YW-5. This indicates that there are more cetaceans in the middle of the wind farm, and more near shore than far shore.

In terms of the overall annual analysis in 2022, Q4 (December-February) had more detection, followed by Q1 (March-May) and Q2 (June-August). No whistles were detected in Q3 (September-November). This indicates that winter may have the highest cetacean activities.

If we compare the whistles at each location, YW-4 and YW-5 have more whistles, while YW-3 has the least whistles, indicating that there are more cetaceans in the center part, and more in the far shore than near shore.

In 2023 Q1 (March-May), no whistle was detected. In Q2 (June-August), whistles were detected in YW-1, No whistles were detected in YW-2 to YW-5. In Q3 (September-November), whistles were detected in YW-5, No whistles were detected in YW-1 to YW-4.

2. Clicks

In terms of the overall analysis results in 2019, Q4 (December to February) had more detections, followed by Q1 (March to May), while Q2 and Q3 (June to November) had fewer detections of clicks. From the detection data, it seems that the cetaceans are mainly foraging or surveying the environment in these waters in winter. If we compare the surveying points, YW-3 has the most clicks and YW-4 has the least clicks.

In terms of the overall analysis results in 2020, Q4 (December to February) had more detections, followed by Q1 (March to May), while Q2 and Q3 (June to November) had fewer detections of clicks. From the detection data, it seems that the cetaceans are mainly foraging or surveying the environment in these waters in winter. If we compare the surveying points, YW-3 has the most clicks and YW-4 has the least clicks.

In terms of the overall analysis results in 2021, Q4 (December to February) had more detections, followed by Q2 (June to August) and Q3 (September to November), while Q1(March to May) had fewer detections of clicks. From the detection data, it seems that the cetaceans are mainly foraging or surveying the environment in these waters in winter, followed by summer. If we compare the surveying points, YW-4 has the most clicks, followed by YW-5, YW-3, while YW-1 has the least clicks.

In terms of the overall analysis results in 2022, Q4 (December to February) had more detections, followed by Q2 (June to August), while Q3 (September to November) had fewer detections of clicks. From the detection data, it seems that the cetaceans are mainly foraging or surveying the environment in these waters in winter, followed by summer. If we compare the surveying points, YW-4 has the most clicks, while YW-1 has the least clicks. This indicates that winter may have the highest cetacean activities, including foraging and environmental detection.

In 2023 Q1 (March-May), no click was detected. In Q2 (June-August), no whistles were detected in all stations. In Q3 (September to November). In Q3 (September-November), clicks were detected in YW-5, No whistles were detected in YW-1 to YW-4.

ii Day/night distribution

1. Whistles

In 2019, for YW-1 in the four quarters, the whistles mainly distributed in the daytime; for YW-2 station in Q1 and Q2, whistles were mainly detected the daytime; for the Q3 and Q4, no obvious day and night distribution is observed. For YW-3, 4, 5, no obvious day and night difference is found for whistle distribution.

In 2020, for YW-1 in Q1 and Q2, no obvious day and night difference is found for whistle distribution and the whistles mainly distributed in the daytime in Q3 and Q4. No obvious difference in daytime/nighttime was found in YW-2, 4, 5. Whistles detected in YW-3 were mostly in daytime.

In 2021, no obvious difference in daytime/nighttime was found in Q1 and Q2. Whistles were detected in YW-3 in Q3, and the whistles mainly distributed in nighttime. In Q4, whistles were detected in YW-1 to YW-4, and the whistles mainly distributed in nighttime. No obvious daytime/nighttime distribution is found.

In 2022, no obvious difference in daytime/nighttime was found in Q2-Q3, in Q1, whistles were detected mostly in daytime in YW-3. In Q4, whistles were detected in all stations, and the whistles were detected mostly in nighttime. No obvious difference in daytime/nighttime was found.

In 2023 Q1 (March-May), no whistle was detected. No obvious difference in daytime/nighttime was found. In Q2 (June-August), whistles were detected in YW-1, No whistles were detected in YW-2 to YW-5. Most whistles were recorded in nighttime. In Q3 (September-November), whistles were detected in YW-5, No whistles were detected in YW-1 to YW-4. No obvious difference in daytime/nighttime was found.

2. Clicks

In 2019, for YW-1, 3, 4, 5, no obvious difference in day and night distribution was observed; clicks in YW-2 mainly distributed in the daytime. The number of detections in the rest of the season is low, no obvious difference in day and night distribution is observed.

In 2020, YW-1 to YW-5 did not observe obvious difference in day and night distribution.

In 2021, no click is detected in YW-1 to YW-5 in Q1. In Q2, no obvious daytime/nighttime distribution is found from YW-1 to YW-3, and clicks in YW-4 and YW-5 mostly distributed in daytime. In Q3 2021, clicks were detected in YW-3 but not in YW-1, YW-2, YW-4 and YW-5. No obvious daytime/nighttime distribution is found.

In 2022 Q3, no click was detected in all stations. In Q4, clicks were detected in all stations and mostly in nighttime. No obvious daytime/nighttime distribution is found.

In 2023 Q1 (March-May), no click was detected. In Q2 (June-August), no clicks were detected in all stations. In Q3 (September-November), clicks were detected in YW-5, No whistles were detected in YW-1 to YW-4. No obvious difference in daytime/nighttime was found.

Based on four years of cetacean underwater acoustic data, YW-3 is probably the area where cetaceans are more active or foraging more often than other areas. YW-4, on the other hand, is the least active area. Cetaceans travelling around (whistles) mainly in the spring and summer, and they forage (clicks) more frequent in the winter. The daytime and nighttime activities of cetaceans are mainly during the daytime between 06:00 and 18:00, and there is no significant difference of distribution regarding tidal change.

Table 3.1.1-13 Whistle Detection in each Quarter (1/3)

Quarter		Station	Detected days	Detected times	Hours recorded/ per day Ratio [note 1]	Contact rate [note2] (time/hour)
1 year before offshore construction	2019 Q1	YW-1	14.00	8,045	6.208	54.00
		YW-2		1,675	3.208	21.76
		YW-3		7,064	9.792	30.06
		YW-4		116	0.792	6.10
		YW-5		2,652	4.583	24.11
	2019 Q2	YW-1	14.00	19,974	8.625	96.49
		YW-2	8.71	11,828	3.625	135.95
		YW-3	14.00	14,776	9.958	61.83
		YW-4	7.96	5,873	3.875	63.15
		YW-5	14.00	14,685	7.708	79.38
	2019 Q3	YW-1	14.00	2,011	8.708	9.62
		YW-2	10.08	1,594	5.458	12.17
		YW-3	14.00	5,431	9.000	25.14
		YW-4	7.67	1,716	1.583	45.17
		YW-5	14.00	516	2.125	10.12
	2019 Q4	YW-1	15.00	2,418	8.625	11.68
		YW-2		13,560	14.208	39.77
		YW-3		8,369	3.458	100.84
		YW-4		1,739	6.083	11.91
		YW-5		3,538	3.708	39.76

Note 1: “Hours recorded/ per day Ratio” refers to hours with whistles detected/24 hours.

Note 2: “Contact rate” refers to whistles detected/ hours with whistles detected.

Table 3.1.1-13 Whistle Detection in each Quarter (2/3)

Quarter		Station	Detected days	Detected times	Hours recorded/ per day Ratio [note 1]	Contact rate [note2] (time/hour)
offshore construction	2020 Q1	YW-1	14.00	3,569	3.583	41.50
		YW-2		1,600	4.917	13.56
		YW-3		854	3.000	11.86
		YW-4		1,044	3.458	12.58
		YW-5		2,089	3.875	22.46
	2020 Q2	YW-1	14.00	1,931	6.790	11.85
		YW-2		1,951	8.130	10.00
		YW-3		1,010	5.920	7.11
		YW-4		1,144	6.330	7.53
		YW-5		1,249	6.040	8.62
	2020 Q3	YW-1	1.00	6	0.125	2.00
		YW-2		5	0.083	2.50
		YW-3		5	0.167	1.25
		YW-4		8	0.250	1.33
		YW-5		6	0.167	1.50
	2020 Q4	YW-1	1.00	74	0.167	18.50
		YW-2		30	0.458	2.73
		YW-3		10	0.292	1.43
		YW-4		5	0.125	1.67
		YW-5	6.79	752	1.625	19.28
	2021 Q1	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2021Q2	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2021Q3	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		51	0.042	50.60
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2021 Q4	YW-1	1.00	42	0.042	41.67
		YW-2		20	0.042	19.84
		YW-3		4	0.042	3.97
		YW-4		283	0.042	280.75
		YW-5		0	0.000	0.00

Note 1: “Hours recorded/ per day Ratio” refers to hours with whistles detected/24 hours.
Note 2: “Contact rate” refers to whistles detected/ hours with whistles detected.

Table 3.1.1-13 Whistle Detection in each Quarter (3/3)

Quarter		Station	Detected days	Detected times	Hours recorded/ per day Ratio [note 1]	Contact rate [note2] (time/hour)
offshore construction	2022 Q1	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		27	0.042	27.00
		YW-4		5322	0.125	1,774.00
		YW-5		0	0.000	0.00
	2022 Q2	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		9	0.042	9.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2022 Q3	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2022 Q4	YW-1	1.00	488	0.458	44.36
		YW-2		50	0.125	16.67
		YW-3		141	0.208	28.20
		YW-4		123	0.250	20.50
		YW-5		871	0.167	217.75
	2023 Q1	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2023 Q2	YW-1	1.00	539	0.208	107.80
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2023 Q3	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		1	1.000	0.04

Note 1: “Hours recorded/ per day Ratio” refers to hours with whistles detected/24 hours.
Note 2: “Contact rate” refers to whistles detected/ hours with whistles detected.

Table 3.1.1-14 Clicks Detection in each Quarter

Quarter		Station	Detected days	Detected times	Hours recorded/ per day Ratio [note 1]	Contact rate [note2] (times/hour)
1 year before offshore construction	108 Q1	YW-1	14.00	2,447	10.500	9.71
		YW-2		3,122	2.000	65.04
		YW-3		6,235	10.208	25.45
		YW-4		357	4.167	3.57
		YW-5		7,456	12.958	23.97
	108 Q2	YW-1	14.00	366	4.667	3.27
		YW-2	8.71	236	2.875	3.41
		YW-3	14.00	3,770	9.833	15.98
		YW-4	7.96	35	0.875	1.66
		YW-5	14.00	69	1.750	1.64
	108 Q3	YW-1	14.00	1,108	7.042	6.56
		YW-2	10.08	121	1.958	2.57
		YW-3	14.00	1,445	8.625	6.98
		YW-4	7.67	237	0.917	10.77
		YW-5	14.00	434	3.667	4.93
	108 Q4	YW-1	15.00	620	1.333	19.38
		YW-2		3,940	9.417	17.43
		YW-3		17,053	5.208	136.43
		YW-4		1,099	2.708	16.91
		YW-5		8,241	12.167	28.22
offshore construction	2020 Q1	YW-1	14.00	123	2.625	1.95
		YW-2		2,927	9.792	12.46
		YW-3		524	4.417	4.94
		YW-4		121	2.330	2.16
		YW-5		0	0.000	0.00
	2020 Q2	YW-1	14.00	77	1.670	1.92
		YW-2		44	1.170	1.57
		YW-3		101	1.500	2.81
		YW-4		51	0.670	3.17
		YW-5		273	2.630	4.33
	2020 Q3	YW-1	1.00	0	0.000	0.00
		YW-2		4	0.083	2.00
		YW-3		0	0.000	0.00
		YW-4		6	0.130	2.00
		YW-5		0	0.000	0.00
	2020 Q4	YW-1	1.00	32	0.042	32.00
		YW-2		12	0.042	12.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5	6.79	886	0.292	126.43

Note 1: “Hours recorded/ per day Ratio” refers to hours with whistles detected/24 hours.
Note 2: “Contact rate” refers to whistles detected/ hours with whistles detected.

Table 3.1.1-14 Clicks Detection in each Quarter (Cont.)

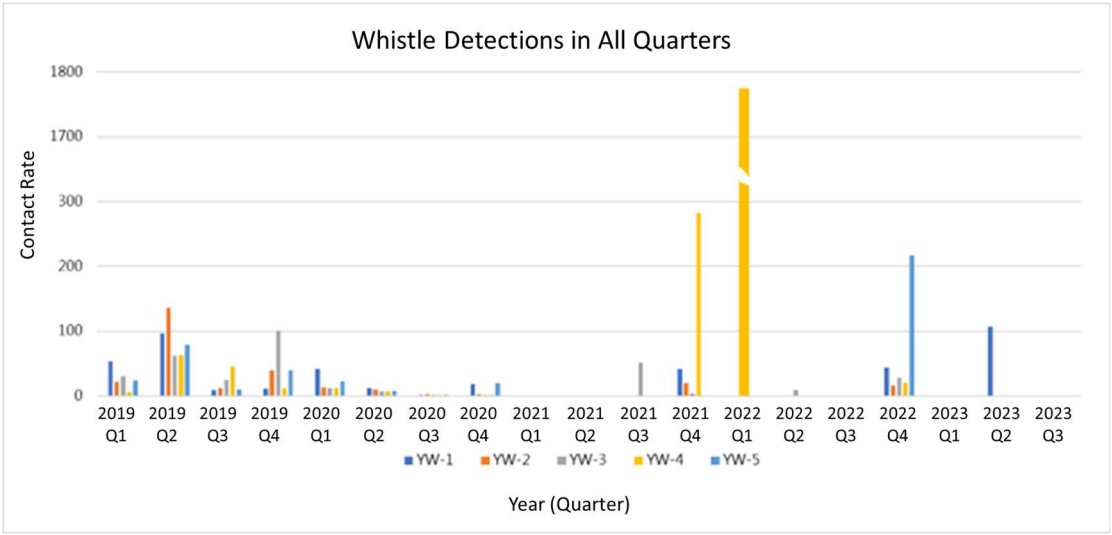
Quarter		Station	Detected days	Detected times	Hours recorded/ per day Ratio [note 1]	Contact rate [note2] (times/hour)
offshore construction	2021 Q1	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2021 Q2	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		180	0.083	7.50
		YW-5		165	0.083	6.88
	2021 Q3	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		109	0.042	108.13
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2021 Q4	YW-1	1.00	12	0.042	12.0
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		348	0.042	348.0
		YW-5		0	0.000	0.00
	2022 Q1	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		23	0.042	23
		YW-4		93	0.042	93
		YW-5		0	0.000	0.00
	2022 Q2	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		259	0.042	259
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2022 Q3	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2022 Q4	YW-1	1.00	69	0.083	34.50
		YW-2		236	0.042	236.00
		YW-3		93	0.042	93.00
		YW-4		326	0.125	108.67
		YW-5		297	0.083	148.50

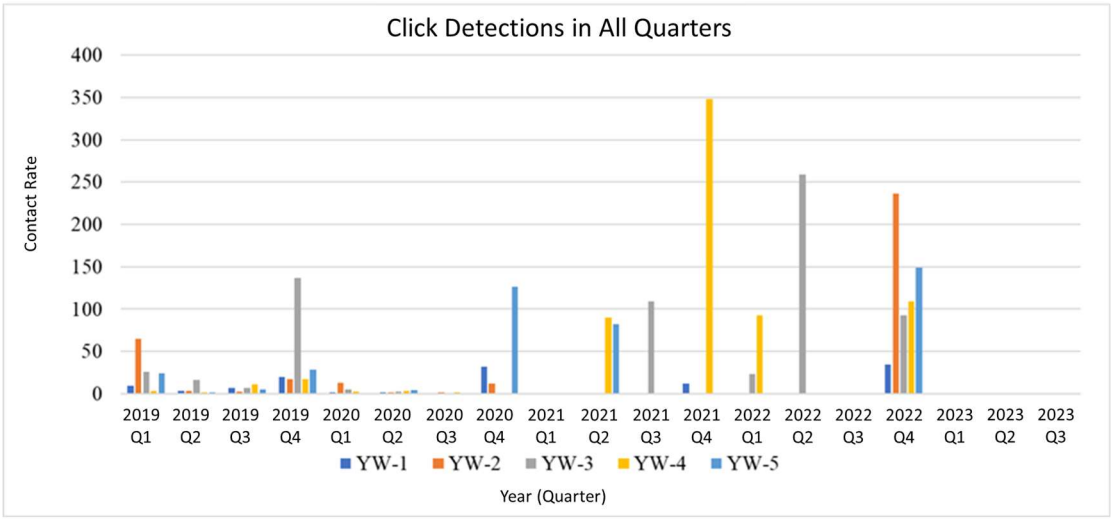
Note 1: “Hours recorded/ per day Ratio” refers to hours with whistles detected/24 hours.
Note 2: “Contact rate” refers to whistles detected/ hours with whistles detected.

Table 3.1.1-14 Clicks Detection in each Quarter(Cont.)

Quarter		Station	Detected days	Detected times	Hours recorded/ per day Ratio [note 1]	Contact rate [note2] (times/hour)
offshore construction	2023Q1	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2023Q2	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		0	0.000	0.00
	2023Q3	YW-1	1.00	0	0.000	0.00
		YW-2		0	0.000	0.00
		YW-3		0	0.000	0.00
		YW-4		0	0.000	0.00
		YW-5		1	1.000	0.04

Note 1: “Hours recorded/ per day Ratio” refers to hours with whistles detected/24 hours.
Note 2: “Contact rate” refers to whistles detected/ hours with whistles detected.





"Contact rate" indicates total detection times/ (valid days×24 hours)

Figure 3.1.1-10 Statics of Whistles and Clicks in Historical Surveys

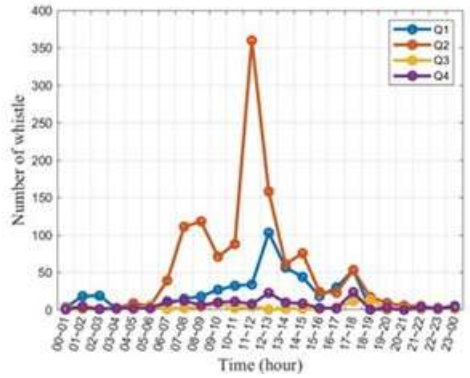
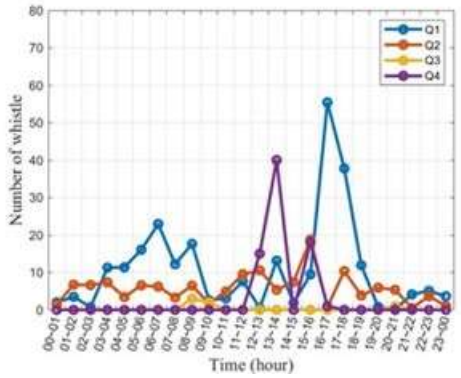
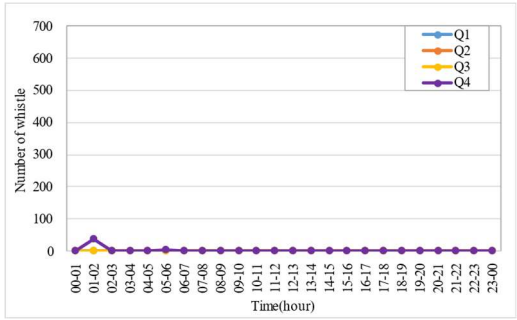
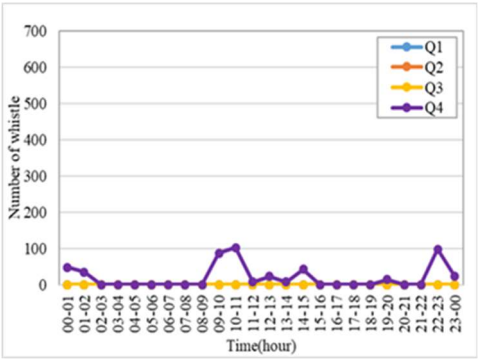
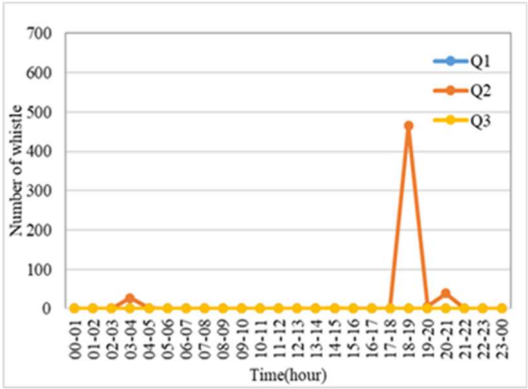
Whistles			
	2019	2020	2021
YW-1			
	2022	2023	
			

Figure 3.1.1-11 Hourly Distribution of Whistle Detections in Historical Surveys(1/5)

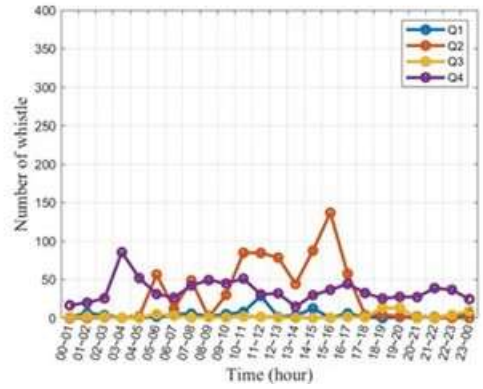
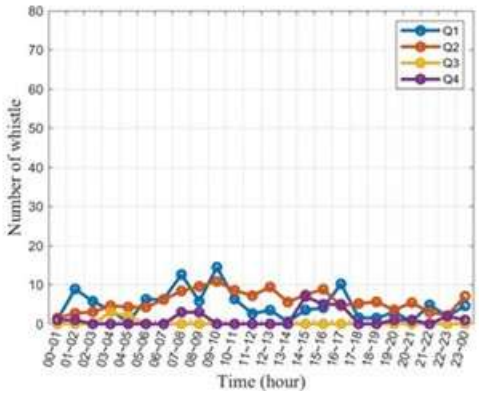
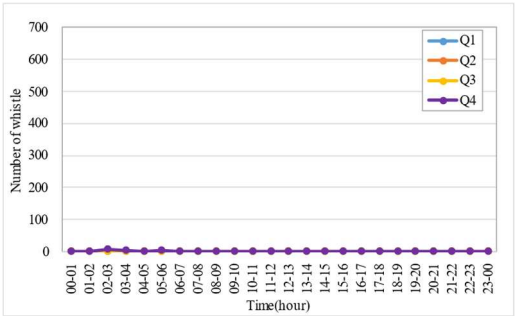
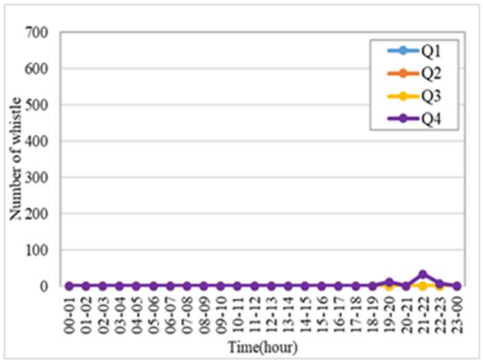
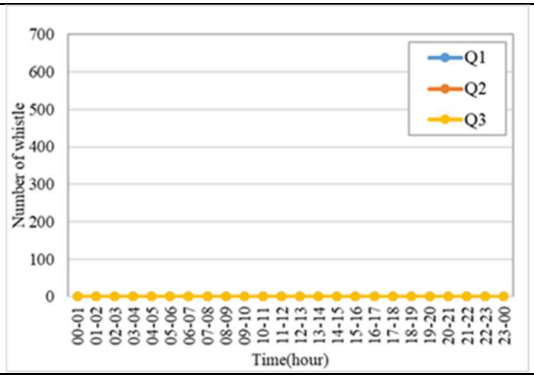
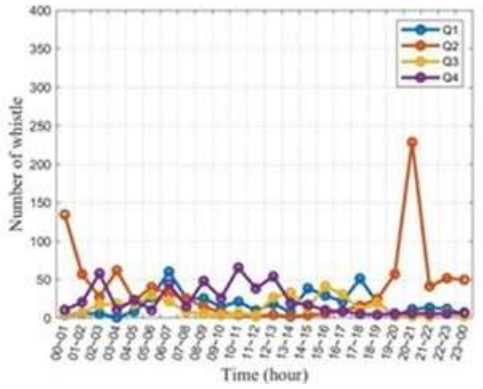
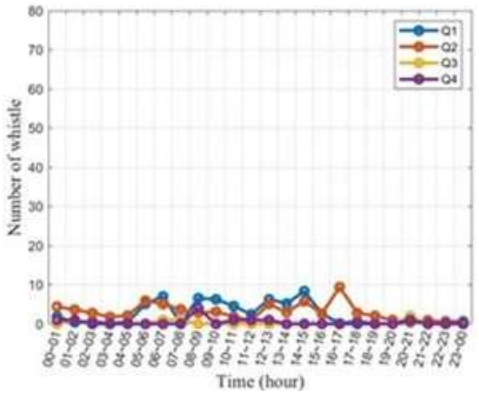
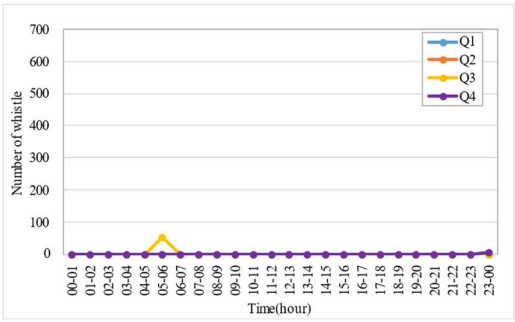
Whistles			
	2019	2020	2021
YW-2			
	2022	2023	
			

