

8. CULTURAL HERITAGE

8.1 Introduction

This **Section** presents the cultural heritage impact assessment (CHIA) associated with the construction of the proposed Project. In accordance with Clause 3.4.8 of the Study Brief No. ESB-327/2019, a Marine Archaeological Investigation (MAI) including impact assessment was undertaken by the qualified marine archaeologist (Dr. William Jeffery) and the findings of the MAI are presented herein.

8.2 Legislative Requirements and Evaluation Criteria

The following legislations/standards/guidelines/requirements is applicable to the assessment of archaeological and historic resources in Hong Kong.

- Environmental Impact Assessment Ordinance (Cap. 499) and the associated Technical Memorandum on the EIA Process (EIAO-TM);
- Antiquities and Monuments Ordinance (Cap. 53) (AM Ordinance);
- Hong Kong Planning Standards and Guidelines; and
- Requirements for Marine Archaeological Investigation (MAI) (Appendix G of the EIA Study Brief).

8.2.1 Environmental Impact Assessment Ordinance (Cap 499)

Annex 10 of the EIAO-TM outlines the criteria for assessment of impact on sites of cultural heritage. The general presumption is in favour of the protection and conservation of all sites of cultural heritage. In addition, adverse impacts on sites of cultural heritage shall be kept to the absolute minimum.

Annex 19 of the EIAO-TM outlines the approaches required in investigating and assessing the impacts on sites of cultural heritage. There is no quantitative standard in deciding the relative importance of these sites, but in general, sites of unique archaeological, historical or architectural value will be considered as highly significant. Preservation in totality is preferred. If, due to site constraints and other factors, only preservation in part is possible, this must be fully justified with alternative proposals or layout designs, which confirm the impracticability of total preservation.

8.2.2 Antiquities and Monuments Ordinance (Cap 53)

The Antiquities and Monuments Ordinance (Cap. 53) (AM Ordinance) provides statutory protection against the threat of development on Declared Monuments to enable their preservation for posterity. The AM Ordinance also establishes the statutory procedures to be followed in making such a declaration.

Any person who discovers an antiquity, or supposed antiquity, is required to report the discovery to the Antiquities Authority.

8.2.3 Hong Kong Planning Standards and Guidelines (HKPSG)

The Chapter 10, Conservation, of the HKPSG provides general guidelines and measures for the conservation of historical buildings, sites of archaeological interest and other antiquities.

8.2.4 Requirements for Marine Archaeological Investigation (MAI)

Requirements for MAI provided in *Appendix G* of the Study Brief details the standard practice, procedures and methodology which must be undertaken in determining marine archaeological baseline and potential, presence of archaeological artefacts, evaluating the potential impact and establishing suitable mitigation measures.

8.3 Assessment Methodology

8.3.1 Introduction

The CHIA follows the criteria and guidelines in *Annexes 10 and 19* of the *EIAO-TM*. It also follows the Requirements for MAI as stated in *Appendix G* of the EIA Study Brief. It should be noted that the Project is marine-based and thus potential impacts on built heritage and terrestrial archaeological resources are not anticipated. Findings of the MAI of this Project are presented in the following sections.

8.3.2 Assessment Area

As the construction works of the proposed Po Toi (Southeast) Fish Culture Zone (FCZ), would mainly be the assembly and anchorage of fish rafts / cages that will be carried out by the fish farmers who obtain marine fish culture licences in this new FCZ which is limited to marine area, no built heritage impact assessment and terrestrial archaeological impact assessment will be conducted for the Cultural Heritage Impact Assessment (CHIA). Therefore, the CHIA will only cover the Marine Archaeological Investigation (MAI).

The Assessment Area for the MAI includes an area to be affected by the marine works associated with the anchoring system of fish rafts/cages as shown in the Project site location in **Figure 8.1**.