Figure 3.1.1-11 Hourly Distribution of Whistle Detections in Historical Surveys(2/5)

<table>
<tr><th colspan="4">Whistles</th></tr>
<tr><th></th><th>2019</th><th>2020</th><th>2021</th></tr>
<tr><td rowspan="2">YW-3</td><td> 
</td><td> 
</td><td> 
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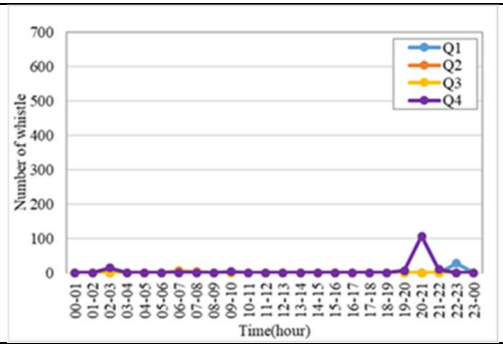
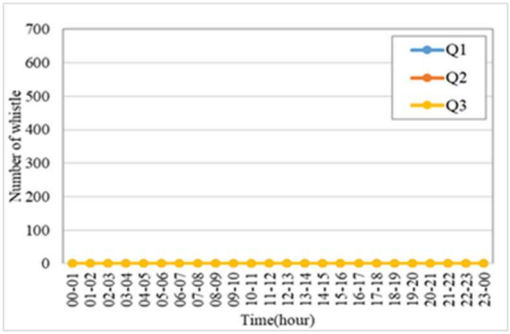
<tr><td>2022</td><td>2023</td><td></td></tr>
<tr><td></td><td> 
</td><td> 
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Figure 3.1.1-11 Hourly Distribution of Whistle Detections in Historical Surveys(3/5)

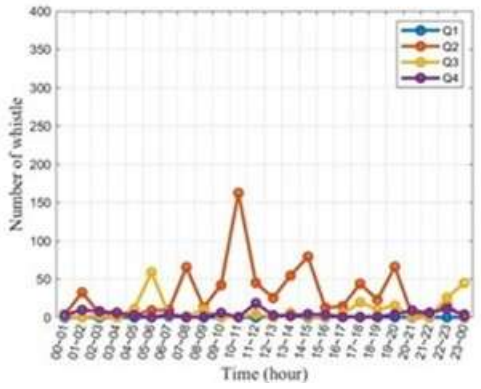
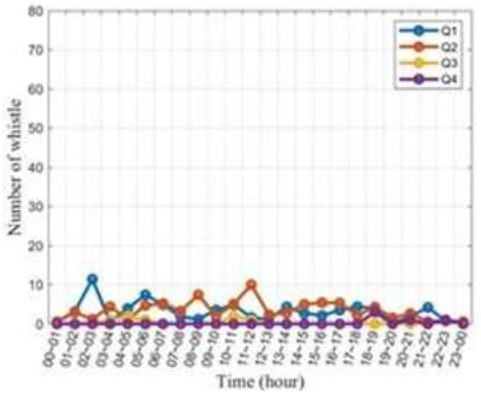
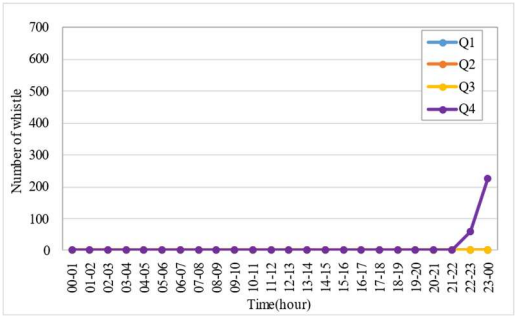
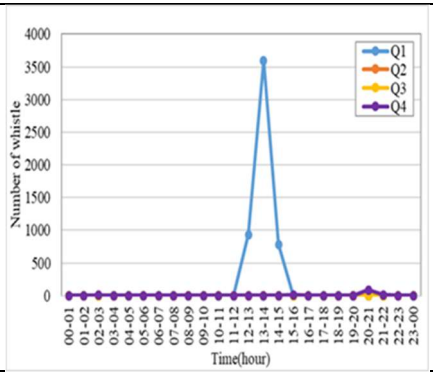
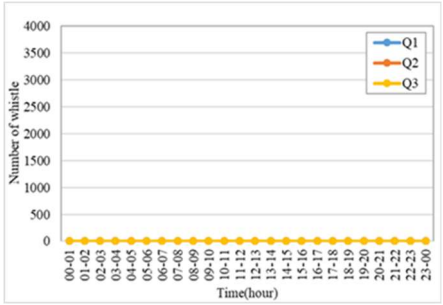
Whistles			
	2019	2020	2021
YW-4			
	2022	2023	
			

Figure 3.1.1-11 Hourly Distribution of Whistle Detections in Historical Surveys(4/5)

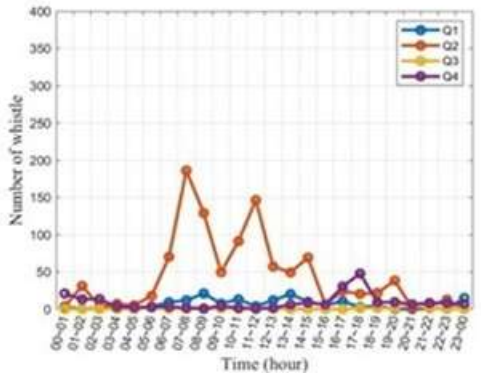
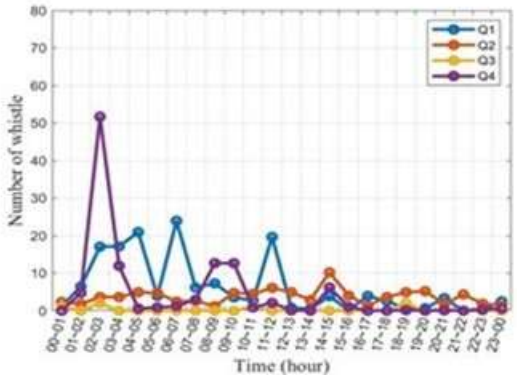
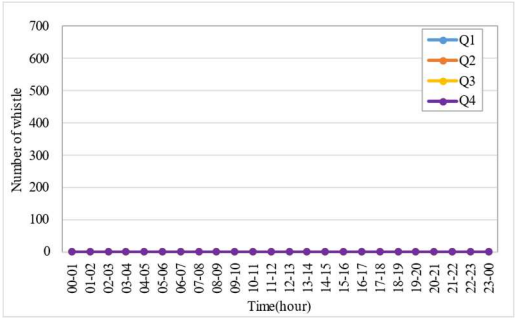
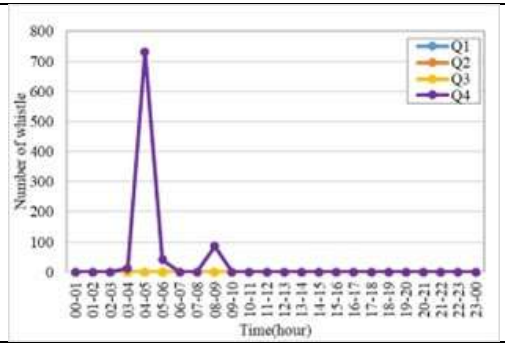
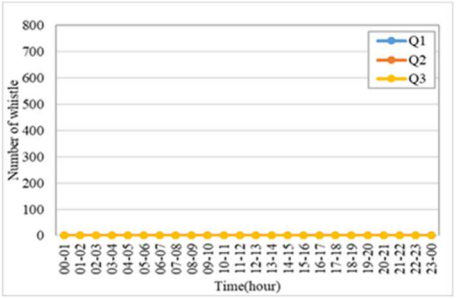
Whistles			
	2019	2020	2021
YW-5			
	2022	2023	
			

Figure 3.1.1-11 Hourly Distribution of Whistle Detections in Historical Surveys(5/5)

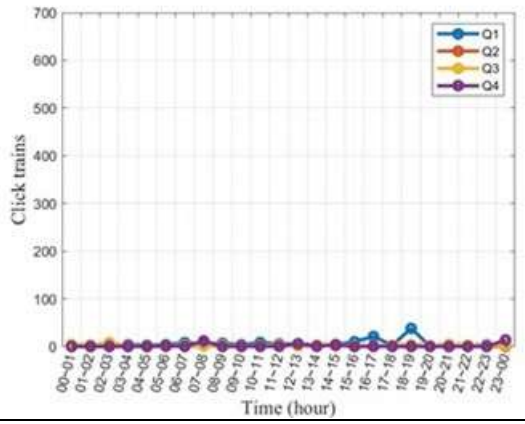
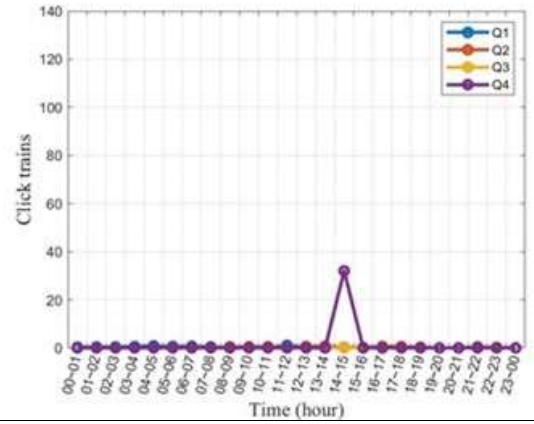
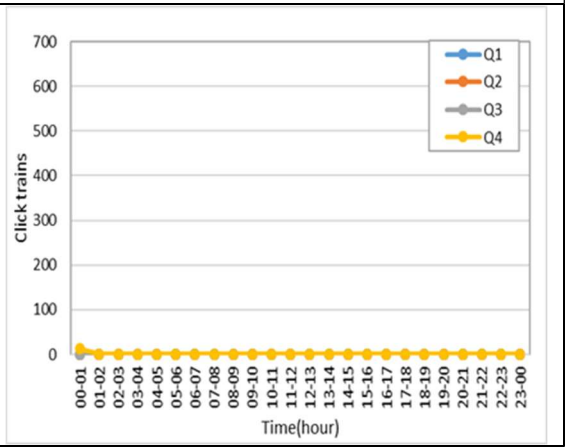
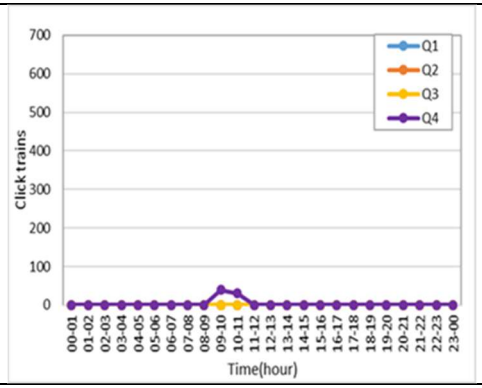
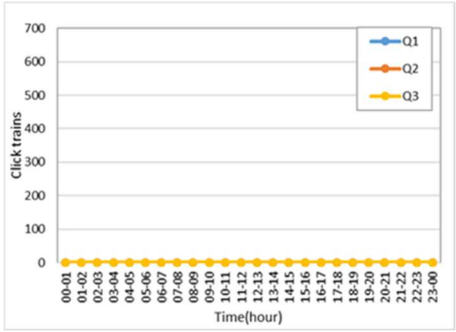
Clicks			
	2019	2020	2021
YW-1			
	2022	2023	
			

Figure 3.1.1-12 Hourly Distribution of clicks Detections in Historical Surveys(1/5)

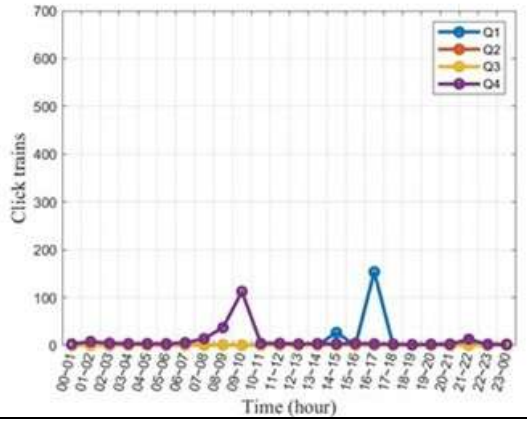
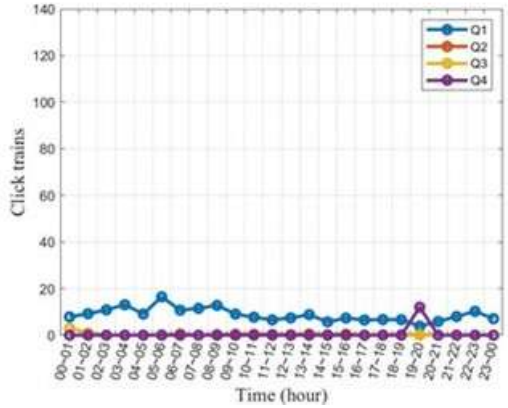
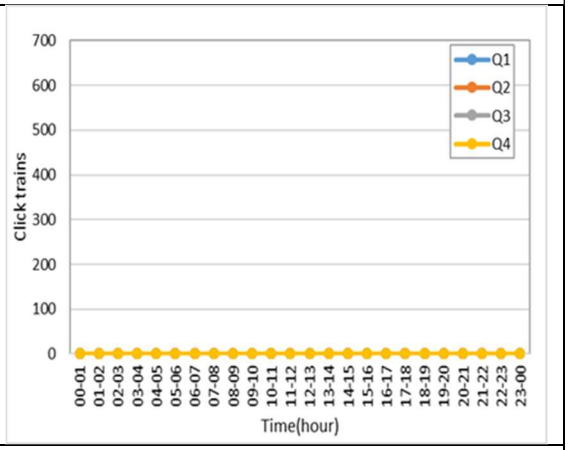
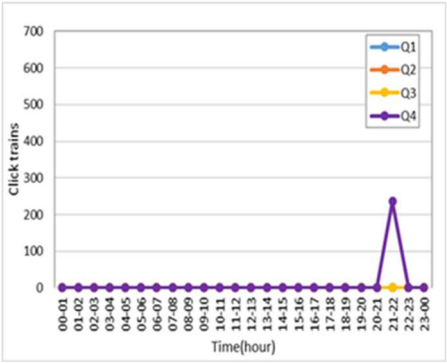
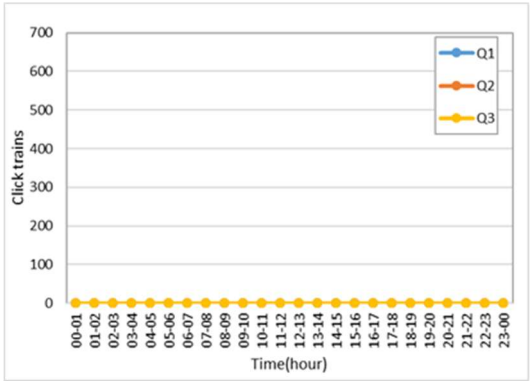
Clicks			
	2019	2020	2021
YW-2			
	2022	2023	
			

Figure 3.1.1-12 Hourly Distribution of clicks Detections in Historical Surveys(2/5)

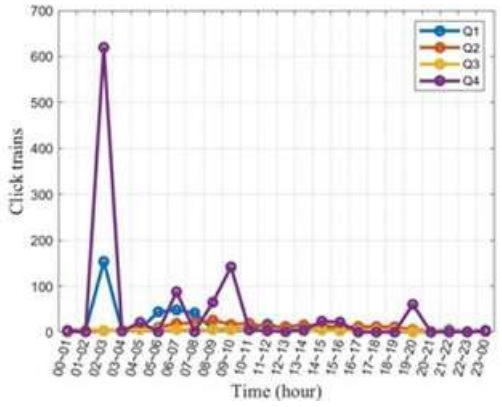
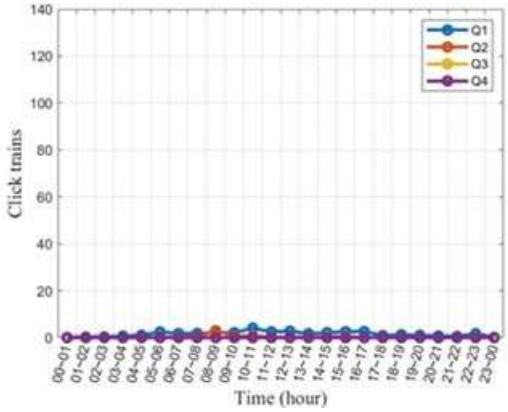
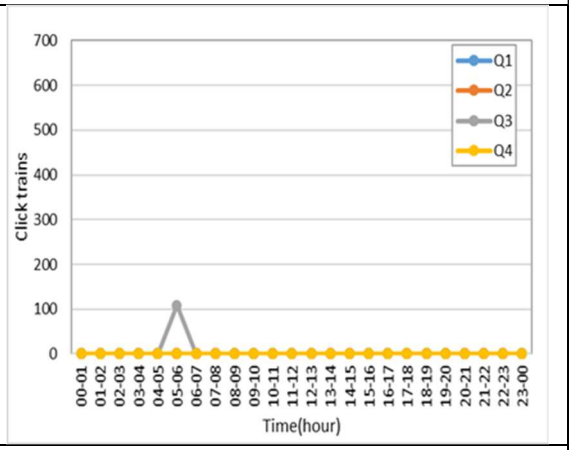
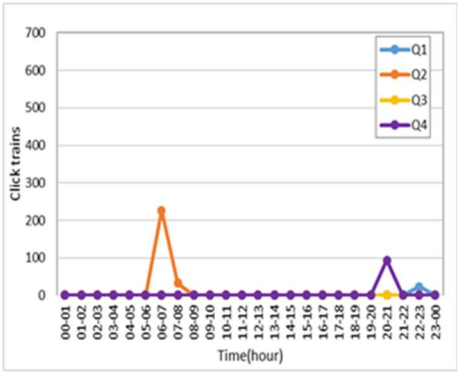
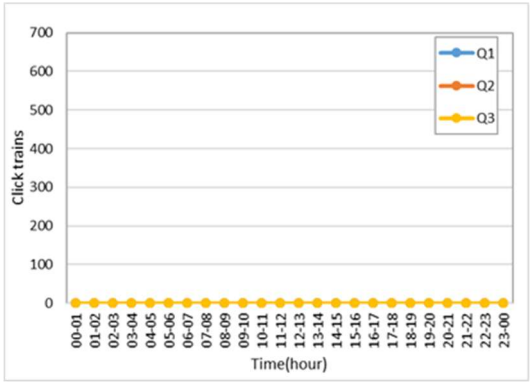
Clicks			
	2019	2020	2021
YW-3			
	2022	2023	
			

Figure 3.1.1-12 Hourly Distribution of clicks Detections in Historical Surveys(3/5)

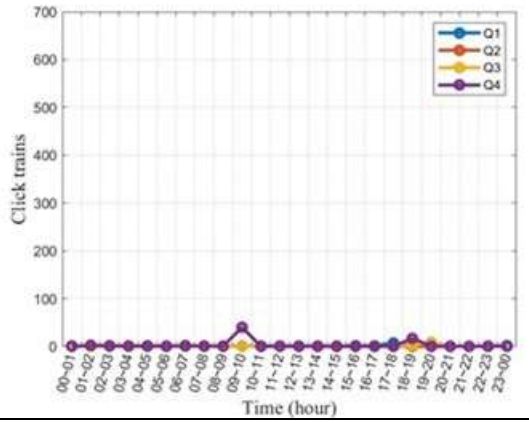
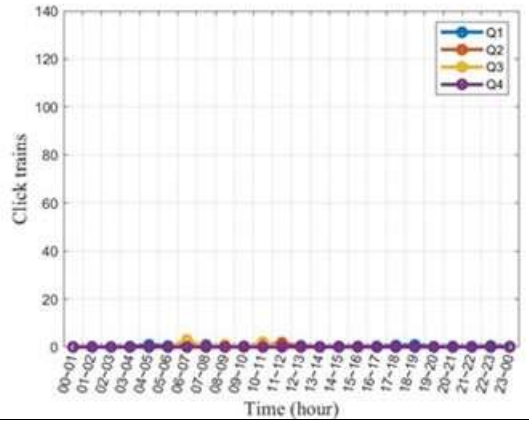
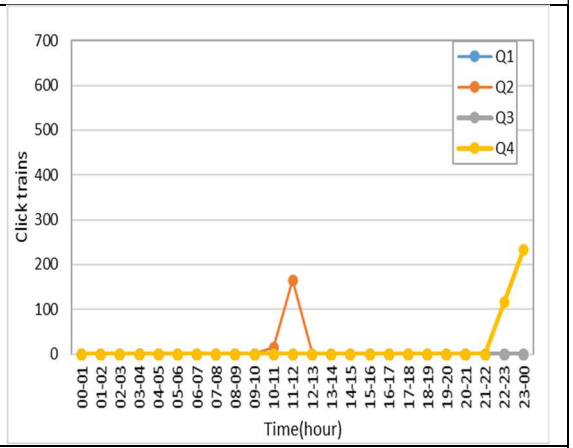
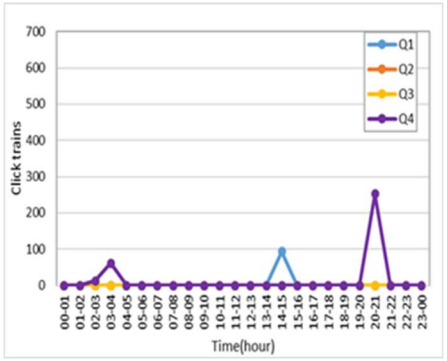
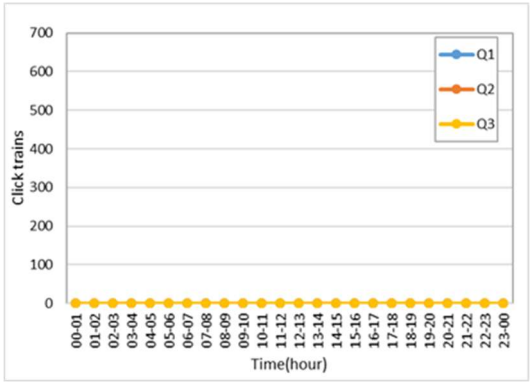
Clicks			
	2019	2020	2021
YW-4			
	2022	2023	
			

Figure 3.1.1-12 Hourly Distribution of clicks Detections in Historical Surveys(4/5)

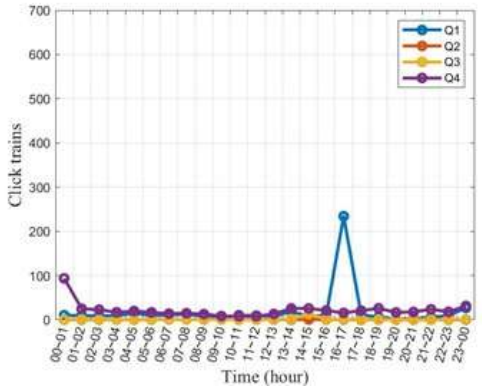
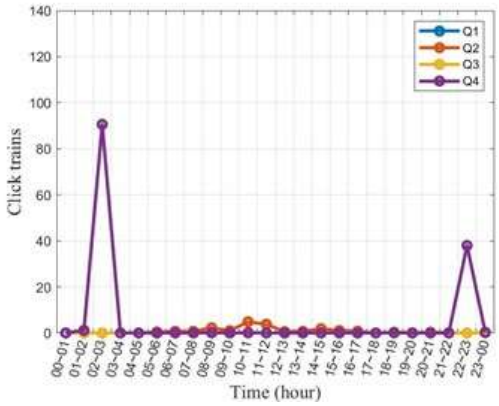
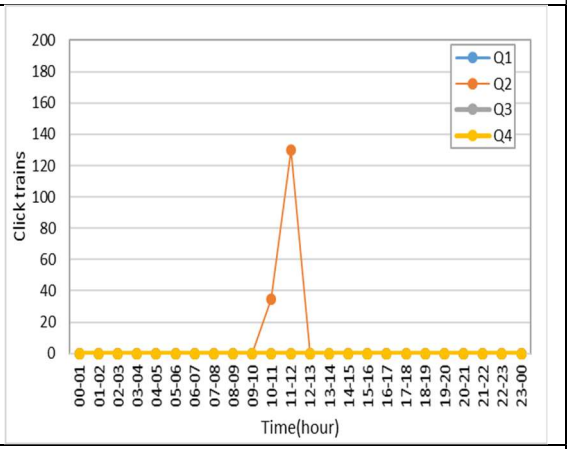
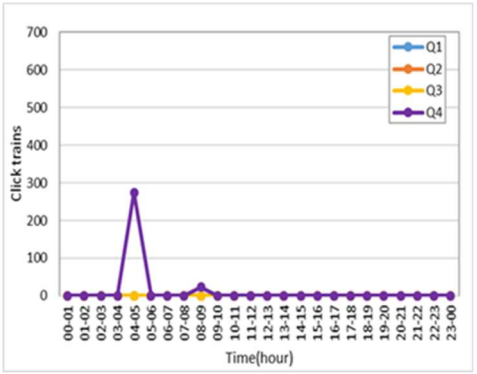
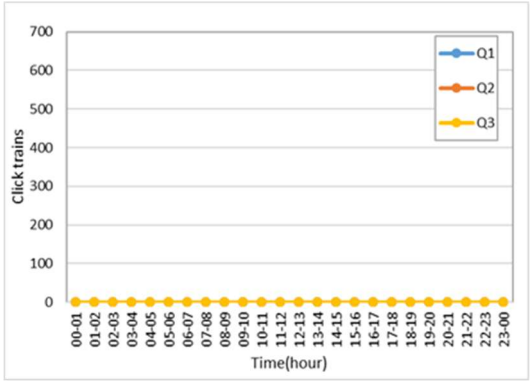
Clicks			
	2019	2020	2021
YW-5			
	2022	2023	
			

Figure 3.1.1-12 Hourly Distribution of clicks Detections in Historical Surveys(5/5)

V. Underwater Noise

YW-3 is located near the cetacean protection area at a water depth of about 8 m. YW-3 is located near the Chinese White Dolphin Wildlife Habitat at a water depth of about 8m. YW-5 is located at the southern boundary of the wind farm at a water depth of about 18 m. Underwater noise monitoring and analysis have been completed throughout the four quarters in 2020, 2021, and 2022. Underwater noise monitoring and analysis of 2023 Q1 is completed in this quarter. The survey times are shown in Table 3.1.1-15.

Table 3.1.1-15 Duration of Underwater Noise Analysis in each Quarter (1/2)

Item	Location	Survey duration
2020 Q1	YW-3	2020.4.21-2020.5.4
	YW-5	2020.4.21-2020.5.4
2020 Q2	YW-3	2020.7.1-2020.7.14
	YW-5	2020.7.1-2020.7.14
2020 Q3	YW-3	2020.11.19-2020.11.20
	YW-5	2020.11.19-2020.11.20
2020 Q4	YW-3	2021.2.21-2021.2.22
	YW-5	2021.2.21-2021.2.28
2021 Q1	YW-3	2021.5.23-2021.5.24
	YW-5	2021.5.24-2021.5.25
2021 Q2	YW-3	2021.8.25-2021.8.26
	YW-5	2021.8.26-2021.8.27
2021 Q3	YW-3	2021.11.05-2021.11.06
	YW-5	2021.11.05-2021.11.06
2021 Q4	YW-3	2022.02.27-2022.02.28
	YW-5	2022.02.27-2022.02.28
2022 Q1	YW-3	2022.05.11-2022.05.12
	YW-5	2022.05.11-2022.05.12
2022 Q2	YW-3	2022.08.17-2022.08.18
	YW-5	2022.08.17-2022.08.18
2022 Q3	YW-3	2022.09.15-2022.09.16
	YW-5	2022.09.15-2022.09.16
2022 Q4	YW-3	2023.02.12-2023.02.13
	YW-5	2023.02.17-2023.02.18

Table 3.1.1-15 Duration of Underwater Noise Analysis in each Quarter (2/2)

Item	Location	Survey duration
2023 Q1	YW-3	2023.05.06-2023.05.07
	YW-5	2023.05.06-2023.05.07
2023 Q2	YW-3	2023.07.19-2023.07.20
	YW-5	2023.07.19-2023.07.20
2023 Q3	YW-3	2023.09.19-2023.09.20
	YW-5	2023.09.19-2023.09.20

i Ambient noise analysis

In 2020, the average noise level of YW-3 and YW-5 was 109.4 dB and 110.5dB in Q1, 124.1 dB and 125.7 dB in Q2, 139.1dB and 127.6 dB in Q3, 126.9 dB and138.0 dB in Q4.

In 2021, the average noise level of YW-3 and YW-5 was 148.0 dB and 146.7 dB in Q1, 132.7 dB and 136.9dB in Q2, 134.0 dB and 152.1 dB in Q3 and 132.0dB and 128.4dB in Q4. The noise peaks were mainly dominated by the low frequency band below 1 kHz. (Table 3.1.1-16).

In 2022, the average noise level of YW-3 and YW-5were 137.9 dB and 126.1dB in Q1. The average noise level of YW-3 was 135.4 dB and 126.0dB in YW-5 in Q2. The average noise level of YW-3 was 130.6 dB and 138.7dB in YW-5 in Q3. The average noise level of YW-3 was 130.4 dB and138.5dB in YW-5 in Q4.

In 2023, the average noise level of YW-3 and YW-5 were 116.0 dB and 130.0dB in Q1, 133.2 dB and 125.5dB in Q2, 129.8dB and 125.6dB in Q3.

ii 1/3 Octave band analysis

The 1/3 Octave band level of each season varied from 5% to 95% of the total sound pressure level is shown as Table 3.1.1-16 and Figure 3.1.1-13.

For YW-3, in 2020, the value is 101.7-123.4 dB in Q1, 113.4-134.6 dB in Q2, 121.8-150.2 dB in Q3, 123.1-131.8 dB in Q4. In 2021, the value is between 129.3-157.9dB in Q1, 115.2-138.5dB in Q2, 108.6-134.6 dB in Q3 and 107.8-138.4dB in Q4. In 2022, the value is between 110.2-136.6 dB in Q1, 106.9-137.9dB in Q2, 114.9-136.5 in Q3, and 107.8-125.8dB in Q4. In 2023, the value is between 102.5-121.6dB in Q1 , 110.1-169.9dB in Q2 and 93.5~147.7dB in Q3.

For YW-5, in 2020, the value is 104.3-121.3dB in Q1, 114.0-136.5 dB in Q2, 116.1-142.9 dB in Q3 and 128.7-147.0 dB in Q4. In 2021, the value is between 123.3-151.4dB in Q1, 120.2-143.1dB in Q2, and 114.1-154.9 dB in Q3 and 112.9-130.8dB in Q4. In 2022, the value is between 106.2-133.3 dB in Q1 and

111.8-131.2 dB in Q2, 134.5-140.8 dB in Q3, and 106.7-142.1 dB in Q4. In 2023, the value is between 123.1-133.8 dB in Q1, 94.9-148.1dB in Q2 and 97.9~165.1dB in Q3.

Table 3.1.1-16 Frequency Band of the Ambient Noise in each Quarter (dB re 1μPa) (1/2)

Year	Site	Frequency Band	Mean	L_{90}	L_{50}	L_5
2020 Q1	YW-3	20-20000 Hz	109.4	101.7	108.2	123.4
		3000-9000 Hz	90.4	82.9	90.9	99.9
	YW-5	20-20000 Hz	110.5	104.3	110.4	121.3
		3000-9000 Hz	90.7	83.8	90.9	99.2
2020 Q2	YW-3	20-20000 Hz	124.1	113.4	125.5	134.6
		3000-9000 Hz	97.6	90.3	97.7	107.0
	YW-5	20-20000 Hz	125.7	114.0	127.0	136.5
		3000-9000 Hz	98.7	90.3	98.7	109.9
2020 Q3	YW-3	20-20000 Hz	139.1	121.8	142.5	150.2
		3000-9000 Hz	103.9	96.6	103.9	111.1
	YW-5	20-20000 Hz	127.6	116.1	130.2	142.9
		3000-9000 Hz	102.8	93.5	102.8	111.6
2020 Q4	YW-3	20-20000 Hz	126.9	123.1	127.1	131.8
		3000-9000 Hz	113.1	107.7	114.0	118.9
	YW-5	20-20000 Hz	138.0	128.7	138.4	147.0
		3000-9000 Hz	112.9	107.9	112.8	118.7
2021 Q1	YW-3	20-20000 Hz	148.0	129.3	150.4	157.9
		3000-9000 Hz	138.2	133.0	136.1	142.1
	YW-5	20-20000 Hz	146.7	123.3	144.6	151.4
		3000-9000 Hz	140.7	131.8	134.7	148.5
2021 Q2	YW-3	20-20000 Hz	132.7	115.2	127.8	138.5
		3000-9000 Hz	110.1	92.4	100.7	116.8
	YW-5	20-20000 Hz	136.9	120.2	130.6	143.1
		3000-9000 Hz	109.3	92.4	103.9	114.7
2021 Q3	YW-3	20-20000 Hz	134.0	108.6	126.6	134.6
		3000-9000 Hz	102.4	82.4	90.3	108.6
	YW-5	20-20000 Hz	152.1	114.1	132.9	154.9
		3000-9000 Hz	113.1	89.5	98.3	110.4
2021 Q4	YW-3	20-20000 Hz	132.0	107.8	122.0	138.4
		2500-10000 Hz	100.2	89.1	94.7	104.9
	YW-5	20-20000 Hz	128.4	112.9	123.4	130.8
		2500-10000 Hz	106.5	88.6	93.8	111.1

Note: Piling operations were carried out on 2020.11.19-2021.02.21, which overlap with the underwater noise survey period in 2020 Q3 and Q4.

Table 3.1.1-16 Frequency Band of the Ambient Noise in each Quarter (dB re 1μPa) (2/2)

Year	Site	Frequency Band	Mean	L_{90}	L_{50}	L_5
2022 Q1	YW-3	20-20000 Hz	137.9	110.2	119.8	136.6
		2500-10000 Hz	104.4	86.2	92.4	112.0
	YW-5	20-20000 Hz	126.1	106.2	118.4	133.3
		2500-10000 Hz	106.5	88.6	93.8	111.1
2022 Q2	YW-3	20-20000 Hz	135.4	106.9	124.3	137.9
		2500-10000 Hz	130.2	89.8	116.1	134.3
	YW-5	20-20000 Hz	126.0	111.8	124.7	131.2
		2500-10000 Hz	106.5	88.6	93.8	111.1
2022 Q3	YW-3	20-20000 Hz	130.6	114.9	124.8	136.5
		2500-10000 Hz	115.5	97.3	104.6	122.4
	YW-5	20-20000 Hz	138.7	134.5	138.7	140.8
		2500-10000 Hz	124.5	120.9	123.9	127.1
2022 Q4	YW-3	20-20000 Hz	130.4	107.8	115.0	125.8
		2500-10000 Hz	105.7	80.9	86.7	106.5
	YW-5	20-20000 Hz	138.	106.7	120.4	142.1
		2500-10000 Hz	99.6	91.6	95.6	103.1
2023 Q1	YW-3	20-20000 Hz	116.0	102.5	111.4	121.6
		2500-10000 Hz	93.7	86.4	90.6	96.8
	YW-5	20-20000 Hz	130.0	123.1	129	133.8
		2500-10000 Hz	115.3	105.9	112.1	119.6
2023 Q2	YW-3	20-20000 Hz	133.2	119.3	126.1	138.1
		2500-10000 Hz	114.4	92.8	99.1	122.6
	YW-5	20-20000 Hz	125.5	106.5	119.2	132.2
		2500-10000 Hz	111.2	88.0	95.1	120.1
2023 Q3	YW-3	20-20000 Hz	129.8	101.2	119.8	137.4
		2500-10000 Hz	115.2	89.7	94.6	123.5
	YW-5	20-20000 Hz	125.6	109.9	117.4	128.2
		2500-10000 Hz	103.9	91.1	96.6	109.2

Note: Piling operations were carried out on 2020.11.19-2021.02.21, which overlap with the underwater noise survey period in 2020 Q3 and Q4.

The results show that in 2020, the total SPL (20-20kHz) of underwater noise has increased from 110 dB to over130 dB from Q2 to Q4. The sound pressure has increase from 127dB to above 140.0dB. It may probably because the area around the wind farm is about to enter the construction phase and the surrounding sea area is under control. In 2022, the total SPL (20-20kHz) is 110.2 to 136.6 dB in YW-3 and 106.2-133.3 dB in YW-5 in Q1, 106.9-137.9 dB in YW-3, 111.8-

131.2dB in YW-5 in Q2, 114.9-136.5 dB in YW-3, 134.5-140.8 dB in YW-5 in Q3, and 107.8-125.8 dB in YW-3, 106.7-142.1dB in YW-5 in Q4.

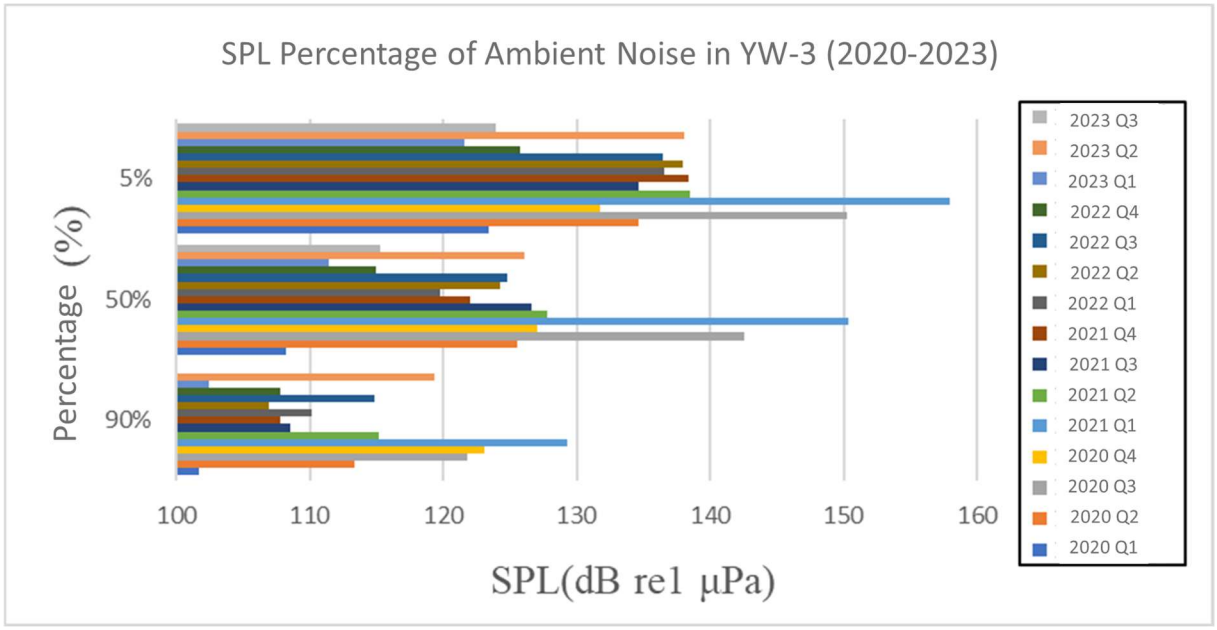
For the underwater ambient noise, the underwater sound signal changes in time and frequency is very complex. As the environmental noise, vessel noise, and biological noise all have temporal and geographical changes, the sound length and frequency range is also wide.

Table 3.1.1-17 Statics of Total SPL in Yunlin Offshore Wind Farm (20-20k Hz)

Quarter	Location	L_{90}	L_{50}	L_5
2020 Q1	YW-3	101.7	108.2	123.4
	YW-5	104.3	110.4	121.3
2020 Q2	YW-3	113.4	125.5	134.6
	YW-5	114.0	127.0	136.5
2020 Q3	YW-3	121.8	142.5	150.2
	YW-5	116.1	130.2	142.9
2020 Q4	YW-3	123.1	127.1	131.8
	YW-5	128.7	138.4	147.0
2021 Q1	YW-3	129.3	150.4	157.9
	YW-5	123.3	144.6	151.4
2021 Q2	YW-3	115.2	127.8	138.5
	YW-5	120.2	130.6	143.1
2021 Q3	YW-3	108.6	126.6	134.6
	YW-5	114.1	132.9	154.9
2021 Q4	YW-3	107.8	122.0	138.4
	YW-5	112.9	123.4	130.8
2022 Q1	YW-3	110.2	119.8	136.6
	YW-5	106.2	118.4	133.3
2022 Q2	YW-3	106.9	124.3	137.9
	YW-5	111.8	124.7	131.2
2022 Q3	YW-3	114.9	124.8	136.5
	YW-5	134.5	138.7	140.8
2022 Q4	YW-3	107.8	115.0	125.8
	YW-5	106.7	120.4	142.1
2023 Q1	YW-3	102.5	111.4	121.6
	YW-5	123.1	129.0	133.8
2023 Q2	YW-3	119.3	126.1	138.1
	YW-5	106.5	119.2	132.2
2023 Q3	YW-3	101.2	119.8	137.4
	YW-5	109.9	117.4	128.2

Note1: Unit: dB re 1μPa

Note2: Piling operations were carried out on 2020.11.19-2021.02.21, which overlap with the underwater noise survey period in 2020 Q3 and Q4.



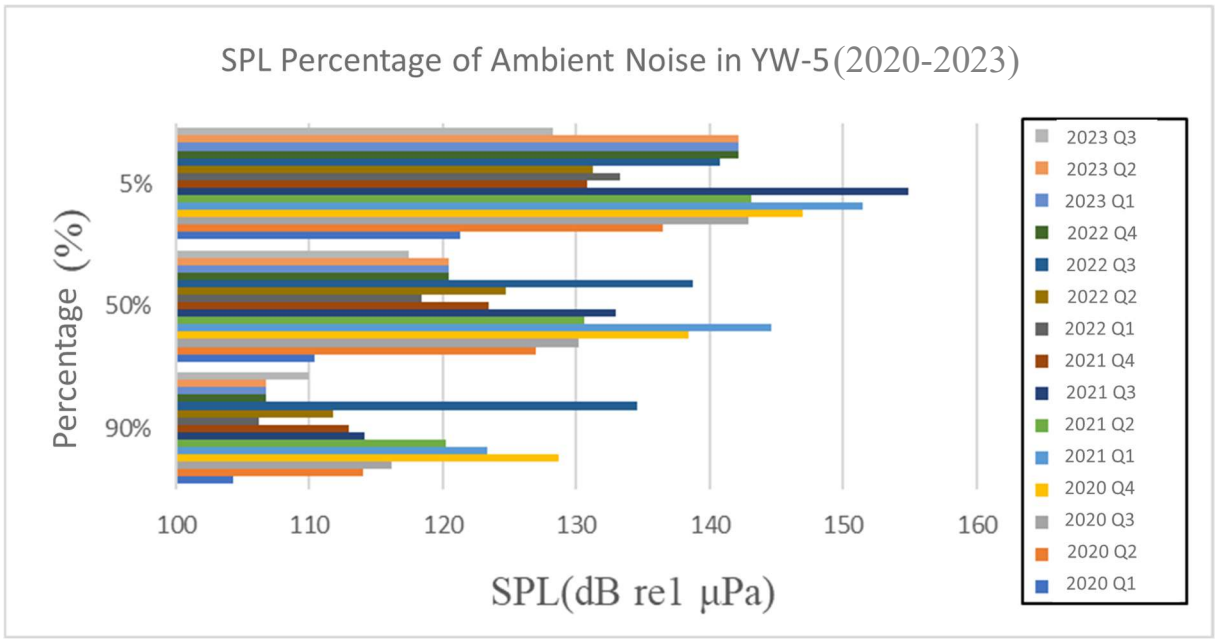


Figure 3.1.1-13 Percentage of SPL of the Ambient Noise in YUN OWF in the Historical Surveys

VI. Visual Monitoring of Cetacean Ecology

30 surveys were conducted between March 2016 and March 2017. A total of 7 herds of cetacean were monitored (Figure 3.1.1-14), including 2 herds of Chinese-white dolphins, 3 herds of finless porpoises, 1 herd of bottle-nosed dolphins and 1 individual of unknown cetacean. The sighting rate is 0.30herds/100km, 0.43 herds/10 hrs. and 0.23 herds/survey.

Visual monitoring of cetacean ecology started from March 2017, 30 survey trips annually were conducted until February 2020, with 175.84 total survey hours, 3,496.2 km in total mileage, 111.43 on-effort hours, 1,773.7 km in on-effort mileage, as shown in Table 3.1.1-18.

In addition, visual monitoring of cetacean ecology during the offshore construction has started since March 2020. 30 trips were conducted in this quarter (September-November 2020), with 172.67 total survey hours, 3,475 km in total mileage, 116.73 on-effort hours and 1624.5 km in on-effort mileage.

Visual monitoring of cetacean ecology during the offshore construction was carried out since March 2021. Until February 2022, 30 trips were conducted in this quarter, with 170.22 total survey hours, 3,565 km in total mileage, 107.54 on-effort hours and 1,554.0 km in on-effort mileage.

Visual monitoring of cetacean ecology during the offshore construction was carried out since March 2022. Until February 2023, 30 trips were conducted, with 175.57 total survey hours, 3539.0 km in total mileage, 116.65 on-effort hours and 1712.0 km on-effort mileage. The visual monitoring was continued since March 2023. Until end of November, 26 trips were conducted, with 145.66 total survey hours, 2,998.0 km in total mileage, 92.59 on-effort hours and 1,398.1 km on-effort mileage, as shown in Table 3.1.1-18.

In the overall 146 trips, 11 herds of cetacean were sighted in 9 trips, including 3 herds of Yangtze Finless Porpoise, 4 bottle-nosed dolphins and 4 herds of unknown cetacean (sighting is too short to identify its species). The environmental factors of each previous sighting locations are as shown in Table 3.1.1-19, sighting location and traveling route is as shown in Figure 3.1.1-15 to 3.1.1-18.

i On effort sighting

1. First Sighting (2019.04.25)

2 individuals of bottlenose dolphins as a herd were spotted at the north boundary of the wind farm on 25th April. (They were listed as unknown cetaceans at first, yet after several discussions with NTU Cetacean Laboratory, they are considered as bottlenose dolphins with a high possibility and is therefore explained in this report) They disappeared once being spotted. Due to the short sighting, no further information was provided in identifying

their species and behaviors. Environmental factors on the location of the vessel when the cetaceans were observed were listed as followed: water depth: 27.5 m, water temperature 27.5℃, salinity 34.6 ‰, pH =8.22.

2. Second Sighting (2019.05.25)

   4 Yangtze Finless Porpoise (judging through their appearance) were spotted around the south-east boundary of the wind farm on May 25. The herd did not jump very high from the surface and disappeared immediately. Their activities indicated that they were foraging. Environmental factors on the location of the vessel when the cetaceans were observed were listed as followed: water depth: 14.8 m, water temperature 27.3℃, salinity 33.4 ‰, pH =8.18.

3. Third Sighting (2019.09.09)

   A group of 4 Yangtze Finless Porpoise were spotted in the survey on September 9 at Northeast boundary of the wind farm. It is inferred that they were foraging. Device for water quality was out of order on the day, therefore only water depth was recorded during the sighting event. Water depth of the vessel location when cetaceans were sighted is 8.4 m. Tracks of the cetaceans were lost immediately in both trips, resulting in difficulties in collecting further information and records.