8.3.3 Baseline Review

A baseline review was conducted to collate existing information to identify the archaeological potential and their likely character, extent, quality and value. The baseline review will focus on known sources including:

- a) Civil Engineering and Development Department, Geotechnical Engineering Office – The Department holds extensive seabed survey data collected from previous geological research;
- b) Marine Department, Hydrographic Office – the Department holds a substantial archive of hydrographic data and charts;
- c) The Royal Naval Hydrographic Department in the UK – the Department maintains an archive of all survey data collected by naval hydrographers;
- d) Relevant Government departments such as Antiquities and Monuments Office, Environmental Protection Department etc. to obtain information on dredging history on the Project site location; and
- e) Internet and libraries sources of relevant studies.

The findings will provide historical records and more detailed geological analysis of submarine features which may have been subsequently masked by more recent sediment deposits and accumulated debris.

8.3.4 Marine Geophysical Survey

A marine geophysical survey of the proposed Po Toi (Southeast) FCZ was conducted and deployed high resolution boomer, side scan sonar, an echo sounder and high resolution multi beam sonar. The multi-beam data was presented as processed digital terrain models to facilitate the archaeological analysis. The data received from the survey were analysed in detail to provide:

- Exact definition of the areas of greatest archaeological potential;
- Assessment of the depth and nature of the seabed sediments to define which areas consist of suitable material to bury and preserve archaeological material;