4. Fourth Sighting (2020.01.03)

   8 bottlenose dolphins were spotted within wind farm area on January 3. Their behaviors suggested they are foraging. Environmental factors of the vessel location are as followed: water depth: 22.4 m, water temperature 20 ℃, salinity: 33.3 ‰, pH value pH 8.49.

5. Fifth Sighting (2021.02.05)

   1 cetacean were spotted within wind farm area on February 5. The species cannot be identified as the cetacean disappeared once it is spotted. It is inferred that it was travelling. Environmental factors of the vessel location are as followed: water depth: 27.4 m, water temperature 19.2 ℃, salinity: 34.0 ‰, pH value pH 8.15.

6. Sixth Sighting (2021.02.05)

   1 bottlenose dolphins were spotted within wind farm area on February 5. Their behaviors suggested they are foraging. Environmental factors of the vessel location are as followed: water depth: 22.1 m, water temperature 20.0℃, salinity: 34.1 ‰, pH value pH 8.16.

7. Seventh Sighting (2021.03.15)

3 unknown cetacean were spotted within wind farm area on March 15. The species cannot be identified as the cetacean disappeared once spotted. It is inferred that they were travelling. Environmental factors of the vessel location are as followed: water depth: 27.4 m, water temperature 19.2 ℃, salinity: 34.0 psu, pH value pH 8.2.

8. Eighth Sighting (2023.01.14)

3 herds of dolphins were sighted on January 14 in this quarter. Details are as follows:

1st sighting: On the transect line at 8:36, a dorsal fin of cetacean was sighted about 700m to the left of the bow. The cetacean species cannot be confirmed as the sighting was brief and no distinctive features were identified.

2nd sighting: At 8:53, a dorsal fin of cetacean was sighted about 500m to the left of the bow. The vessel stopped to search the cetacean. The surveyors sighted the cetacean on the left stern, which then dived and disappeared. The cetacean species cannot be confirmed as the sighting was brief.

3rd sighting: At 10:30, dorsal fins of cetaceans were sighted on the left of the bow. The cetaceans were confirmed to be bottlenose dolphins after a closer check. The herd composed of 11-20 individuals, with 2 mother-child pairs. The young individuals jumped out of the water. Their diving period were identical with short intervals, and the swimming direction was northward. After 20 minutes of observation, the diving periods lengthened, and some individuals were not sighted after diving. After confirming that photos, sighting records, disappearing spot of cetacean were properly taken, the vessel left the cetacean and resumed the transect line survey. Environmental factors of the vessel location are as followed: water depth: 27.4 m, water temperature 19.2 ℃, salinity: 34.0 psu, pH value pH 8.2.

9. Ninth Sighting (2023.09.20)
On September 20, at around 8:55 a.m., one black dorsal finless cetacean was spotted in the water about 200 meters away from the vessel along the wind farm transect line, and was identified as a Yangtze Finless Porpoise. The vessel proceeded in the direction of the cetacean, and it was not observed for 10 minutes.

ii Off Effort Sighting

1. 1st Off Effort Sighting (2020.05.08)

   3 Chinese white dolphins were spotted at non effort sighting outside of Budai Port on May 8. Their behaviors suggested they are foraging. Environmental factors of the vessel location are as followed: water depth: 7.9m, water temperature 28.5℃, salinity: 33.7 ‰, pH value pH 8.18.

2. 2nd Off Effort Sighting (2021.02.21)

   3 Chinese white dolphins were spotted on the way to the wind farm on February 21. Their behaviors suggested they are travelling. Environmental factors of the vessel location are as followed: water depth: 5.9m, water temperature 19.5℃, salinity: 32.7 ‰, pH value pH 8.16.

3. 3rd Off-Effort Sighting (2021.07.11)
   After departing the port, the dorsal fin of a Chinese White Dolphin was sighted at the 11 o'clock direction at 7:31 A.M. on July 11th. Only 1 individual was observed and after surfacing twice, it was not sighted again.

4. 4th Off Effort Sighting (2021.07.20)
   After completing the surveys and while returning to the port, Chinese White Dolphins were sighted outside the Budai Port at 9:59 A.M. on July 20. 6 individuals, including 1 mother-calf pair, were observed. The group was dispersed and moving in different directions, suggesting they were engaged in foraging behavior.

5. 5th Off Effort Sighting (2023.10.19)
   2 Chinese White Dolphins were observed coming out of the water about 30 meters away from the vessel on the way to the wind farm on October 19, at 9:30 a.m. They dived deeply after the vessel approached, and then came out of the water at the stern of the vessel. They moved at a slow speed and in an irregular direction, so the pattern cannot be identified.

6 surveys were carried out in this quarter, and the sighting rate is 0.17%. If compared to the surveys in the EIS stage (2016/2017) and survey results in 2019, 2021, and 2023 Sighting rates in Q1 and Q4 is higher. It can be inferred that more cetacean activities can be found in the wind farm area in Q1 and Q4. Details are shown in Table 3.1.1-20.

It is discovered that sighting rate in this marine area varies a lot. Possible explanations are: 1. The natural variability of cetacean activities is highly unsteady, 2. Cetacean is rare in the Project area. Therefore, accumulation of more long-term survey data is necessary in order to reflect the actual activity frequency. Cetaceans are animals with high mobility. Also, their food do not scatter evenly in the marine area. Therefore, cetaceans will move in a great scale for foraging or mating in order to accomplish required mission in life.

This is especially true when it comes to non-offshore/ open sea cetaceans, whose active range are even wider. As a result, chance of encountering cetacean is very small. In addition, cetacean activities are mainly underwater; their breathing time on water surface is so short that observers may not notice instantly. Therefore, cetacean sightings during offshore surveys are very rare.

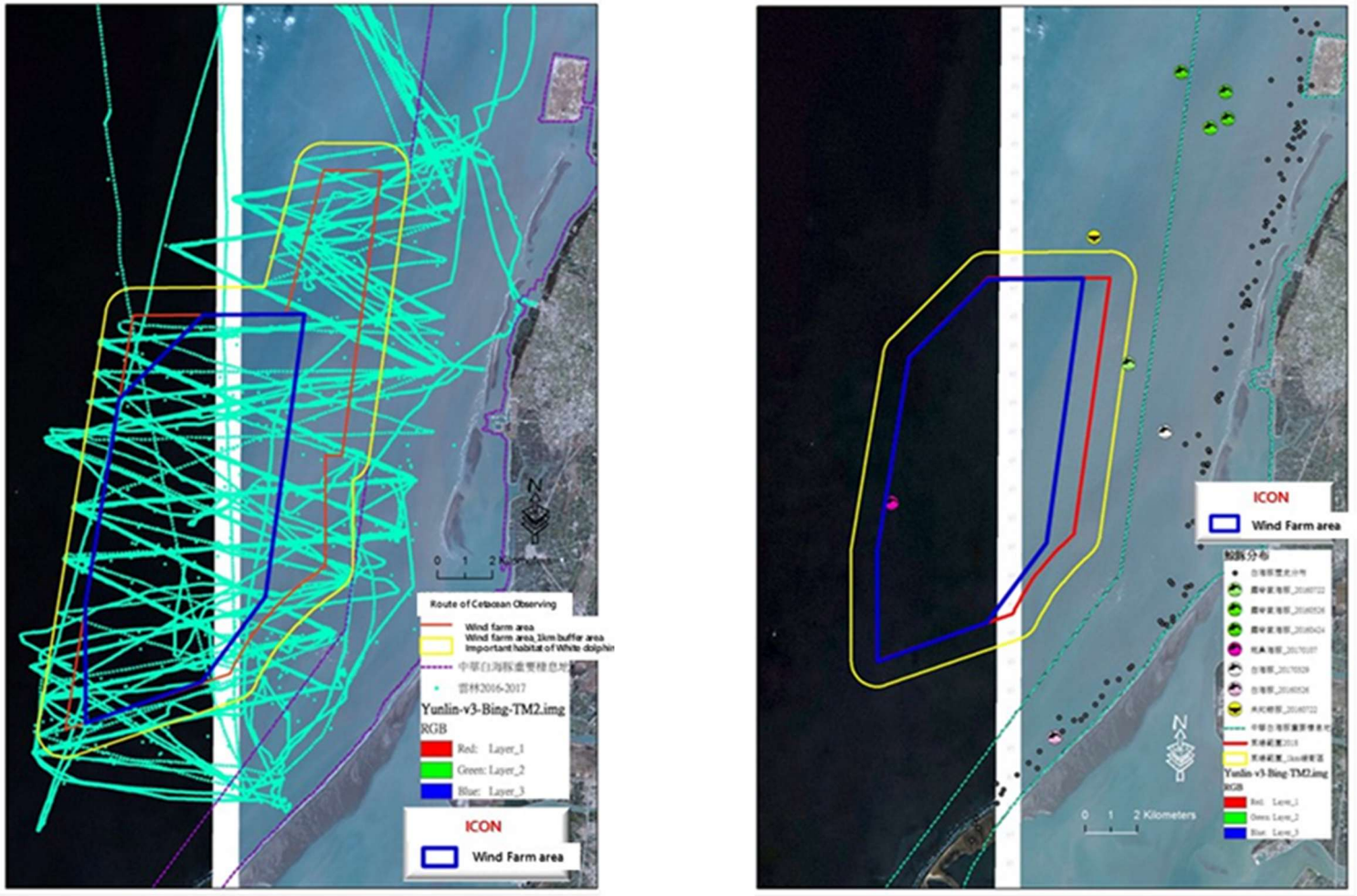


Figure 3.1.1-14 Transect Lines and Results of Cetacean Surveys during EIS Stage (March 2016 to March 2017)

Table 3.1.1-18 Previous Cetacean Visual Survey (1/5)

Trips		Survey Date	Transect[R1] Line		Total Hours (hour)	Total Mileage (km)	On-Effort Hours (hours)	On-Effort Mileage (km)	Sighting Rate (herd)
			Departure	Return					
2019 Q1	1	25th April	6	5	6.08	108.0	4.38	58.4	1
	2	14th May	1	2	5.98	116.0	4.55	67.3	0
	3	15th May	4	3	4.95	107.0	3.80	58.1	0
	4	25th May	6	5	6.08	110.0	4.33	57.9	1
	subtotal	4 trips	--	--	23.09	441.0	17.06	241.7	2
2019 Q2	1	25th June	2	3	5.11	105.0	3.42	56.1	0
	2	26th June[R2]	3	4	4.40	90.9	1.76	28.2	0
	3	15th July	3	4	5.04	105.0	3.62	57.5	0
	4	16th July	5	3	4.94	106.0	3.51	57.0	0
	5	23rd July	3	1	6.06	119.0	4.20	66.7	0
	6	24th July	6	4	4.74	107.0	3.46	57.3	0
	7	25th July	3	5	5.11	105.0	3.63	57.1	0
	8	26th July	6	2	5.20	2,020.0	3.72	57.3	0
	9	22nd August	1	2	5.60	116.0	4.08	67.3	0
	10	23rd August	3	4	5.04	104.0	3.53	57.7	0
	11	27th August	5	6	5.07	106.0	3.44	57.3	0
	12	28th August	1	4	6.40	108.0	4.05	66.0	0
	subtotal	12 trips	--	--	62.70	1,280.9	42.41	685.5	--
2019 Q3	1	9th September	2	5	5.38	119.0	3.16	55.5	1
	2	10th September	3	6	4.82	2,020.0	3.25	56.4	0
	3	11th September	1	2	6.06	122.0	4.18	65.7	0
	4	2nd October	5	6	5.68	111.0	3.54	57.5	0
	5	3rd October	4	3	5.00	103.0	3.66	57.4	0
	6	4th October	1	2	5.82	115.0	4.37	66.6	0
	7	5th October	5	6	6.73	2,020.0	3.74	57.2	0
	subtotal	7 trips	--	--	39.49	788.0	25.90	416.3	1
2019 Q4 (This Quarter)	1	10th December	4	1	6.44	136.0	3.83	68.8	0
	2	16th December	2	1	9.60	188.3	3.60	66.7	0
	3	14th December	6	1	9.83	209.0	4.06	66.9	0
	4	29th December	5	6	6.89	117.0	3.33	55.7	0
	5	3rd January	4	3	6.39	117.0	3.31	56.8	1
	6	25th February	4	5	5.50	108.0	3.80	57.7	0
	7	26th February	2	5	5.90	111.0	4.12	57.6	0
	Subtotal	7 trips	--	--	50.55	986.3	26.05	430.2	1
Total		30 trips	--	--	175.84	3,496.2	111.43	1,773.7	4

Remark1: Number of transect line (departure and return) indicates the numbered planned cetacean transect line survey route as shown in Figure 1.4-2.

Remark2" Due to a weather change on 26th June, strengthening wind and wave resulted in combers that covered more than 50% of the visible range of sea surface; it also affected sailing safety. Therefore, the sailing ended in advance. Besides, on-effort mileage (28.2 km) has reached half of the scheduled value (57 km), and is therefore included in the calculation of standard siting rate.

Table 3.1.1-18 Previous Cetacean Visual Survey (2/5)

Trips		Survey Date	Transect[R1] Line		Total Hours (hour)	Total Mileage (km)	On-Effort Hours (hours)	On-Effort Mileage (km)	On-effort Sighting (herd (individual))	Off-effort Sighting (herd (individual))
			Departure	Return						
2020 Q1	1	April 17	1	2	5.89	116.0	4.69	66.7	0	0
	2	May 1	2	5	5.57	109.0	4.18	57.5	0	0
	3	May 2	4	3	5.47	103.0	4.16	57.2	0	0
	4	May 5	3	1	6.07	120.0	4.77	67.8	0	0
	5	May 8	6	4	5.68	114.0	3.93	57.0	0	1(3)
	6	May 9	5	6	5.47	109.0	4.21	57.8	0	0
	Subtotal	6 trips	--	--	34.15	671.0	25.94	364.0	--	1
2020 Q2	1	June 01	4	5	5.94	106.0	4.31	57.4	0	0
	2	June 02	3	6	5.55	108.0	4.08	56.5	0	0
	3	June 11	1	2	6.41	116.0	5.00	66.6	0	0
	4	June 12	2	3	6.07	112.0	4.38	57.2	0	0
	5	July 21	6	1	6.17	125.0	4.60	65.6	0	0
	6	July 22	5	4	5.57	109.0	4.14	56.5	0	0
	7	July 29	1	6	6.58	125.0	4.89	65.9	0	0
	8	July 30	5	1	6.21	123.0	4.56	66.1	0	0
	9	August 17	2	5	5.57	114.0	3.99	56.7	0	0
	10	August 18	4	3	5.37	111.0	4.05	57.2	0	0
	Subtotal	10 trips	--	--	59.44	1,149.0	44.00	605.7	--	--
2020 Q3	1	September 7	6	4	5.87	111.0	4.36	56.9	0	0
	2	September 8	3	2	5.48	108.0	3.92	56.7	0	0
	3	November 17	5	6	5.28	112.0	3.58	50.9	0	0
	4	November 18	3	1	6.85	126.0	4.53	61.3	0	0
	5	November 19	1	4	5.80	125.0	4.05	59.6	0	0
	6	November 20	6	5	5.14	117.0	3.05	44.9	0	0
	Subtotal	6 trips	--	--	34.42	699.0	23.49	330.3	--	--
2020 Q4	1	Jan 13	2	3	4.87	101.0	1.56	22.4	0	0
	2	Jan 14	4	2	5.72	119.0	3.09	42.4	0	0
	3	Jan 15	5	6	5.99	119.0	3.33	47.5	0	0
	4	Jan 31	2	5	4.91	124.0	2.22	32.1	0	0
	5	Feb 1	4	3	5.70	115.0	3.69	52.0	0	0
	6	Feb 5	3	2	5.86	129.0	2.79	39.2	2(1, 1)	0
	7	Feb 6	1	4	6.17	131.0	3.49	46.2	0	0
	8	Feb 21	6	3	5.44	118.0	3.13	42.7	0	1(1)
	Subtotal	8 trips	--	--	44.66	956.0	23.30	324.5	2	1
Total (2020)		30 trips	--	--	172.67	3,475.0	116.73	1,624.5	2	2

Remark: Number of transect line (departure and return) indicates the numbered planned cetacean transect line survey route as shown in Figure 1.4-2.

Table 3.1.1-18 Previous Cetacean Visual Survey (3/5)

Trips		Survey Date	Transect Line [R1]		Total Hours (hour)	Total Mileage (km)	On-Effort Hours (hours)	On-Effort Mileage (km)	On-effort Sighting (herd (individual)	Off-effort Sighting (herd (individual)
			Departure	Return						
2021 Q1	1	March 15	5	2	6.12	130.0	3.35	46.6	1(3)	0
	2	March 16	1	4	6.10	130.0	3.81	52.8	0	0
	3	March 29	6	1	5.74	135.0	3.59	50.9	0	0
	4	March 30	3	6	5.28	114.0	3.42	50.0	0	0
	5	April 12	2	5	5.20	121.0	3.11	45.3	0	0
	6	April 13	4	3	5.41	115.0	3.80	52.8	0	0
	7	April 28	5	4	5.49	118.0	3.20	43.8	0	0
	8	May 13	1	5	5.95	131.0	3.66	51.3	0	0
	9	May 28	2	6	5.55	122.0	3.23	44.5	0	0
	10	May 29	4	3	5.95	118.0	3.61	48.7	0	0
	Subtotal	10 trips	--	--	56.71	1,234.0	34.78	486.7	1	--
2021 Q2	1	June 10	3	1	5.95	132.0	3.90	55.0	0	0
	2	June 11	6	2	5.14	121.0	3.16	44.3	0	0
	3	July 5	1	5	6.26	126.0	4.46	62.9	0	0
	4	July 12	5	2	5.22	120.0	3.12	44.3	0	0
	5	July 13	6	1	6.04	128.0	4.24	59.7	0	0
	6	July 14	3	4	5.55	115.0	3.80	51.8	0	0
	7	August 17	4	3	6.65	105.0	3.27	48.2	0	0
	8	August 18	2	6	5.33	118.0	3.30	50.0	0	0
	9	August 27	5	3	4.85	121.0	2.76	39.0	0	0
	10	August 28	2	5	5.24	115.0	3.69	54.7	0	0
	Subtotal	10 trips	--	--	56.23	1,201.0	35.70	509.9	--	--
2021 Q3	1	September 6	3	4	5.17	112.0	3.35	49.9	0	0
	2	September 7	6	2	5.76	120.0	3.44	48.5	0	0
	3	September 22	4	1	5.67	125.0	3.65	53.8	0	0
	4	September 23	1	6	5.62	127.0	3.67	55.5	0	0
	5	November 5	4	5	5.55	111.0	3.72	54.2	0	0
	6	November 6	5	4	5.16	112.0	3.48	50.5	0	0
	Subtotal	6 trips	--	--	32.93	707.0	21.31	312.4	--	--
2021 Q4	1	December 16	1	6	6.03	128.0	4.42	65.9	0	0
	2	February 26	6	2	6.82	113.0	3.62	56.9	0	0
	3	February 28	2	3	11.49	182.0	3.41	56.9	0	0
	4	February 28	3	1			4.30	65.3	0	0
	Subtotal	4 trips	--	--	24.34	423.0	15.75	245	--	--
Total(2021)		30 trips	--	--	170.22	3,565.0	107.54	1,544.0	1	--

Remark1: Number of transect line (departure and return) indicates the numbered planned cetacean transect line survey route as shown in Figure 1.4-2.

Remark2: 1 herd of unknown cetacean was observed on March 15th. The species cannot be identified as sighting duration is too short.

Table 3.1.1-18 Previous Cetacean Visual Survey (4/5)

Trips		Survey Date	Transect Line [R1]		Total Hours (hour)	Total Mileage (km)	On-Effort Hours (hours)	On-Effort Mileage (km)	On-effort Sighting (herd (individual)	Off-effort Sighting (herd (individual)
			Departure	Return						
2022 Q1	1	March 01	3	6	5.51	117.0	3.77	55.1	0	0
	2	March 17	2	5	5.51	117.0	3.81	57.2	0	0
	3	March 25	4	2	5.79	112.0	3.87	56.7	0	0
	4	April 21	6	3	6.64	120.0	4.36	58.1	0	0
	5	April 27	5	1	5.88	125.0	4.45	65.6	0	0
	6	May 11	1	4	5.92	123.0	4.10	60.2	0	0
	7	May 12	4	5	5.50	114.0	3.73	55.0	0	0
	Subtotal	7 trips	--	--	40.55	828.0	28.09	407.9	--	--
2022 Q2	1	June 03	2	4	5.38	116.0	3.85	57.3	0	0
	2	June 04	6	3	5.61	118.0	3.94	58.6	0	0
	3	June 12	3	1	5.67	119.0	4.27	65.7	0	0
	4	June 13	5	2	6.58	121.0	4.18	57.9	0	0
	5	June 14	1	6	6.34	128.0	4.36	65.7	0	0
	6	June 23	5	3	5.18	115.0	3.54	53.5	0	0
	7	June 24	1	5	5.69	121.0	3.66	56.5	0	0
	8	July 09	4	6	5.57	121.0	3.17	47.5	0	0
	9	July 10	3	1	6.07	124.0	4.30	64.8	0	0
	10	July 13	2	4	5.44	116.0	3.65	57.0	0	0
	11	July 30	6	2	6.09	120.0	3.69	50.2	0	0
	12	August 16	3	5	5.51	112.0	3.63	52.2	0	0
	13	August 17	4	1	6.26	121.0	4.29	63.9	0	0
	14	August 18	6	4	5.78	111.0	3.99	56.6	0	0
	15	August 21	5	6	5.73	107.0	3.75	53.4	0	0
	16	August 22	1	2	5.75	120.0	3.65	54.7	0	0
	Subtotal	16 trips	--	--	92.65	2,718.0	61.92	915.5	--	--
2022 Q3	1	September 15	2	3	5.09	113.0	2.84	42.1	0	0
	2	September 19	4	1	7.01	120.0	4.30	63.6	0	0
	3	October 02	6	2	5.57	114.0	3.63	51.9	0	0
	Subtotal	3 trips	--	--	17.67	347.0	10.77	157.6	--	--
2022 Q4	1	January 12	5	3	5.53	111.0	3.79	56.6	0	0
	2	January 13	3	6	5.81	118.0	3.67	53.6	0	0
	3	January 14	1	4	7.57	131.0	4.52	64.2	3(14)	0
	4	February 1	2	5	5.80	114.0	3.91	56.6	0	0
	Subtotal	4 trips	--	--	15.88	474.0	15.89	231.0	3	0
Total		30 trips	--	--	166.75	4,367.0	116.67	1,712.0	6	--

Remark1: Number of transect line (departure and return) indicates the numbered planned cetacean transect line survey route as shown in Figure 1.4-2.