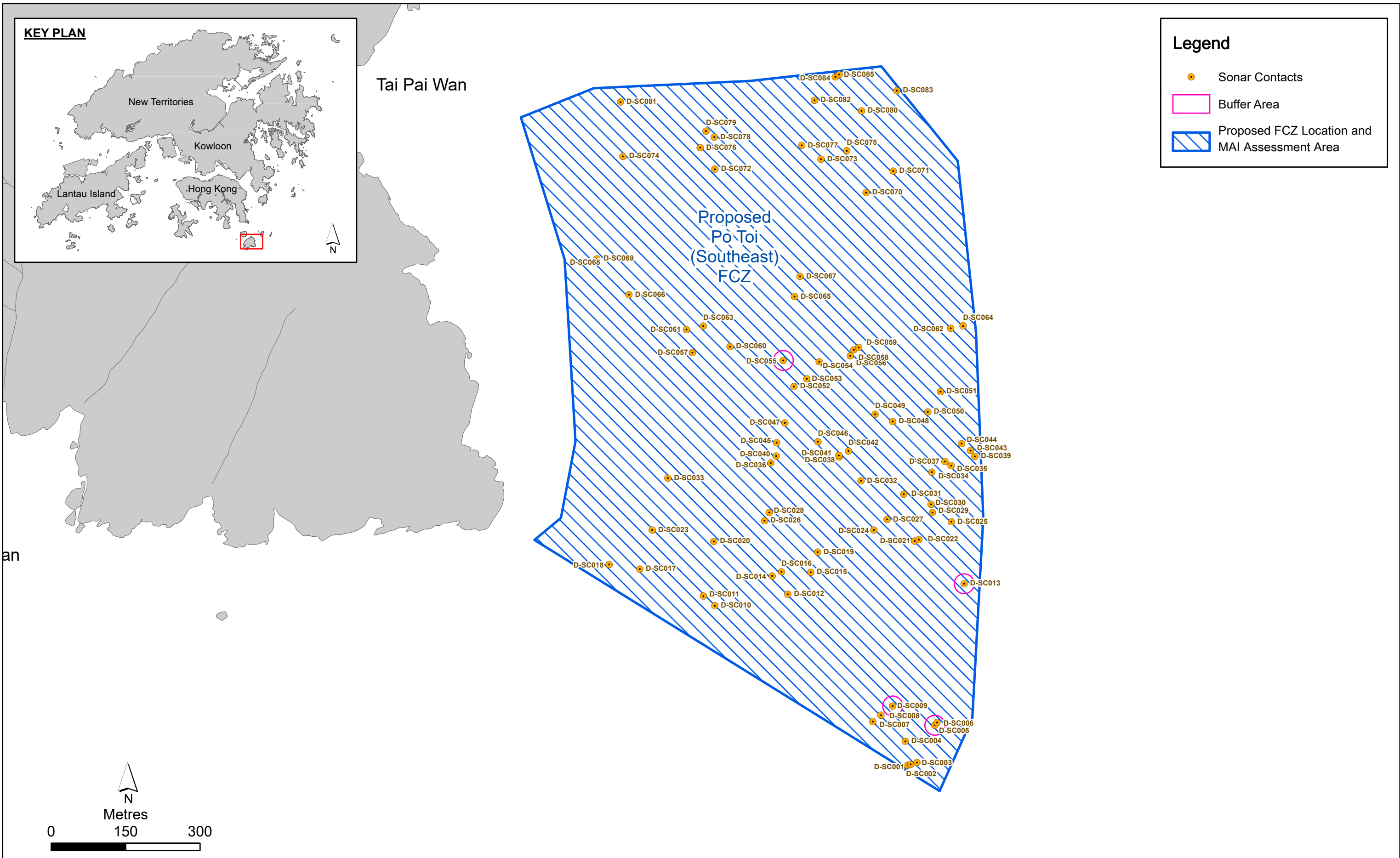


Figure 8.1

Locations of Sonar Contacts at the Proposed FCZ at Po Toi (Southeast)

- Detailed examination of survey records to map anomalies in and on the seabed which may be archaeological material; and
- Detailed examination of the multi beam sonar data to assess the archaeological potential of the sonar contact.

8.3.5 Establishing Marine Archaeological Potential

The data examined during baseline review and marine geophysical survey data review were analysed to provide an indication of the likely character and extent of archaeological resources within the assessment area. The results are presented in below sections.

8.3.6 Further Archaeological Actions (Provisional)

Subject to the results of establishing archaeological potential, accepted marine archaeological practices could be recommended to acquire more detailed data on areas with archaeological potential that may potentially be impacted by the Project site at Po Toi (Southeast). These may include further detailed marine geophysical surveys of potential areas, including Remote Operated Vehicle, visual diver survey, or employing a watching brief. If it is considered necessary, the detailed plan and scope will be agreed with AFCD, EPD and Antiquities and Monuments Office (AMO).

8.3.7 Impact Assessment and Recommendations

Based on the findings and analysis of the baseline conditions and results of the evaluation of the marine archaeological potential, an impact assessment was conducted to evaluate the potential marine impacts of the Project on marine archaeological resources / sites, and recommend necessary marine archaeological actions or mitigation measures.

8.4 Marine Archaeological Review

8.4.1 Baseline Review

8.4.1.1 Review of Historical Documents

The Assessment Area is located at the waters off southeast Po Toi (See **Figure 8.1**). The Project site at Po Toi (Southeast) is approximately 100 hectares (850 - 1500m long and 850m wide) in size. The closest Tai Wan Site of Archaeological Interest, Po Toi (Tai Wan SAI, Po Toi), is located behind Tai Wan Bay over 2 km at west of the Assessment Area, where prehistoric sherds were found. Rock Carvings which can be dated back to the Bronze Age are found on the Po Toi Island, are now Declared Monuments (Peacock, 1985).

The name “Po Toi Shan” (蒲胎山) first appeared in the <Zhenghe Navigation Map> (鄭和航海圖) (See **Figure 8.2**) which was drawn up in 1425, and published in the Ming dynasty military treatise *Wubei Zhi* (武備志). In 1950s to 1960s, inhabitants of Po Toi mainly resided in two villages, namely Chang Shek Pai (長石排) and Shan Liu (山寮). Most of the villagers carried the surnames of Yu (余), Ho (何), Wan (溫), Pang (彭) and Chan (陳) and subsisted on farming, fishing and the harvesting of sea-weed. The population has fallen dramatically over the past few decades, as young generation tend to move away and seek employment opportunities in the city.