Table 3.1.1-18 Previous Cetacean Visual Survey (5/5)

Trips		Survey Date	Transect Line [R1]		Total Hours (hour)	Total Mileage (km)	On-Effort Hours (hours)	On-Effort Mileage (km)	On-effort Sighting (herd (individual)	Off-effort Sighting (herd (individual)
			Departure	Return						
2023 Q1	1	March 8	3	5	11.46	147.0	3.16	47.3	0	0
	2	March 21	4	2	5.50	116.0	3.55	54.7	0	0
	3	March 23	6	3	5.80	117.0	3.62	49.7	0	0
	4	April 18	5	2	5.17	116.0	3.22	50.2	0	0
	5	May 4	5	1	5.68	122.0	4.03	63.2	0	0
	6	May 6	2	4	5.39	112.0	3.54	45.8	0	0
	7	May 17	1	4	5.44	122.0	2.40	58.1	0	0
	8	May 26	2	6	5.53	120.0	2.40	52.1	0	0
	Subtotal	8 trips	--	--	43.61	933.0	25.92	421.1	--	--
2023 Q2	1	June 7	3	6	5.99	121.0	3.76	54.0	0	0
	2	June 26	2	1	6.34	123.0	4.37	64.1	0	0
	3	June 27	6	2	5.15	116.0	3.17	48.4	0	0
	4	June 28	4	3	5.45	110.0	3.62	54.4	0	0
	5	July 11	1	6	6.41	126.0	4.13	59.6	0	1(1)
	6	July 12	5	6	5.08	109.0	3.19	49.7	0	0
	7	July 13	4	5	5.54	109.0	3.31	51.2	0	0
	8	July 20	3	4	6.03	111.0	3.22	46.5	0	1(6)
	9	August 22	6	1	6.11	124.0	3.85	58.6	0	0
	10	August 23	5	6	5.22	109.0	2.88	43.4	0	0
	11	August 24	2	1	5.72	117.0	3.79	58.9	0	0
	12	August 29	6	4	5.29	108.0	3.23	50.1	0	0
	Subtotal	12 trips	--	--	68.33	1,383	42.53	638.9	--	--
	1	September 18	6	3	5.42	108.0	3.44	53.7	0	0
	2	September 19	1	4	5.74	119.0	3.87	60.5	0	0
	3	September 20	1	5	5.94	120.0	3.65	56.6	1(1)	0
	4	September 21	3	1	5.65	118.0	3.71	58.0	0	0

	5	October 19	4	2	5.34	110.0	3.42	52.7	0	1(2)
	6	October 20	3	5	5.63	107.0	3.68	56.5	0	0
	Subtotal	6 trips	--	--	33.73	682.0	21.77	338.0	--	--

Table 3.1.1-19 Previous Records of Environment Factors on Cetacean Spotting Points

On effort sighting						
Survey date	Cetacean Species	Water Depth(m)	Water Temperature (℃)	Salinity (‰)	pH	Cetacean Behavior
2019.04.25	Bottlenose Dolphin	27.5	27.5	34.6	8.22	--
2019.05.25	Yangtze Finless Porpoise	14.8	27.3	33.4	8.18	Foraging
2019.09.09	Yangtze Finless Porpoise	8.4	--	--	--	Foraging
2020.01.03	Bottlenose Dolphin	22.4	20.0	33.3	8.49	Travelling
2020.02.05	Unknown cetacean	27.4	19.2	34.0	8.15	Travelling
2020.02.05	Bottlenose Dolphin	22.1	20.0	34.1	8.16	Foraging
2021.03.15	Unknown cetacean	27.4	19.2	34.0	8.20	Travelling
2023.01.14	Unknown cetacean[3]	--	--	--	--	Travelling
2023.01.14	Unknown cetacean[3]	23.8	23.0	33.2	8.10	Travelling
2023.01.14	Bottlenose Dolphin	24.9	22.6	33.1	8.13	Travelling
2023.09.20	Yangtze Finless Porpoise	12.3	28.8	32.5	8.29	Travelling
Off effort sighting						
Survey date	Cetacean Species	Water Depth(m)	Water Temperature (℃)	Salinity (‰)	pH	Cetacean Behavior
2020.05.08	Chinese white dolphin	7.9	28.5	33.7	8.20	Foraging
2021.02.21	Chinese white dolphin	5.9	19.5	32.7	8.16	Travelling
2023.07.11	Chinese white dolphin	8.3	30.6	34.2	8.15	--[1]
2023.07.20	Chinese white dolphin	8.1	31.5	32.9	8.08	Foraging
2023.10.19	Chinese white dolphin	6.5	26.6	32.6	8.01	Travelling

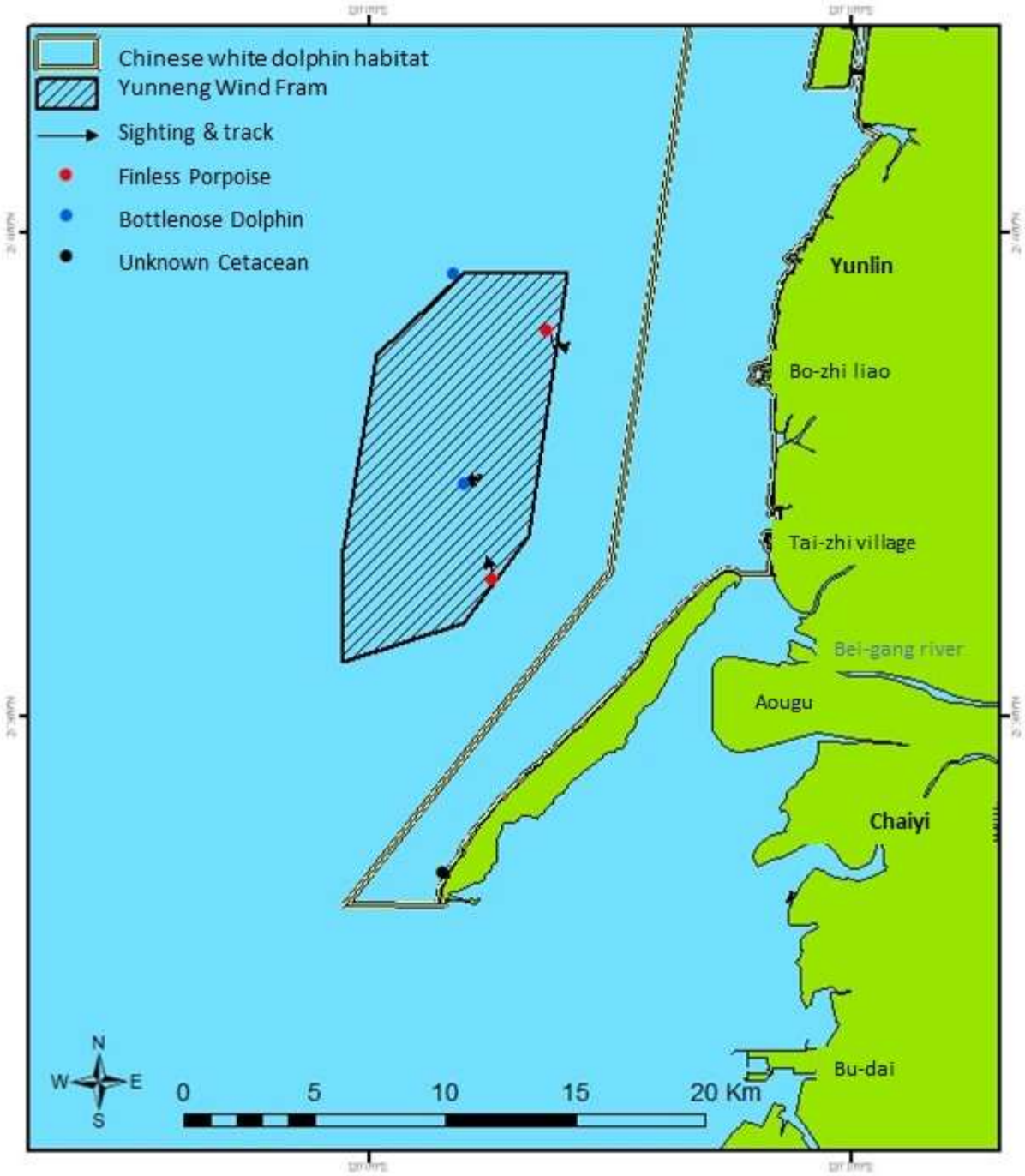
Remark1: Due to the short sighting, no further information was provided in identifying their species and behaviors.

Remark2: Device for water quality was out of order on 9/9, therefore only water depth was recorded.

Remark3: Species cannot be identified as the sighting is too short.

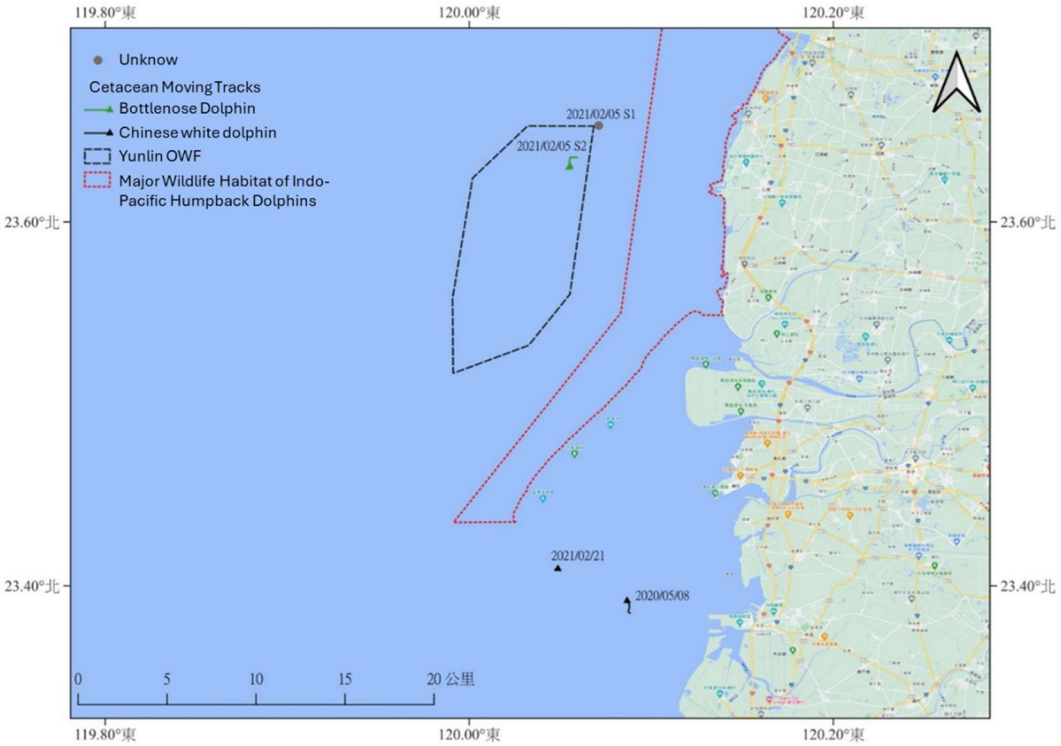
Table 3.1.1-20 Comparison of Sighting Rates in Previous Quarters

Year	Quarter	Trips	On-effort sighting	On-Effort Mileage (km)	On-Effort hour (hr)	On-effort Sighting (on-effort/100km)
2016/2017 (EIA)	Q1	8	4	569.8	44.62	0.70
	Q2	9	2	785.6	53.40	0.26
	Q3	7	0	511.8	32.68	0
	Q4	6	1	479.4	31.78	0.21
2019	Q1	4	2	241.7	17.06	0.83
	Q2	12	0	685.5	42.41	0
	Q3	7	1	416.3	25.90	0.24
	Q4	7	1	430.4	24.65	0.23
2020	Q1	6	0	364.0	25.94	0
	Q2	10	0	605.7	43.99	0
	Q3	6	0	330.3	23.49	0
	Q4	8	2	324.5	23.30	0.62
2021	Q1	10	1	486.7	34.78	0.21
	Q2	10	0	509.9	35.70	0
	Q3	6	0	312.4	21.31	0
	Q4	4	0	245.0	15.75	0
2022	Q1	7	0	407.9	28.09	0
	Q2	16	0	915.5	61.91	0
	Q3	3	0	157.6	10.77	0
	Q4	4	3	231.0	15.89	1.30
2023	Q1	8	0	421.1	25.91	0.00
	Q2	12	0	638.9	42.53	0.00
	Q3	6	1	338.0	21.77	0.46



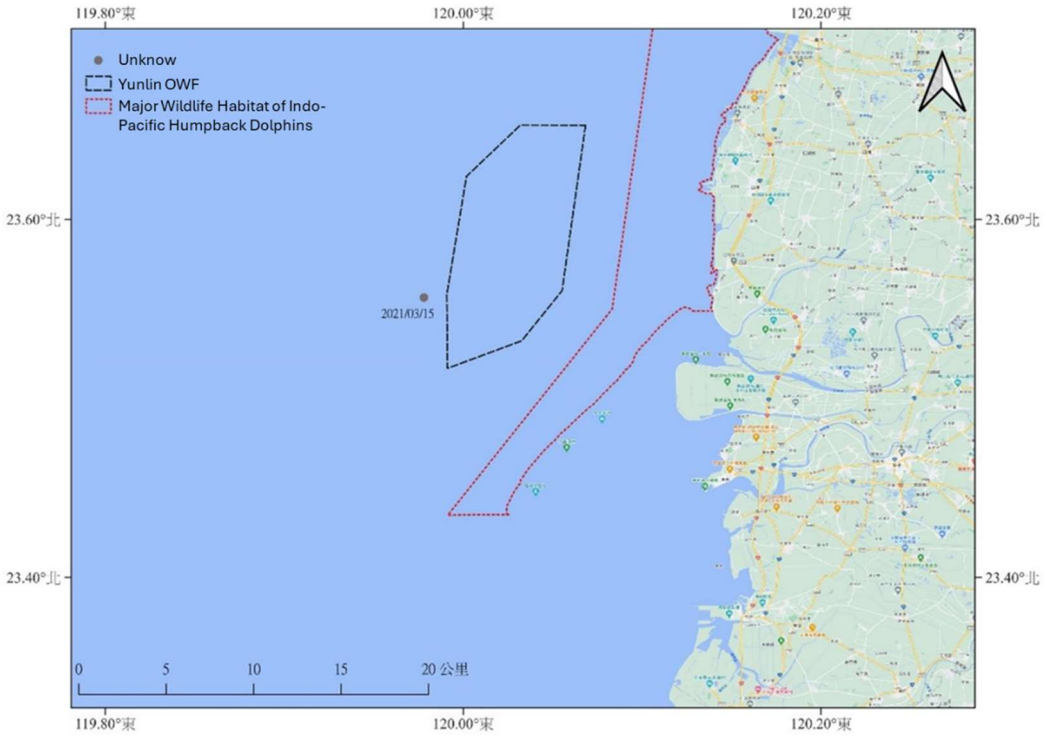
Note: A herd of 2 dolphins (bottle nose dolphin) are spotted at the north boundary of wind farm on April 25, 2019. A herd of 4 Yangtze Finless Porpoise at the southeast boundary of wind farm on May 25, 2020. A herd of 4 Yangtze Finless Porpoise at the Northeast boundary of wind farm on September 9. A herd of 8 bottle nose dolphins are spotted in the wind farm area on January 3, 2020.

Figure 3.1.1-15 The Spotted Location of The Cetacean from Visual Survey and its Moving Tracks in 2019



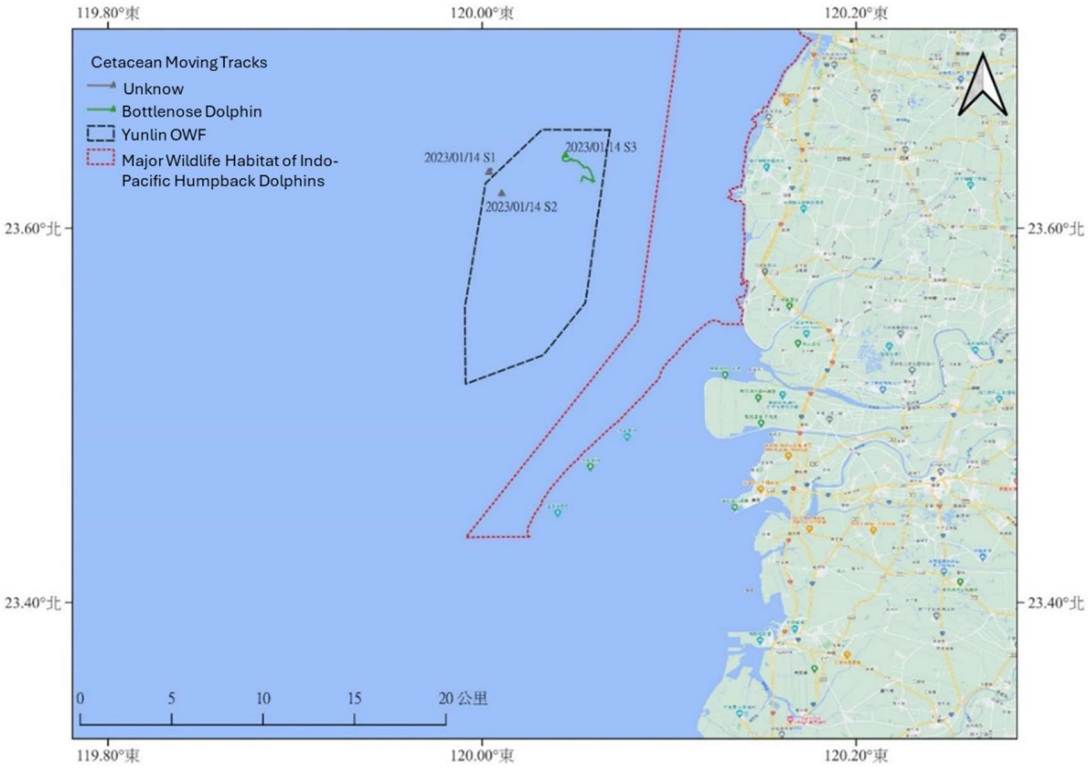
Remark1: A herd of 3 Chinese white dolphins were spotted on off-effort route (outside of Budai Port).
Remark 2: The sighting time of the unidentified cetaceans was too brief to be recorded.

Figure 3.1.1-16 The Spotted Location of The Cetacean from Visual Survey and its Moving Tracks in 2020



Note: The sighting time of the unidentified cetaceans was too brief to be recorded.

Figure 3.1.1-17 The Spotted Location of The Cetacean from Visual Survey and its Moving Tracks in 2021



Note: The sighting time of the unidentified cetaceans was too brief to be recorded.

Figure 3.1.1-18 The Spotted Location of The Cetacean from Visual Survey and its Moving Tracks in 2022

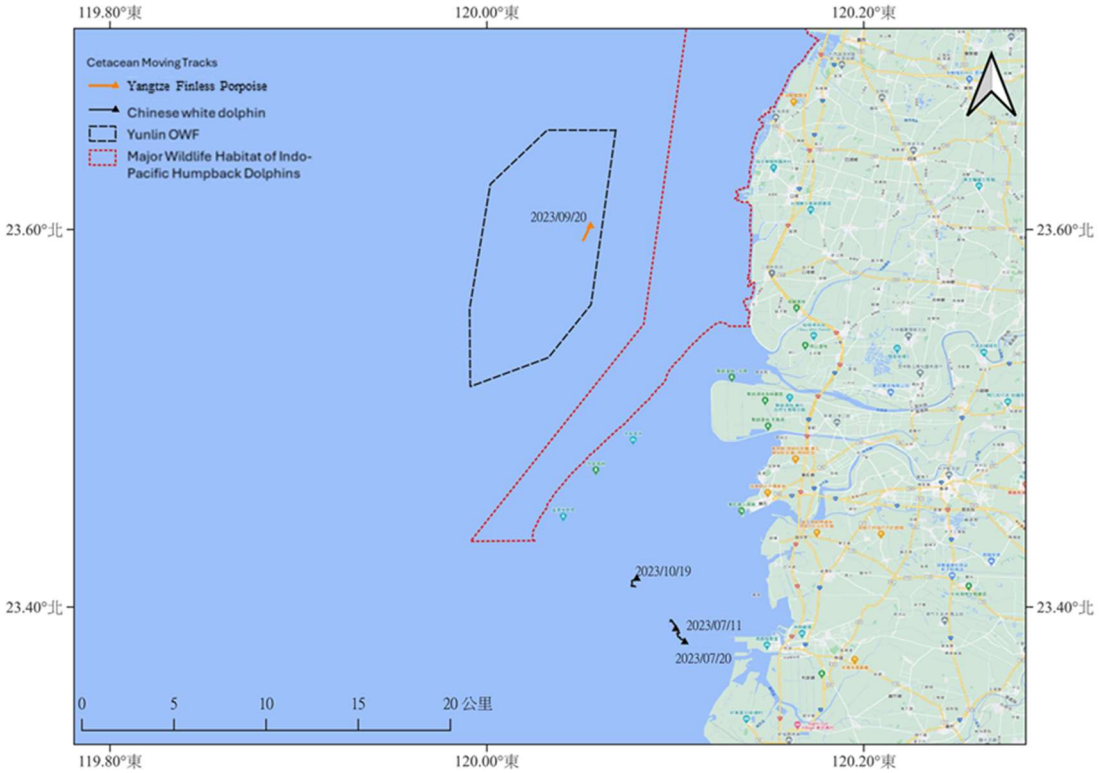


Figure 3.1.1-19 The Spotted Location of The Cetacean from Visual Survey and its Moving Tracks in 2023

VII. Air Quality

This environmental monitoring project is conducted according to suggestions stated in EIS document and review conclusion (official letter #1080100460). Since January 2020, monitoring spots for air quality have been changed from Anxi Temple, Yunlin Fishery Association and Kouhu Junior high school to Anxi Temple, Kouhu Junior high school and Feisha Village.

Previous monitoring results of air quality are listed in Table 3.1.1-24 and Figure 3.1.1-19. In 2021 Q1 and 2022 Q1, $PM_{2.5}$ in Kouhu Junior High School and Feisha Village are slightly higher than the MOENV's air control standard (24 hour value of $PM_{2.5}$ = 35 $\mu g/m^3$). Monitoring results at the rest of the sampling stations complied with air quality standards. MOENV's monitoring stations near the Project area from 11:00 March 17 to 11:00 March 18 show that $PM_{2.5}$ in Taixi monitoring station is 33$\mu g/m^3$, and $PM_{2.5}$ in Mailiao monitoring station is 36$\mu g/m^3$. MOENV's monitoring stations near the Project area from 10:00 on March 30 to 12:00 on March 31, the value is 53.8 $\mu g/m^3$ in Chiayi station and 47.7 $\mu g/m^3$ in Xinggang station. It is inferred that the exceedance is affected by the high background value of $PM_{2.5}$.

VIII. Noise and Vibration

This environmental monitoring project is conducted according to suggestions stated in EIS document and review conclusion (official letter #1080100460). Since January 2020, monitoring spots for air quality have been changed from Taiwan Provincial Highway No.17/County Highway No.158 (Taixi Junior High School), Residency of Yugang Road and Section 1 Zhongzheng Road (Fire Bureau) to Anxi Temple, Residence in Feisha Village and Residency of Yugang Road.

Monitoring results of noise are shown as Table 3.1.1-25 and Figure 3.1.1-21. Results of most sampling stations in this quarter complied with Noise Control Standards of Second Type of Zone near roads more than 8m wide. Only values in 2021 Q3 and Q4, 2022 Q4 slightly exceeded the standards (L_{day}=74dB(A)and L_{night}=67dB(A)). It is inferred that the exceedance in 2021 Q3 and Q4 may be caused by the ambient traffic noise such as vehicle horns; the exceedance in 2022 Q4 may be caused by the campaign vehicles due to election. The vehicle flow and announcement have elevated the average value. These factors have led to the exceedance in Noise Control Standards of Second Type of Zone near roads more than 8m wide.

Monitoring results of vibration are shown as Table 3.1.1-26 and Figure 3.1.1-22. Results of all sampling stations in this quarter complied with control standards of Japan Vibration Regulations of first types of area.

Table 3.1.1-21 Analytical Table of Previous Air Quality Monitoring Results(1/3)

Unit: μg/m³

Monitoring Item	Monitoring Date		Anxi Temple	Fisherman's Association of Yunlin District	Kouhu Junior High School	Residence in Feisha Village	Air Quality Standards
TSP Value of 24 hours	During EIA	2016.07-2016.10	94-114	69-112	69-110	-	-
	2019 Q1	2019.03.27-28	64	71	56	-	
	2019 Q2	2019.06.03-04	30	29	40	-	
	2019 Q3	2019.08.28-29	56	55	47	-	
	2019 Q4	2019.11.27-28	128	97	71	-	
	2020 Q1	2020.02.26-27	80	-	55	61	
	2020 Q2	2020.05.21-22	19	-	19	18	
	2020 Q3	2020.07.13-14	20	-	18	19	
	2020 Q4	2020.11.25-26 2020.12.07-08	44	-	57	52	
	2021 Q1	2021.03.17-18	73	-	86	80	
	2021 Q2	2021.06.01-02	39	-	30	26	
	2021 Q3	2021.08.24-25	35	-	50	33	
	2021 Q4	2021.11.29-30	41	-	41	60	
	2022 Q1	2022.03.30-31	62	-	57	66	
	2022 Q2	2022.05.26-27	15	-	19	19	
	2022 Q3	2022.07.27-28	22	-	26	24	
	2022 Q4	2022.10.27-28	60	-	64	74	
	2023 Q1	2023.01.18-19	82	-	129	107	
	2023 Q2	2023.05.04-05	63	-	53	62	
	2023 Q3	2023.07.20-21	21	-	33	21	
	2023 Q4 (This quarter)	2023.10.17~18	70	-	35	35	

Table 3.1.1-21 Analytical Table of Previous Air Quality Monitoring Results (2/3)

Unit: μg/m³

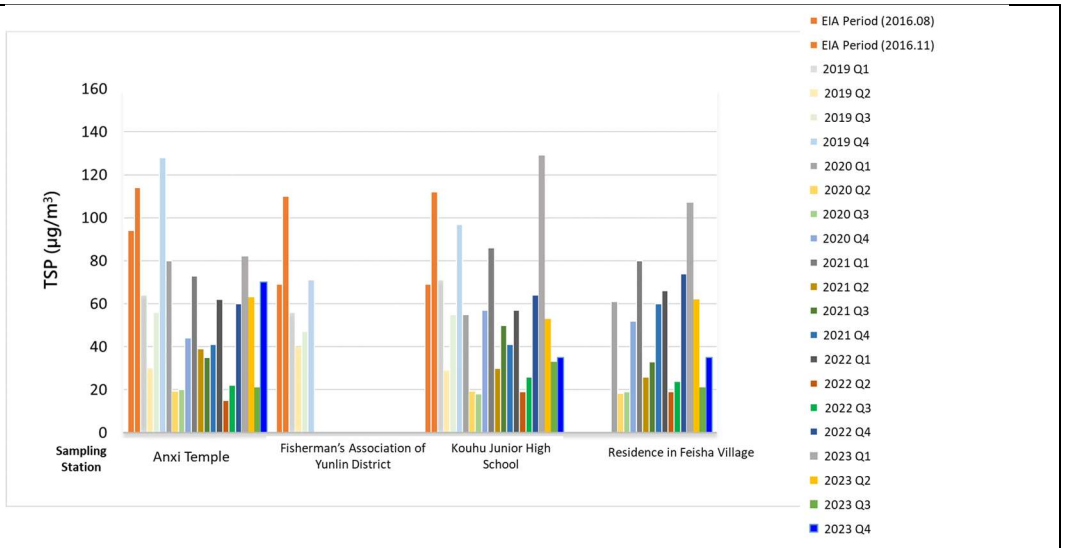
Monitoring Item	Monitoring Date		Anxi Temple	Fisherman's Association of Yunlin District	Kouhu Junior High School	Residence in Feisha Village	Air Quality Standards
PM_{10} Day Equivalent Value	During EIA	2016.07-2016.10	55-57	34-55	37-53	-	100
	2019 Q1	2019.03.27-28	53	60	48	-	
	2019 Q2	2019.06.03-04	19	16	30	-	
	2019 Q3	2019.08.28-29	44	34	30	-	
	2019 Q4	2019.11.27-28	64	49	35	-	
	2020 Q1	2020.02.26-27	39	-	39	40	
	2020 Q2	2020.05.21-22	8	-	9	7	
	2020 Q3	2020.07.13-14	15	-	14	14	
	2020 Q4	2020.11.25-26 2020.12.07-08	21	-	38	32	
	2021 Q1	2021.03.17-18	62	-	74	63	
	2021 Q2	2021.06.01-02	31	-	22	26	
	2021 Q3	2021.08.24-25	19	-	20	21	
	2021 Q4	2021.11.29-30	21	-	26	37	
	2022 Q1	2022.03.30-31	41	-	40	43	
	2022 Q2	2022.05.26-27	12		13	14	
	2022 Q3	2022.07.27-28	13	-	14	15	
	2022 Q4	2022.10.27-28	40	-	34	40	
	2023 Q1	2023.01.18-19	35	-	40	42	
	2023 Q2	2023.05.04-05	13	-	14	19	
	2023 Q3	2023.07.20-21	15	-	17	10	
	2023 Q4 (This quarter)	2023.10.17~18	40	-	20	20	

Table 3.1.1-21 Analytical Table of Previous Air Quality Monitoring Results (3/3)

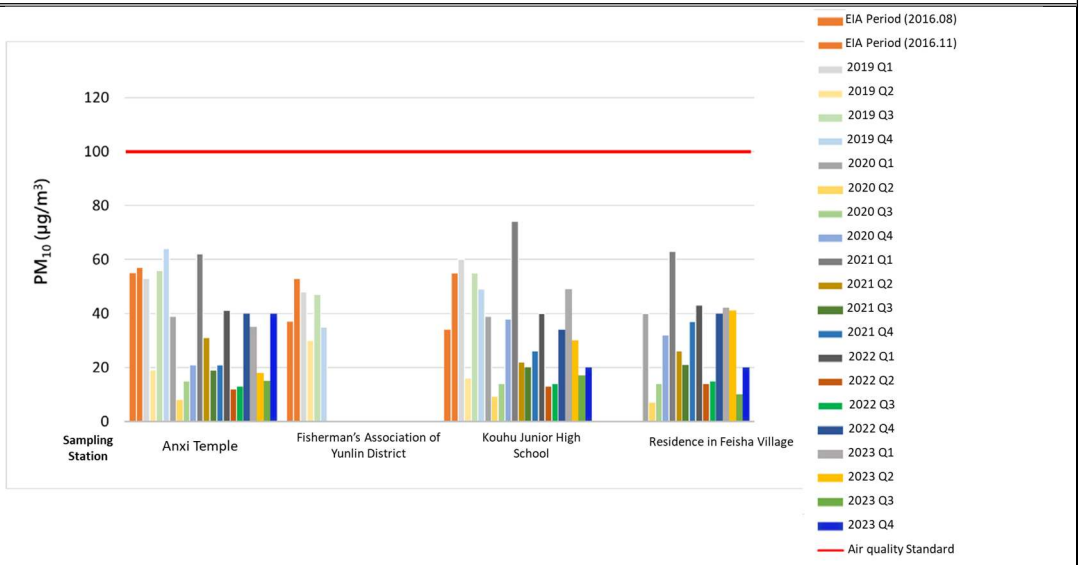
Unit: μg/m³

Monitoring Item	Monitoring Date		Anxi Temple	Fisherman's Association of Yunlin District	Kouhu Junior High School	Residence in Feisha Village	Air Quality Standards
$PM_{2.5}$ Value of 24 hours	During EIA	2016.07-2016.10	23-29	14-33	19-34	-	35
	2019 Q1	2019.03.27-28	30	32	31	-	
	2019 Q2	2019.06.03-04	11	11	11	-	
	2019 Q3	2019.08.28-29	21	22	20	-	
	2019 Q4	2019.11.27-28	13	13	11	-	
	2020 Q1	2020.02.26-27	18	-	23	22	
	2020 Q2	2020.05.21-22	5	-	4	5	
	2020 Q3	2020.07.13-14	6	-	5	6	
	2020 Q4	2020.11.25-26 2020.12.07-08	8	-	15	19	
	2021 Q1	2021.03.17-18	33	-	43*	43*	
	2021 Q2	2021.06.01-02	8	-	7	8	
	2021 Q3	2021.08.24-25	9	-	10	9	
	2021 Q4	2021.11.29-30	8	-	8	10	
	2022 Q1	2022.03.30-31	31	-	39*	38*	
	2022 Q2	2022.05.26-27	6		6	6	
	2022 Q3	2022.07.27-28	6	-	7	8	
	2022 Q4	2022.10.27-28	11	-	13	15	
	2023 Q1	2023.01.18-19	20	-	28	28	
	2023 Q2	2023.05.04-05	13	-	14	19	
	2023 Q3	2023.07.20-21	6	-	13	6	
	2023 Q4 (This quarter)	2023.10.17~18	28	-	14	14	

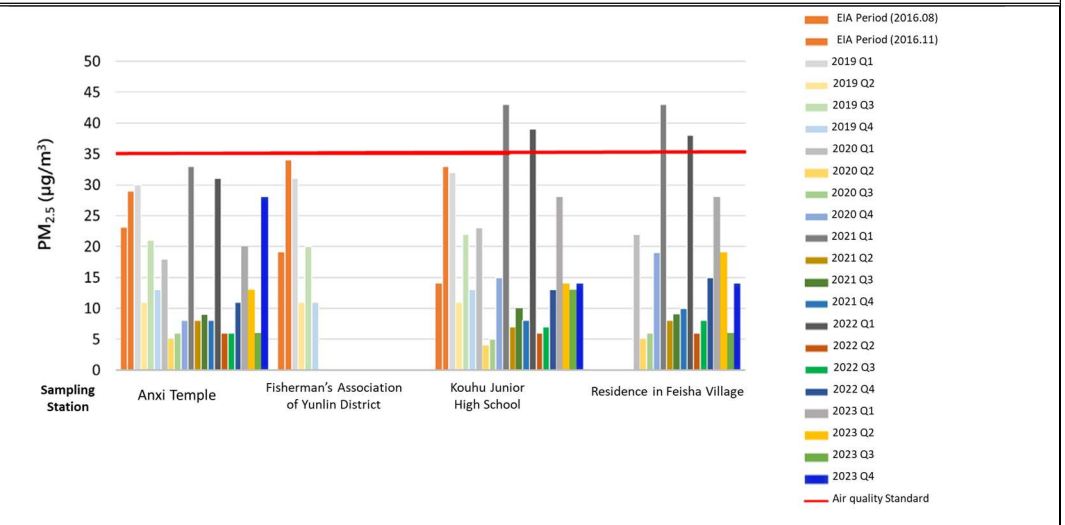
Remark: Monitoring spot for air quality has been changed since January 2020 according to 1st EIS report (finalized for review on January 3, 2020)



TSP



PM_{10}



$PM_{2.5}$

Figure 3.1.1-19 Analysis Result of Previous Air Quality Monitoring

Figure 3.1.1-20 The Location of the Survey Stations in the Project and the Lunbei Station of the MOENV

Table 3.1.1-22 Analysis Results Table of Previous Noise Monitoring(1/2)

Sampling Station	Monitoring Date		Equivalent Sound Energy at All Time Period (dB)		
			L_{day}	L_{night}	$L_{midnight}$
Taiwan Provincial Highway No.17/ County Highway No.158 (Taixi Junior High School)	During EIA	2016.08-2016.11	65.1-65.4	60.1-62.5	57.0-59.4
	2019 Q1	2019.03.27-28	67.7	60.7	60.0
	2019 Q2	2019.06.03-04	68.8	61.3	59.2
	2019 Q3	2019.08.28-29	69.9	62.6	59.5
	2019 Q4	2019.11.27-28	68.7	60.5	61.7
Sec. 1, Zhongzheng Rd (Fire Bureau)	During EIA	2016.08-2016.11	62.5-66.0	59.2-62.3	55.0-60.1
	2019 Q1	2019.03.27-28	68.5	61.0	60.5
	2019 Q2	2019.06.03-04	74.0	69.0	66.2
	2019 Q3	2019.08.28-29	68.5	63.7	57.4
	2019 Q4	2019.11.27-28	68.4	61.4	56.2
Residency of Yugang Road	During EIA	2016.08-2016.11	64.2-64.8	59.0-60.2	53.8-56.4
	2019 Q1	2019.03.27-28	69.6	61.8	53.4
	2019 Q2	2019.06.03-04	67.3	62.4	58.4
	2019 Q3	2019.08.28-29	63.3	62.7	56.7
	2019 Q4	2019.11.27-28	63.5	61.3	53.3
	2020 Q1	2020.02.26-27	64.7	61.3	53.6
	2020 Q2	2020.06.02-03	62.0	60.8	55.8
	2020 Q3	2020.07.13-14	65.1	59.7	57.3
	2020 Q4	2020.11.25-26	65.4	67.8	55.1
	2021 Q1	2021.03.16-17	65.7	63.9	56.8
	2021 Q2	2021.05.24-25	62.3	62.2	55.2
	2021 Q3	2021.08.25-26	62.6	60.5	53.8
	2021 Q4	2021.11.29-30	69.1	66.3	62.8
	2022 Q1	2022.03.30-31	66.0	62.2	55.0
	2022 Q2	2022.05.26-27	62.0	57.5	55.3
	2022 Q3	2022.07.27-28	67.7	63.6	58.0
	2022 Q4	2022.10.27-28	64.5	60.2	53.4
	2023 Q1	2023.01.18-19	68.7	66.4	59.2
	2023 Q2	2023.05.04-05	64.0	66.0	54.7
	2023 Q3	2023.07.20-21	74.8*	60.5	54.9
	2023 Q4 (This quarter)	2023 12.28-29	69.6	58.6	57.3
Noise Control Standards of Second Type of Zone near roads more than 8m wide			74.0	70.0	67.0

Remark: Monitoring spot for noise vibration has been changed since January 2020 according to 1st EIS report (finalized for review on January 3, 2020)

Remark: "*" indicates the value exceed Noise Control Standards of Second Type of Zone near roads more than 8m wide

Table 3.1.1-22 Analysis Results Table of Previous Noise Monitoring (2/2)

Sampling Station	Monitoring Date		Equivalent Sound Energy at All Time Period (dB)		
			L_{day}	L_{night}	$L_{midnight}$
Anxi Temple	During EIA	-	-	-	-
	2020 Q1	2020.02.26-27	67.6	61.2	58.6
	2020 Q2	2020.06.02-03	67.1	61.1	60.5
	2020 Q3	2020.07.13-14	73.9	66.6	66.3
	2020 Q4	2020.12.07-08	66.8	58.0	58.8
	2021 Q1	2021.03.16-17	67.3	63.2	59.6
	2021 Q2	2021.05.24-25	62.3	62.2	55.2
	2021 Q3	2021.08.25-26	67.4	60.4	60.4
	2021 Q4	2021.11.29-30	75.4*	66.7	67.2*
	2022 Q1	2022.03.30-31	67.8	59.0	59.6
	2022 Q2	2022.05.26-27	71.6	61.3	65.7
	2022 Q3	2022.07.27-28	70.9	63.3	62.3
	2022 Q4	2022.10.27-28	68.2	58.7	59.1
	2023 Q1	2023.01.18-19	70.7	66.4	60.2
	2023 Q2	2023.05.04-05	66.9	58.8	61.2
	2023 Q3	2023.07.20-21	68.0	60.0	59.3
	2023 Q4 (This quarter)	2023 10.17-18	66.9	59.3	57.9
Residence in Feisha Village	During EIA	-	-	-	-
	2020 Q1	2020.02.26-27	67.1	63.0	59.0
	2020 Q2	2020.06.02-03	67.9	60.9	58.6
	2020 Q3	2020.07.13-14	67.5	60.9	59.5
	2020 Q4	2020.11.25-26	66.1	63.2	58.1
	2021 Q1	2021.03.16-17	67.5	62.9	59.8
	2021 Q2	2021.05.24-25	66.8	59.7	59.5
	2021 Q3	2021.08.25-26	67.4	60.4	60.4
	2021 Q4	2021.11.29-30	67.7	63.4	61.9
	2022 Q1	2022.03.30-31	67.8	59.0	59.6
	2022 Q2	2022.05.26-27	66.0	60.1	59.8
	2022 Q3	2022.07.27-28	67.4	63.8	60.3
	2022 Q4	2022.10.27-28	74.6*	75.1*	67.7*
	2023 Q1	2023.01.18-19	67.2	63.1	59.8
	2023 Q2	2023.05.04-05	66.8	62.5	57.7
	2023 Q3	2023.07.20-21	66.1	60.3	58.7
	2023 Q4 (This quarter)	2023 12.28-29	66.8	61.5	57.9
Noise Control Standards of Second Type of Zone near roads more than 8m wide			74.0	70.0	67.0

Remark: Monitoring spot for noise vibration has been changed since January 2020 according to 1st EIS report (finalized for review on January 3, 2020)

Remark: "*" indicates the value exceed Noise Control Standards of Second Type of Zone near roads more than 8m wide.

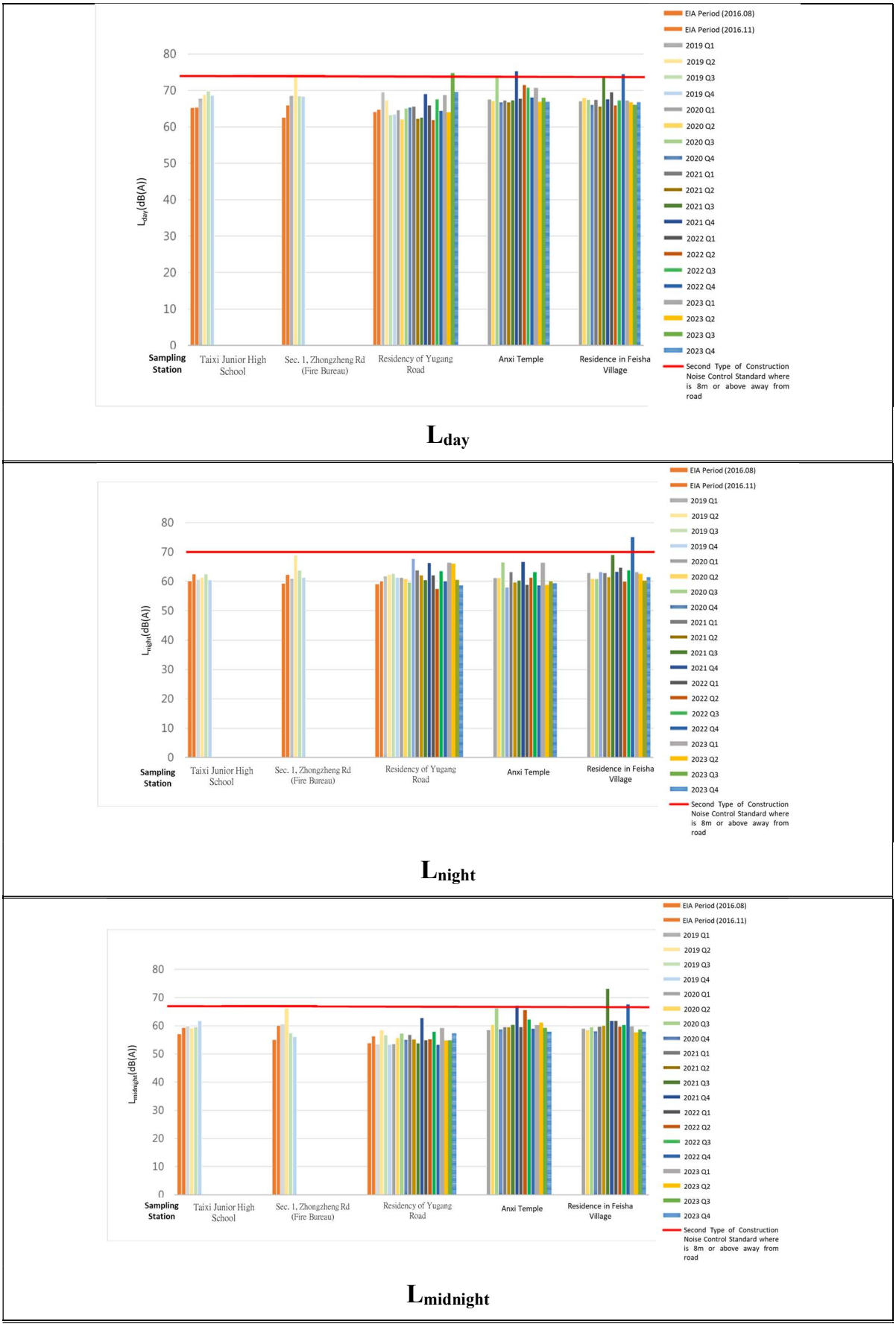


Figure 3.1.1-21 Analysis of Previous Noise Monitoring Results

Table 3.1.1-23 Analysis Results Table of Previous Vibration Monitoring (1/3)

Sampling Station	Monitoring Date		Equivalent Sound Energy at All Time Period (dB)	
			L_{V10day}	$L_{V10\ night}$
Taiwan Provincial Highway No.17/ County Highway No.158 (Taixi Junior High School)	During EIA	2016.08-2016.11	39.9-43.4	32.9-35.2
	2019 Q1	2019.03.27-28	36.9	30.8
	2019 Q2	2019.06.03-04	36.5	30.7
	2019 Q3	2019.08.28-29	37.3	30.8
	2019 Q4	2019.11.27-28	30.8	30.0
Sec. 1, Zhongzheng Rd (Fire Bureau)	During EIA	2016.08-2016.11	37.9-40.9	32.6-34.3
	2019 Q1	2019.03.27-28	32.5	30.0
	2019 Q2	2019.06.03-04	38.8	32.3
	2019 Q3	2019.08.28-29	38.4	30.2
	2019 Q4	2019.11.27-28	33.0	30.0
Residency of Yugang Road	During EIA	2016.08-2016.11	36.7-40.5	32.0-34.6
	2019 Q1	2019.03.27-28	44.3	31.6
	2019 Q2	2019.06.03-04	34.7	30.1
	2019 Q3	2019.08.28-29	33.6	30.6
	2019 Q4	2019.11.27-28	32.1	30.1
	2020 Q1	2020.02.26-27	30.4	30.0
	2020 Q2	2020.06.02-03	32.8	30.0
	2020 Q3	2020.07.13-14	33.3	30.0
	2020 Q4	2020.11.25-26	34.6	31.3
	2021 Q1	2021.03.16-17	34.6	30.4
	2021 Q2	2021.05.24-25	32.1	30.0
	2021 Q3	2021.08.25-26	33.7	30.7
	2021 Q4	2021.11.29-30	35.0	30.1
	2022 Q1	2022.03.30-31	43.2	38.5
	2022 Q2	2022.05.26-27	42.5	38.7
	2022 Q3	2022.07.27-28	34.3	31.3
	2022 Q4	2022.10.27-28	33.3	30.1
	2023 Q1	2023.01.18-19	35.6	31.9
	2023 Q2	2023.05.04-05	34.0	30.0
	2023 Q3	2023.07.20-21	35.7	30.0
	2023 Q4 (This quarter)	2023.12.28-29	34.9	30.4
Control Standards of First Types of Area (L_{v10})			65	60

Remark: Monitoring spot for noise vibration has been changed since January 2020 according to 1st EIS report (finalized for review on January 3, 2020)

Table 3.1.1-23 Analysis Results Table of Previous Vibration Monitoring (2/3)

Sampling Station	Monitoring Date		Equivalent Sound Energy at All Time Period (dB)	
			L_{V10day}	$L_{V10\ night}$
Anxi Temple	During EIA	-	-	-
	2020 Q1	2020.02.26-27	36.3	30.0
	2020 Q2	2020.06.02-03	37.1	30.2
	2020 Q3	2020.07.13-14	38.1	30.1
	2020 Q4	2020.12.07-08	37.2	30.0
	2021 Q1	2021.03.16-17	36.7	30.3
	2021 Q2	2021.05.24-25	35.8	30.0
	2021 Q3	2021.08.25-26	37.5	30.5
	2021 Q4	2021.11.29-30	41.2	31.9
	2022 Q1	2022.03.30-31	39.7	33.1
	2022 Q2	2022.05.26-27	38.6	30.4
	2022 Q3	2022.07.27-28	39.4	35.4
	2022 Q4	2022.10.27-28	35.4	30.0
	2023 Q1	2023.01.18-19	35.7	30.0
	2023 Q2	2023.05.04-05	42.8	33.4
	2023 Q3	2023.07.20-21	36.5	30.0
	2023 Q4 (This quarter)	2023.10.17-18	34.1	30.0
Control Standards of First Types of Area (L_{v10})			65	60

Remark: Monitoring spot for noise vibration has been changed since January 2020 according to 1st EIS report (finalized for review on January 3, 2020)

Table 3.1.1-23 Analysis Results Table of Previous Vibration Monitoring(3/3)

Sampling Station	Monitoring Date		Equivalent Sound Energy at All Time Period (dB)	
			L_{V10day}	$L_{V10\ night}$
Residence in Feisha Village	During EIA	-	-	-
	2020 Q1	2020.02.26-27	41.8	39.0
	2020 Q2	2020.06.02-03	40.2	35.1
	2020 Q3	2020.07.13-14	40.1	35.3
	2020 Q4	2020.11.25-26	41.3	35.9
	2021 Q1	2021.03.16-17	40.4	36.0
	2021 Q2	2021.05.24-25	40.1	35.8
	2021 Q3	2021.08.25-26	42.1	36.4
	2021 Q4	2021.11.29-30	41.0	36.8
	2022 Q1	2022.03.30-31	41.5	37.2
	2022 Q2	2022.05.26-27	39.4	34.2
	2022 Q3	2022.07.27-28	39.8	35.3
	2022 Q4	2022.10.27-28	41.8	37.0
	2023 Q1	2023.01.18-19	40.6	36.5
	2023 Q2	2023.05.04-05	39.4	35.0
	2023 Q3	2023.07.20-21	40.1	34.4
	2023 Q4 (This quarter)	2023.12.28-29	39.2	33.8
Control Standards of First Types of Area (L_{v10})			65	60

Remark: Monitoring spot for noise vibration has been changed since January 2020 according to 1st EIS report (finalized for review on January 3, 2020)

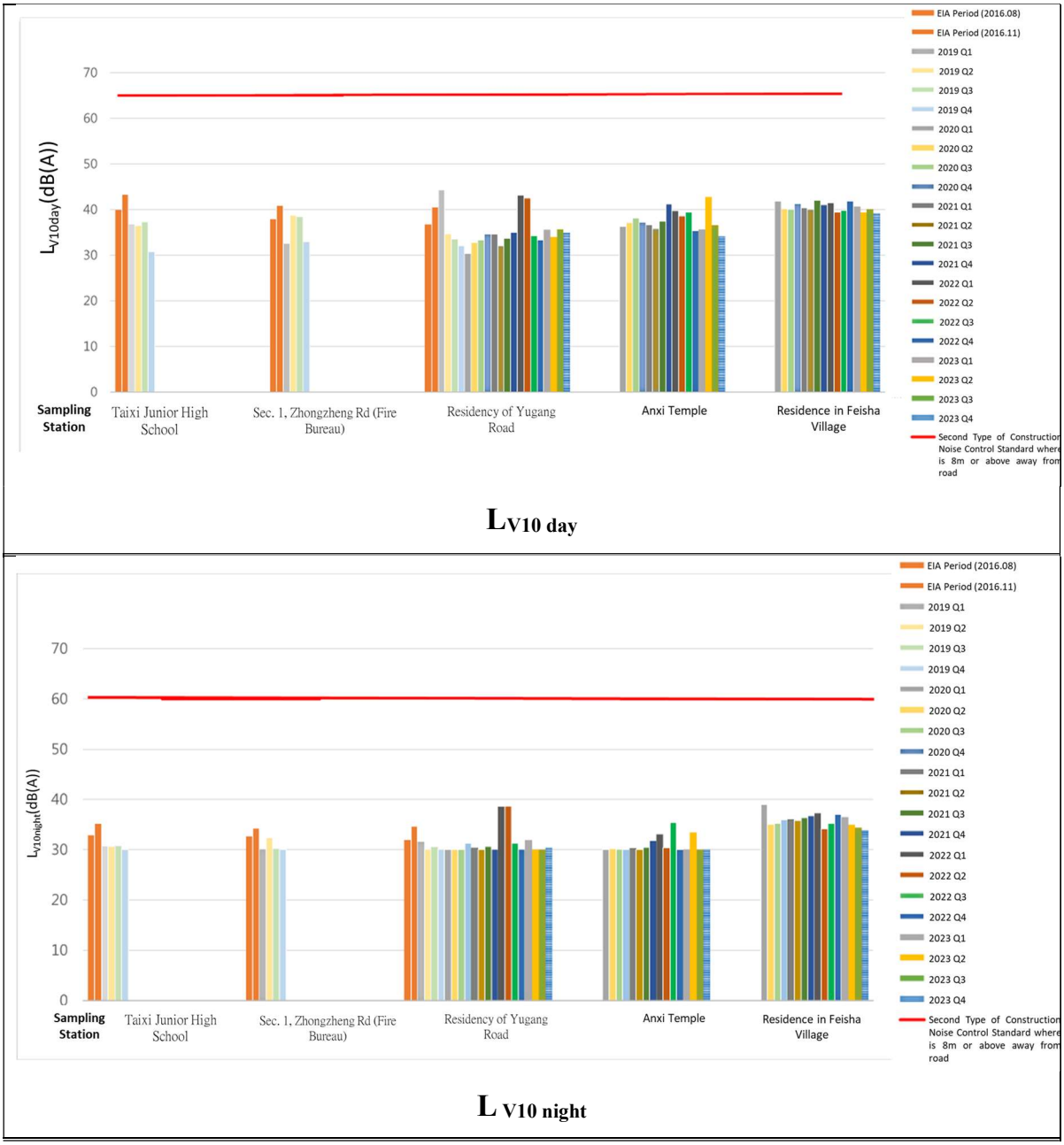


Figure 3.1.1-22 Analysis of Previous Vibration Monitoring Results

X. Terrestrial Ecology

i Plants

61 families, 166 genera and 251 species were recorded in EIS (2016 October-2017 January). Comparing to the EIS stage, 79 species were newly recorded in this quarter, including Ficus microcarpa cv., Red Fruit Fig-tree, Coral Vine, Paper Flower, Worm-seed Goosefoot, Oakleaf Goosefoot, Cactus, *Alysicarpus ovalifolius* and Lepidium. 37 species recorded in the EIS stage were not recorded in this quarter, including Sessile Alternanthera, Ponnanganni, Lepidium bonariense, Alysicarpus bupleurifolius and Dwarf poinsettia, etc. Since the survey area is an area with more human activities, the species are mainly human-planted and human-disturbed species. Most of the differences with the environmental stage are due to the removal or expansion of plants by human mowing, while a small part is due to the increase or decrease of plants caused by changes of planting or crop replacement.

75 families, 199 genera and 254 species were documented in the same quarter in the last year (2022 Q4). A total of 77 families, 203 genera and 261 species were documented in this quarter. 14 species were newly added in this survey, including Trisetiferous Dock, Lepidium, *Alysicarpus ovalifolius*, Japanese Tree Bine, Naroow-leaves Sida, Sida cordifolia, Oenanthe javanica, Chinese Sealavender, White Woodrose, Simpleleaf Shrub Chaste Tree, Purple Cudweed, asparagus, Maguey and Common Torulinium. 8 species recorded in the EIS stage were not recorded in this quarter, including brocoli, cauliflower, peas, Garland Chrysanthemum, Common Cosmos, Prickly Sow Thistle, Fimbristylis dichotoma and Crabgrass. Since the area included in the survey had frequent human activities, species were mostly cultivated plants or those that had higher endurance of artificial disturbance. Change of plants were slight, as artificial plantings attributes to increase and loss of plants.

H' for previous xylophtyta in forest sampling area is between 0.41-1.21. *E5* falls between 0.48-1.00. *H'* for ground-covered plant in forest sampling area is between 0.93-2.40, *E5* falls between 0.36-0.83. *H'* for herbal plants is between 0.23-1.69, *E5* falls between 0.38-0.87. Diversity index of plant sampling area in previous surveys are shown as Table 3.1.1-24 and Figure 3.1.1-23 to 3.1.1-25.

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (1/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	*E5*
Xylophtyta in Forest Sampling Area	T1	2019 Q1	0.43	0.66
		2019 Q2	0.43	0.66
		2019 Q3	0.43	0.66
		2019 Q4	0.43	0.66
		2020 Q1	0.43	0.66
		2020 Q2	0.43	0.66
		2020 Q3	0.43	0.66
		2020 Q4	0.43	0.66
		2021 Q1	0.43	0.66
		2021 Q2	0.43	0.66
		2021 Q3	0.43	0.66
		2021 Q4	0.41	0.64
		2022 Q1	0.41	0.64
		2022 Q2	0.41	0.64
		2022 Q3	0.63	0.58
		2022 Q4	0.63	0.58
		2023 Q1	0.63	0.58
		2023 Q2	0.63	0.58
		2023 Q3	0.63	0.58
		2023 Q4	0.63	0.58
	T2	2019 Q1	1.00	0.66
		2019 Q2	1.00	0.66
		2019 Q3	1.00	0.66
		2019 Q4	1.00	0.66
		2020 Q1	1.00	0.66
		2020 Q2	1.00	0.66
		2020 Q3	1.00	0.66
		2020 Q4	1.00	0.66
		2021 Q1	1.00	0.66
		2021 Q2	1.00	0.66
		2021 Q3	1.00	0.66
		2021 Q4	0.98	0.66
		2022 Q1	0.98	0.66
		2022 Q2	0.98	0.66
		2022 Q3	1.13	0.63
		2022 Q4	1.15	0.66
		2023 Q1	1.15	0.66
		2023 Q2	1.15	0.66
		2023 Q3	1.15	0.66
		2023 Q4	1.07	0.64

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (2/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	*E*5
Xylophtyta in Forest Sampling Area	T3	2019 Q1	1.08	0.72
		2019 Q2	1.08	0.72
		2019 Q3	1.08	0.72
		2019 Q4	1.08	0.72
		2020 Q1	1.08	0.72
		2020 Q2	1.08	0.72
		2020 Q3	1.08	0.72
		2020 Q4	1.08	0.72
		2021 Q1	1.08	0.72
		2021 Q2	1.08	0.72
		2021 Q3	1.08	0.72
		2021 Q4	1.14	0.72
		2022 Q1	1.14	0.72
		2022 Q2	1.14	0.72
		2022 Q3	1.21	0.75
		2022 Q4	1.19	0.77
		2023 Q1	1.19	0.77
		2023 Q2	1.19	0.77
		2023 Q3	1.19	0.77
		2023 Q4	1.19	0.77
	T4	2019 Q1	0.69	1.00
		2019 Q2	0.69	1.00
		2019 Q3	0.69	1.00
		2019 Q4	0.69	1.00
		2020 Q1	0.69	0.99
		2020 Q2	0.69	0.99
		2020 Q3	0.69	0.99
		2020 Q4	0.69	0.99
		2021 Q1	0.69	0.99
		2021 Q2	0.69	0.99
		2021 Q3	0.69	0.99
		2021 Q4	0.68	0.97
		2022 Q1	0.68	0.97
		2022 Q2	0.68	0.97
		2022 Q3	0.68	0.98
		2022 Q4	0.68	0.97
		2023 Q1	0.68	0.98
		2023 Q2	0.68	0.98
		2023 Q3	0.68	0.98
		2023 Q4	0.68	0.98

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (3/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	*E*5
Xylophtyta in Forest Sampling Area	T5	2019 Q1	0.60	0.84
		2019 Q2	0.60	0.84
		2019 Q3	0.60	0.84
		2019 Q4	0.60	0.84
		2020 Q1	0.60	0.84
		2020 Q2	0.60	0.84
		2020 Q3	0.60	0.84
		2020 Q4	0.60	0.84
		2021 Q1	0.60	0.84
		2021 Q2	0.60	0.84
		2021 Q3	0.60	0.84
		2021 Q4	0.60	0.85
		2022 Q1	0.60	0.85
		2022 Q2	0.60	0.85
		2022 Q3	0.56	0.79
		2022 Q4	0.55	0.78
		2023 Q1	0.55	0.78
		2023 Q2	0.55	0.78
		2023 Q3	0.55	0.78
		2023 Q4	0.55	0.78

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (4/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	*E*5
Ground-Cover Plant in Forest Sampling Area	T1	2019 Q1	0.96	0.55
		2019 Q2	0.94	0.54
		2019 Q3	0.93	0.50
		2019 Q4	0.99	0.54
		2020 Q1	1.12	0.55
		2020 Q2	1.34	0.66
		2020 Q3	1.48	0.56
		2020 Q4	1.42	0.57
		2021 Q1	1.53	0.60
		2021 Q2	1.64	0.61
		2021 Q3	1.63	0.60
		2021 Q4	1.63	0.57
		2022 Q1	1.62	0.57
		2022 Q2	1.36	0.50
		2022 Q3	1.49	0.36
		2022 Q4	1.43	0.45
		2023 Q1	1.65	0.53
		2023 Q2	1.45	0.51
		2023 Q3	1.21	0.41
		2023 Q4	1.09	0.43
	T2	2019 Q1	1.02	0.71
		2019 Q2	1.07	0.73
		2019 Q3	1.14	0.69
		2019 Q4	1.23	0.74
		2020 Q1	1.23	0.75
		2020 Q2	1.23	0.75
		2020 Q3	1.49	0.74
		2020 Q4	1.39	0.72
		2021 Q1	1.37	0.65
		2021 Q2	1.35	0.64
		2021 Q3	1.34	0.64
		2021 Q4	1.49	0.61
		2022 Q1	1.57	0.58
		2022 Q2	1.42	0.58
		2022 Q3	1.73	0.60
		2022 Q4	1.71	0.64
		2023 Q1	1.77	0.67
		2023 Q2	1.80	0.67
		2023 Q3	1.66	0.61
		2023 Q4	1.72	0.59

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (5/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	*E*5
Ground-Cover Plant in Forest Sampling Area	T3	2019 Q1	2.10	0.82
		2019 Q2	1.99	0.73
		2019 Q3	2.05	0.75
		2019 Q4	2.05	0.76
		2020 Q1	2.01	0.74
		2020 Q2	2.04	0.76
		2020 Q3	2.05	0.78
		2020 Q4	2.05	0.75
		2021 Q1	1.97	0.77
		2021 Q2	1.96	0.77
		2021 Q3	1.91	0.73
		2021 Q4	1.89	0.73
		2022 Q1	1.93	0.78
		2022 Q2	1.91	0.74
		2022 Q3	1.95	0.73
		2022 Q4	1.98	0.79
		2023 Q1	2.00	0.83
		2023 Q2	1.95	0.71
		2023 Q3	2.00	0.73
		2023 Q4	2.02	0.74
	T4	2019 Q1	1.25	0.46
		2019 Q2	1.32	0.48
		2019 Q3	1.51	0.51
		2019 Q4	1.59	0.54
		2020 Q1	1.62	0.55
		2020 Q2	1.62	0.55
		2020 Q3	1.58	0.48
		2020 Q4	1.64	0.59
		2021 Q1	1.71	0.65
		2021 Q2	1.72	0.65
		2021 Q3	1.71	0.61
		2021 Q4	2.00	0.74
		2022 Q1	2.05	0.75
		2022 Q2	1.87	0.65
		2022 Q3	1.84	0.67
		2022 Q4	1.84	0.68
		2023 Q1	1.94	0.71
		2023 Q2	1.67	0.63
		2023 Q3	1.67	0.63
		2023 Q4	1.68	0.65

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (6/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	*E*5
Ground-Cover Plant in Forest Sampling Area	T5	2019 Q1	1.49	0.78
		2019 Q2	1.57	0.83
		2019 Q3	2.18	0.81
		2019 Q4	2.16	0.81
		2020 Q1	2.16	0.80
		2020 Q2	2.19	0.80
		2020 Q3	2.40	0.73
		2020 Q4	2.23	0.76
		2021 Q1	2.24	0.78
		2021 Q2	2.22	0.76
		2021 Q3	2.19	0.75
		2021 Q4	2.35	0.82
		2022 Q1	2.35	0.82
		2022 Q2	2.20	0.73
		2022 Q3	1.68	0.57
		2022 Q4	1.87	0.63
		2023 Q1	1.85	0.65
		2023 Q2	1.97	0.62
		2023 Q3	2.09	0.65
		2023 Q4	2.11	0.61

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (7/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	E5
Herbal	H1	2019 Q1	0.38	0.42
		2019 Q2	0.43	0.47
		2019 Q3	0.86	0.48
		2019 Q4	1.05	0.55
		2020 Q1	0.97	0.48
		2020 Q2	1.28	0.69
		2020 Q3	1.11	0.77
		2020 Q4	1.11	0.78
		2021 Q1	1.06	0.75
		2021 Q2	1.09	0.73
		2021 Q3	1.07	0.74
		2021 Q4	1.25	0.85
		2022 Q1	1.35	0.87
		2022 Q2	1.47	0.81
		2022 Q3	1.26	0.66
		2022 Q4	1.32	0.60
		2023 Q1	1.06	0.54
		2023 Q2	1.09	0.80
		2023 Q3	1.13	0.77
		2023 Q4	0.88	0.74
	H2	2019 Q1	1.25	0.79
		2019 Q2	1.05	0.80
		2019 Q3	1.15	0.73
		2019 Q4	1.14	0.71
		2020 Q1	1.10	0.67
		2020 Q2	0.96	0.71
		2020 Q3	0.98	0.73
		2020 Q4	0.99	0.70
		2021 Q1	1.03	0.71
		2021 Q2	1.03	0.67
		2021 Q3	0.98	0.67
		2021 Q4	1.08	0.68
		2022 Q1	1.16	0.71
		2022 Q2	1.16	0.67
		2022 Q3	1.25	0.59
		2022 Q4	1.47	0.66
		2023 Q1	1.44	0.75
		2023 Q2	1.37	0.81
		2023 Q3	1.66	0.80
		2023 Q4	1.51	0.86

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (8/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	E5
Herbal	H3	2019 Q1	1.02	0.66
		2019 Q2	0.93	0.59
		2019 Q3	0.88	0.56
		2019 Q4	0.90	0.51
		2020 Q1	0.95	0.54
		2020 Q2	0.95	0.52
		2020 Q3	0.76	0.54
		2020 Q4	0.81	0.60
		2021 Q1	0.89	0.61
		2021 Q2	0.87	0.58
		2021 Q3	0.96	0.58
		2021 Q4	1.12	0.55
		2022 Q1	0.68	0.45
		2022 Q2	0.55	0.40
		2022 Q3	1.03	0.68
		2022 Q4	1.21	0.72
		2023 Q1	0.63	0.43
		2023 Q2	0.45	0.38
		2023 Q3	0.65	0.42
		2023 Q4	0.55	0.46
	H4	2019 Q1	0.23	0.50
		2019 Q2	0.31	0.56
		2019 Q3	0.66	0.67
		2019 Q4	0.63	0.67
		2020 Q1	0.67	0.71
		2020 Q2	0.85	0.77
		2020 Q3	1.26	0.71
		2020 Q4	1.20	0.74
		2021 Q1	1.04	0.72
		2021 Q2	1.01	0.72
		2021 Q3	1.11	0.72
		2021 Q4	1.11	0.72
		2022 Q1	0.96	0.52
		2022 Q2	1.05	0.51
		2022 Q3	1.24	0.64
		2022 Q4	1.43	0.68
		2023 Q1	1.13	0.53
		2023 Q2	0.90	0.51
		2023 Q3	0.82	0.87
		2023 Q4	0.43	0.65

Table 3.1.1-24 Diversity index of Plant Sampling Area in Previous Surveys (9/9)

Type of Sampling Area	Sampling Area No.	Survey Quarter	Diversity（*H'*）	E5
Herbal	H5	2019 Q1	0.95	0.52
		2019 Q2	0.93	0.71
		2019 Q3	0.85	0.48
		2019 Q4	0.88	0.48
		2020 Q1	0.72	0.43
		2020 Q2	1.04	0.46
		2020 Q3	0.86	0.43
		2020 Q4	0.88	0.47
		2021 Q1	1.05	0.50
		2021 Q2	1.00	0.49
		2021 Q3	0.76	0.49
		2021 Q4	0.83	0.52
		2022 Q1	0.91	0.65
		2022 Q2	0.78	0.48
		2022 Q3	1.16	0.61
		2022 Q4	1.13	0.60
		2023 Q1	0.96	0.47
		2023 Q2	1.69	0.78
		2023 Q3	0.90	0.53
		2023 Q4	0.74	0.55

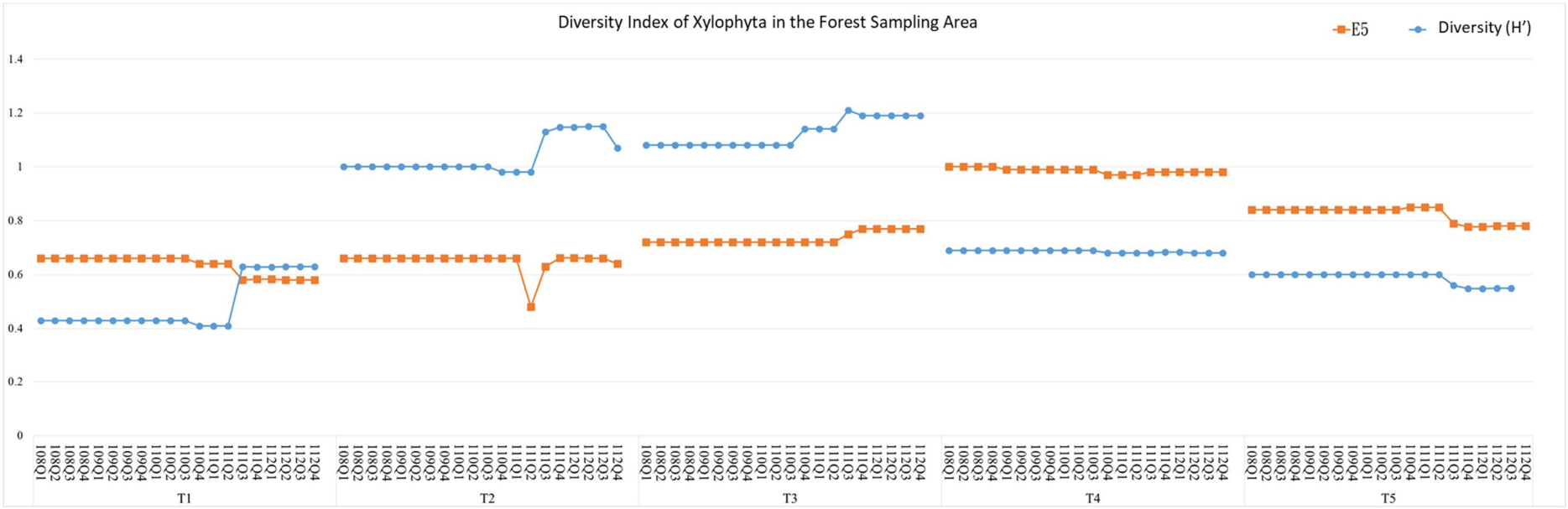


Figure 3.1.1-23 Diversity Index of Xylophyta in the Forest Sampling Area

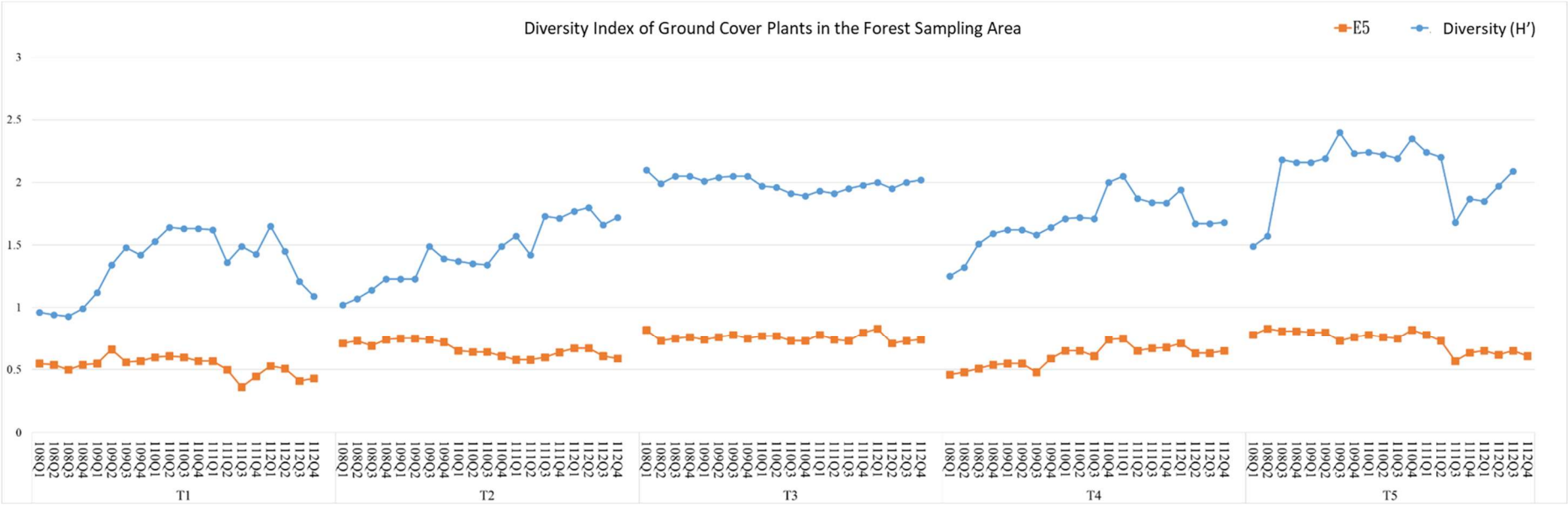


Figure 3.1.1-24 Diversity Index of Ground Cover Plants in the Forest Sampling Area

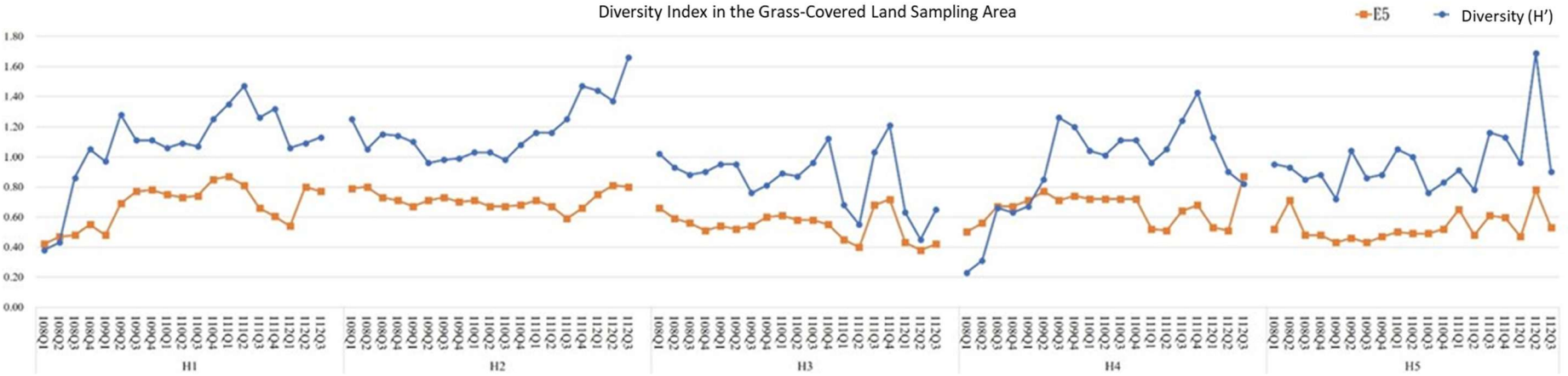


Figure 3.1.1-25 Diversity Index in the Grass-Covered Land Sampling Area

ii Animal

1. Mammals

3 orders, 3 families and 13 species were recorded in stage of EIS (October 2016 and January 2017). 4 species were added comparing to the last survey, including Brown Rat, Red-bellied tree squirrel, Gem-faced civet and Formosan hare. Greater bandicoot rat, Striped field mouse, House Mouse, Formosan mouse-eared bat, *Myotis secundus*, Formosan Tube-nosed Bat, Villus Noctule and Eptesicus pachyomus horikawai were not recorded comparing to the EIA stage. The dominant species in the EIA stage is House Shrew and is Japanese house bat in this survey.

In the last survey (October 2022), 5 orders, 7 families and 10 species were recorded. 1 species were added comparing to the last survey, including *Tadarida insignis*.The dominant species in the EIA stage and this survey is Japanese house bat.

H' index of mammal in previous surveys is between 0.30-1.67, indicating a poor composition of mammal species in the survey area. Species observed in the area mostly prefer farmland. Difference in diversity index is caused by species captured by mousetrap. *H'* index will be lower when less species are captured. Run chart of mammal *H'* index and number of species are shown as Figure 3.1.1-26 and Table 3.1.1-25.

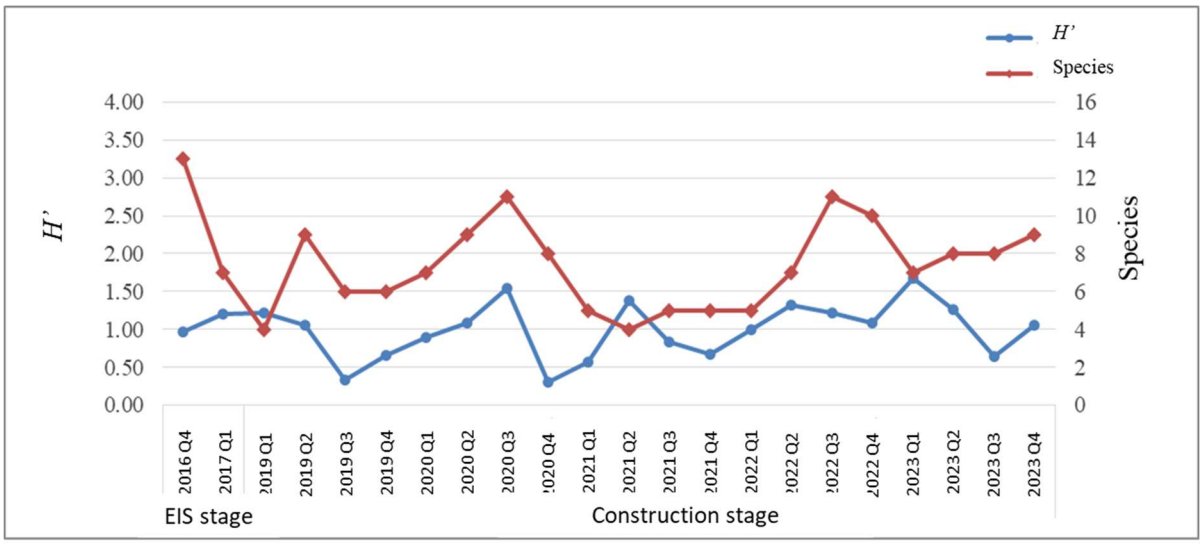


Figure 3.1.1-26 Run Chart of Mammal *H'* Index and Number of Species

Table 3.1.1-25 Species and *H'* Index of Mammals

Quarter		Species	*H'*
EIA	2016Q4	13	0.96
	2017 Q1	7	1.20
Construction	2019 Q1	4	1.22
	2019 Q2	9	1.05
	2019 Q3	6	0.34
	2019 Q4	6	0.66
	2020 Q1	7	0.90
	2020 Q2	9	1.08
	2020 Q3	11	1.55
	2020 Q4	8	0.30
	2021 Q1	5	0.56
	2021 Q2	4	1.37
	2021 Q3	5	0.83
	2021 Q4	5	0.67
	2022 Q1	5	0.99
	2022 Q2	7	1.31
	2022 Q3	15	1.21
	2022 Q4	10	1.09
	2023 Q1	7	1.67
	2023 Q2	8	1.26
	2023 Q3	8	0.64
	2023 Q4	9	1.05

2. Birds

12 orders, 30 families and 58 species were recorded in stage of EIS (October 2016). 14 species were added comparing to the last survey, including Pied Avocet, Dunlin, Greater Sand-Plover, Lesser Sand-Plover, Painted Snipe, White-breasted Water Hen, Savanna Nightjar, Zitting Cisticola, White Wagtail, Grey Wagtail, Oriental Skylark, Vinous-throated Parrotbill, Grey Treepie and Oriental Magpie; 17 species were recorded in the last survey but not in this quarter, including Pacific Golden-Plover, Oriental Pratincole, African Sacred Ibis, Slaty-breasted Rail, Northern Pintail, Green-winged Teal, House Swift, Pigmy Woodpecker, Crested Myna, Long-tailed Shrike, Cisticola exilis volitans, Eastern Yellow Wagtail, *Anthus richardi*, Blue Rock-Thrush, Gray-streaked Flycatcher, Arctic Warbler and Black-naped Blue Monarch. The dominant species in the EIA stage little egret and is sparrow in this survey.

10 orders, 27 families and 53 species were recorded in the same quarter of last year (October 2022). 7 species were added comparing to the last survey, including Dunlin, Greater Sand-Plover, Lesser Sand-Plover, Painted Snipe, Grey Heron, Common Kestrel and Vinous-throated Parrotbill; 5species were recorded in the last survey but not in this quarter, including Whimbrel, Pacific Golden-Plover, Oriental Pratincole, Malayan Night-Heron and Green-winged Teal.

H' index of bird in previous surveys is between 3.08-3.70. Survey area includes farmland, buildings, fish farm and coastal environments. Bird activities can be observed in each types of habitats. The index indicates a rich composition. Run chart of bird *H'* index and number of species are shown as Figure 3.1.1-27 and Table 3.1.1-26.

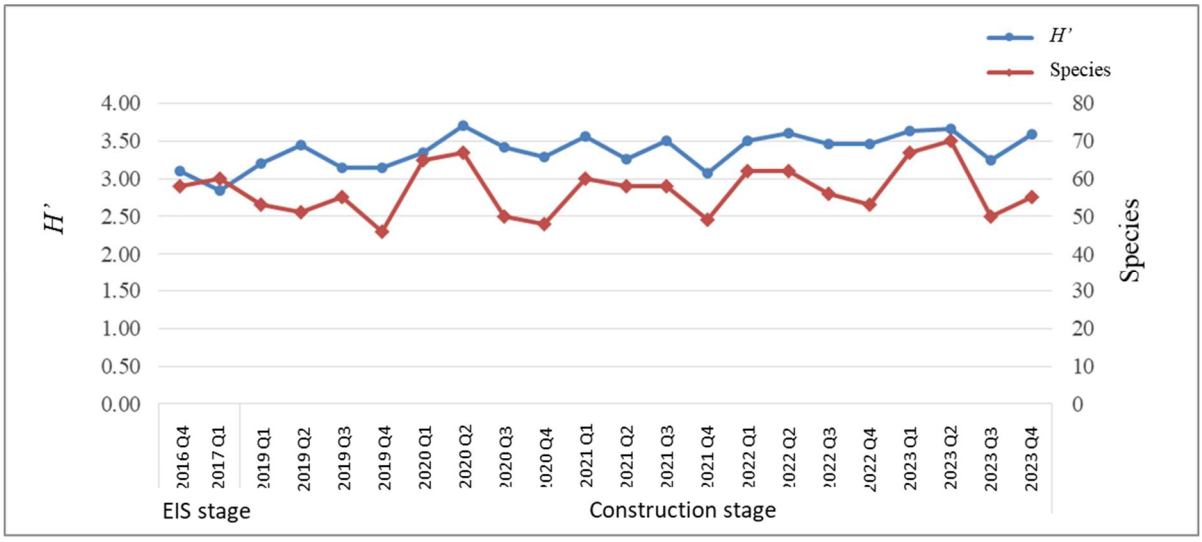


Figure 3.1.1-27 Run Chart of Bird *H'* Index and Number of Species

Table 3.1.1-26 Species and *H'* Index of Birds

Quarter		Species	*H'*
EIA	2016Q4	58	3.11
	2017 Q1	60	2.85
Construction	2019 Q1	53	3.20
	2019 Q2	51	3.44
	2019 Q3	55	3.15
	2019 Q4	46	3.14
	2020 Q1	65	3.35
	2020 Q2	67	3.70
	2020 Q3	50	3.41
	2020 Q4	48	3.29
	2021 Q1	60	3.56
	2021 Q2	58	3.25
	2021 Q3	58	3.50
	2021 Q4	49	3.08
	2022 Q1	63	3.50
	2022 Q2	62	3.60
	2022 Q3	56	3.46
	2022 Q4	53	3.46
	2023 Q1	67	3.63
	2023 Q2	70	3.66
	2023 Q3	50	3.24
	2023 Q4	55	3.58

3. Amphibian

1 order, 3 families and 3 species were recorded in stage of EIS (October 2016 and January 2017). The survey is conducted in summer, and the survey in the EIS phase was conducted in fall and winter. As there is no spring survey data in the EIS phase, so the survey result is compared with the spring of last year.

In the last survey (July 2022), 1 order, 4 families and 5 species were recorded. 2 species were added comparing to the last survey, including East Asian bullfrog and Ornamented pygmy frog. Overall, not many amphibian were recorded in the two stages.

H' index of amphibian in previous surveys is between 0.00-1.36, indicating a poor composition in amphibian species. Survey area are mostly farmland, buildings, fish farm and coastal area, which are not suitable habitats for amphibian. In the survey conducted in 2019 Q1, no amphibian was observed as the temperature is low and it is not the breeding season. Run chart of amphibian *H'* index and number of species are shown as Figure 3.1.1-28 and Table 3.1.1-27.

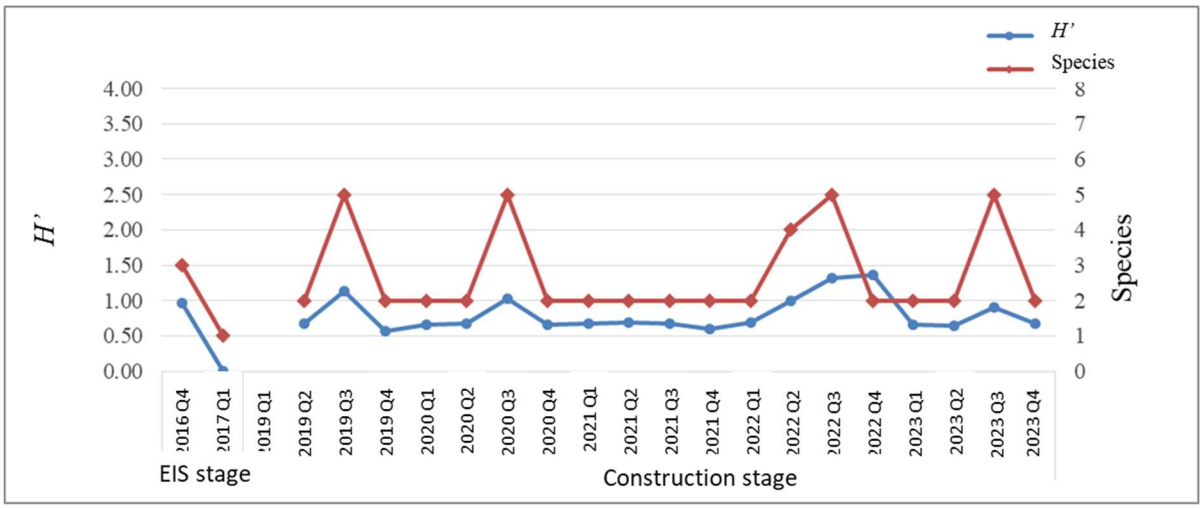


Figure 3.1.1-28 Run Chart of Amphibian *H'* Index and Number of Species

Table 3.1.1-27 Species and *H'* Index of Amphibian

Quarter		Species	*H'*
EIA	2016Q4	3	0.97
	2017 Q1	1	-
Construction	2019 Q1	0	-
	2019 Q2	2	0.68
	2019 Q3	5	1.13
	2019 Q4	2	0.57
	2020 Q1	2	0.66
	2020 Q2	2	0.67
	2020 Q3	5	1.03
	2020 Q4	2	0.67
	2021 Q1	2	0.67
	2021 Q2	2	0.69
	2021 Q3	2	0.67
	2021 Q4	2	0.60
	2022 Q1	2	0.69
	2022 Q2	4	1.00
	2022 Q3	5	1.32
	2022 Q4	2	1.36
	2023 Q1	2	0.66
	2023 Q2	2	0.65
	2023 Q3	5	0.91
	2023 Q4	2	0.68

4. Reptile

2 order, 7 families and 10 species were recorded in stage of EIS (October 2016). *Eutropis multifasciatais* newly recorded, and 5 species, including *Plestiodon chinensis formosensis*, Stejneger's grass lizard, Formosan grass lizard, Taiwan Banded Krait and Chinese Stripe-necked Turtle were not recorded in this survey.

In the last survey (July 2022), 2 order, 4 families and 6 species were recorded. Taiwan stink snake is newly recorded, and 1 species, including Chinese Stripe-necked Turtle were not recorded in this survey. The dominant species in both surveys is Common House Gecko.

H' index of reptile in previous surveys is between 0.43-1.45. Secondary forest and grasslands, that are suitable for reptile, are less observed in the survey area. Except for survey conducted in 2019 Q3, in which higher

temperature results a higher activity of reptile, the rest of the quarters present a poor composition in reptile species. Run chart of reptile *H'* index and number of species are shown as Figure 3.1.1-29 and Table 3.1.1-28.

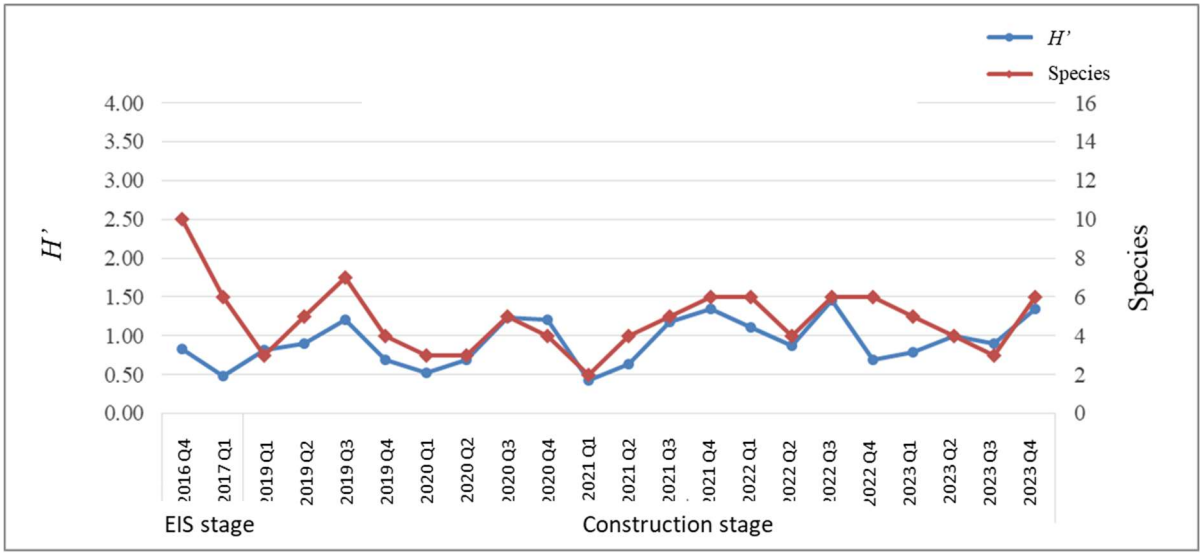


Figure 3.1.1-29 Run Chart of Reptile *H'* Index and Number of Species

Table 3.1.1-28 Species and *H'* Index of Reptiles

Quarter		Species	*H'*
EIA	2016Q4	10	0.83
	2017 Q1	6	0.47
Construction	2019 Q1	3	0.81
	2019 Q2	5	0.90
	2019 Q3	7	1.21
	2019 Q4	4	0.70
	2020 Q1	3	0.53
	2020 Q2	3	0.69
	2020 Q3	5	1.23
	2020 Q4	4	1.21
	2021 Q1	2	0.43
	2021 Q2	4	0.64
	2021 Q3	5	1.18
	2021 Q4	6	1.35
	2022 Q1	6	1.11
	2022 Q2	4	0.87
	2022 Q3	6	1.45
	2022 Q4	6	1.36
	2023 Q1	5	0.79
	2023 Q2	4	1.00
	2023 Q3	3	0.90
	2023 Q4	6	1.34

5. Butterfly

1 order, 3 families and 8 species were recorded in stage of EIS (October 2016). 1 order, 5 families and 8 species were recorded. 12 species including Small White, Wood white, Indian Cabbage White, Glassy Tiger, Golden-C Comma, Eggfly, Angled Castor, Formosan Swift, Lime Butterfly, Blue Triangle, The spangle and Great Mormon were newly recorded, and 3 species including Danaid Eggfly, Pea blue and Grass Blue were not recorded in this survey.

In the last survey (July 2022), 1 order, 5 families and 14 species were recorded. 4 species including Angled Castor, Lime Butterfly, The spangle and Great Mormon were newly recorded, and 1 speciesPea blue were not recorded in this survey. The survey area is located at the coastal area, the majority was constituted by common butterflies that prefer crops in agricultural land.

H' index of butterfly in previous surveys is between 1.36-2.65, indicating a rich composition in butterfly species. Recorded species are mainly species that prefer farmland. In July 2022, the survey is conducted in the growing season of fertilizer plants, therefore, many butterfly that favors Cruciferae crops are observed at farmland, and the survey recorded the most species among all surveys. Run chart of butterfly *H'* index and number of species are shown as Figure 3.1.1-30 and Table 3.1.1-29.

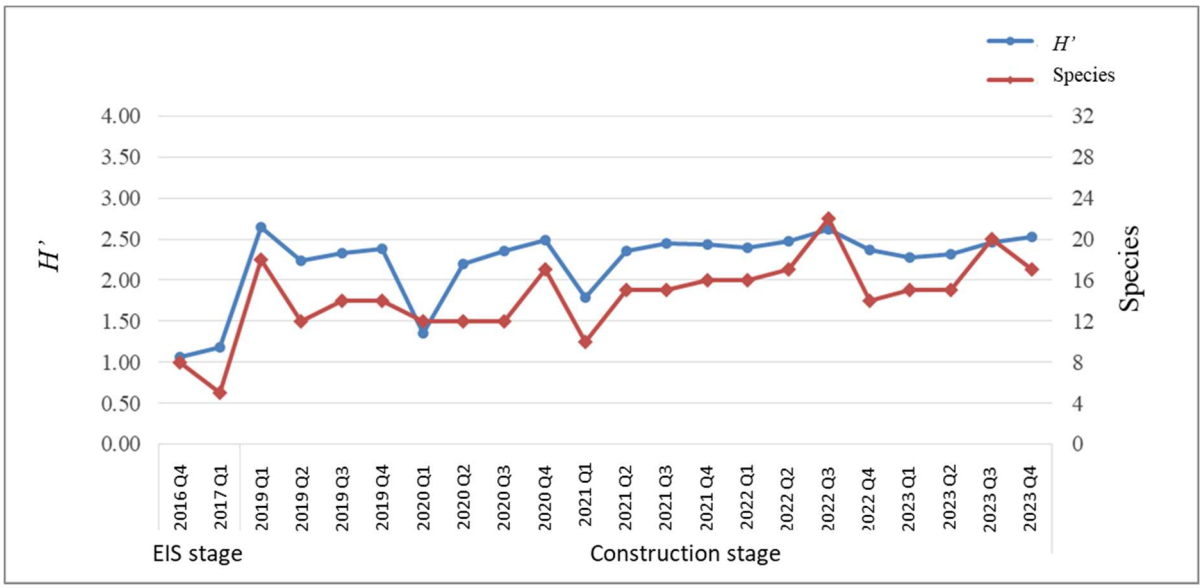


Figure 3.1.1-30 Run Chart of Butterfly *H'* Index and Number of Species

Table 3.1.1-29 Species and *H'* Index of Butterfly

Quarter		Species	*H'*
EIA	2016Q4	8	1.07
	2017 Q1	5	1.18
Construction	2019 Q1	18	2.65
	2019 Q2	12	2.23
	2019 Q3	14	2.33
	2019 Q4	14	2.38
	2020 Q1	12	1.36
	2020 Q2	12	2.19
	2020 Q3	12	2.36
	2020 Q4	17	2.49
	2021 Q1	10	1.78
	2021 Q2	15	2.36
	2021 Q3	15	2.45
	2021 Q4	16	2.44
	2022 Q1	16	2.40
	2022 Q2	17	2.48
	2022 Q3	22	2.61
	2022 Q4	14	2.36
	2023 Q1	15	2.27
	2023 Q2	15	2.32
	2023 Q3	20	2.46
	2023 Q4	17	1.36

XI. Electromagnetic Field

The historical monitoring result is shown as Table 3.1.1-30. In all surveys conducted in this Project, all results comply with the value suggested by the Induction for Limiting Exposure of Time-varying electronic field, Magnetic Field and Electromagnetic Field.

Table 3.1.1-30 Monitoring Result of Electromagnetic Field

Sampling station	Sihu booster station	
	magnetic field (mG)	electronic field v/m
2023.08.28	0.294	0.162
Suggested value	833	4166

Remark: Refer to Induction for Limiting Exposure of Time-varying electronic field, Magnetic Field and Electromagnetic Field, 2021.01.21. Amendment is made under Official No. 1090004463, which comes into effect 6 months after its issuance.

3.1.2 Abnormal Environmental Monitoring results and Response Actions

I. Abnormal issues in the last quarter are listed in Table 3.1.2-1.

Table 3.1.2-1 Abnormal Issues and Response Actions of Previous Quarter

Abnormal Issues	Response Actions	Work Effectiveness
L_{day} in the Residency of Yugang Road exceeded the Noise Control Standards of Second Type of Zone near roads more than 8m wide.	L_{day} in the Residency of Yugang Road exceeded the standards as the average noise value was affected by momentary vehicle noise.	L_{day} in the Residency of Yugang Road exceeded the Noise Control Standards of Second Type of Zone near roads more than 8m wide.

II. Abnormal issue was found in the environmental monitoring results of this quarter, details are listed in Table 3.1.2-2.

Table 3.1.2-2 Abnormal Issues and Response Actions of This Quarter

Abnormal Issues	Response Actions
None	None

3.2 Recommendations

No recommendation for the environmental program. This project will implement relevant monitoring tasks as stated in the program.

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I. General

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