In March 2015, a cannon was recorded by the Hong Kong Underwater Archaeological Association at the waters approximately 100m off south of Po Toi during their regular diving activities in March 2015 at a water depth of approximately 11m. It was also reported that two anchors and a section of iron chain were also identified about 20m from the cannon at a water depth of approximately 15m.⁽⁸⁵⁾ Whilst their

(85) 東網 2015 年 4 月 9 日網上新聞報導: “潛水意外收獲 蒲台島海域現二戰古炮船錨”

8.4.1.5 Summary of Marine Archaeological Potential

Based on the historical review, the human activities have occurred since the Bronze Age around the area. Evidence shows that fishing and maritime transport associated with the old villages has been the major maritime activities at the adjacent area. No shipwrecks of marine archaeological potential identified from the Charts and the Wreck Databases, the waters of the Assessment Area may have marine archaeological potential.

8.4.2 Marine Geophysical Survey Result

A marine geophysical survey as part of the site investigations of the Project was conducted on 19th and 29th March 2021 to study the seabed features and to locate anomalous features in the surveyed area. The survey covered the areas to be affected by marine works associated with the anchoring system of fish rafts. The survey findings were processed by the geophysicists and reviewed by the qualified marine archaeologist, Dr William Jeffery, and cultural heritage specialist, Ms Peggy Wong. **Figure 8.1** shows the marine geophysical survey coverage. The survey track plots are shown in **Appendix 8A**. Details of survey types with objectives and survey spacing are shown in **Table 8.1** and the equipment list is shown in **Table 8.2**.

The seabed is primarily covered with fine sediment mainly consist of silty. Isolated to scattered pockmarks, small areas of disturbed seabed with possible dumped materials and several seabed scars are observed on the seafloor. Rock outcrop areas are located at the southwestern margin of the survey site while a small area of coarse sediments with poorly developed megaripples located in the west of the survey site (see **Figure 8.3**, **Figure 8.4** and **Figure 8.5**).

Review of the survey findings identified 85 sonar contacts (D-SC001 to D-SC085). They are located at a range of water depth from 33.1m to 38m and their dimensions are shown in **Table 8.3**. Most of the sonar contacts are interpreted as debris, seventeen of sonar contacts are possibly gravel patches (D-SC002, D-SC003, D-SC012, D-SC014, D-SC015, D-SC026, D-SC029, D-SC031, D-SC033, D-SC046, D-SC049, D-SC053, D-SC059, D-SC061, D-SC064, D-SC071 and D-SC074), five are possibly tires (D-SC015, D-SC077, D-SC079, D-SC081 and D-SC084) and four are linear debris (D-SC010, D-SC017, D-SC018 and D-SC082). Due to their random placement, the diminished intensity of the sonar contact, small in size, irregular shape, and lack of a shadow to indicate they have some elevation, they have been interpreted as natural material and of no marine archaeological potential. From the survey, D-SC005, D-SC009, D-SC013 & D-SC055 have comparatively strong signal strength and some regular shape, **Figure 8.6**, **Figure 8.7**, **Figure 8.8** and **Figure 8.9** show their SSS rectified images respectively, and are possibly of marine archaeology potential. Their locations are shown in **Figure 8.1** and the sonar contact images are illustrated in **Appendix 8B**. According to *Annex 10 of EIAO-TM*, the general presumption is in favour of the protection and conservation of all sites of cultural heritage. The potential direct impact on these four sonar contacts (D-SC005, D-SC009, D-SC013, and D-SC055) that may have marine archaeological potential will be avoided by isolating them with a 20 m radius buffer zone from any tug boat anchoring and anchoring of the fish rafts/cages. Given there is no direct impact to the sonar contacts within Project site that may have marine archaeological potential, it is not necessary to conduct magnetic survey or diver survey to verify the archaeological significance of the Project site that may be of marine archaeological potential.

No sub-bottom anomalies of marine archaeology potential were observed in the Assessment Area.

Table 8.1 Survey Types with Objectives and Survey Spacing

Survey Type	Objective	Survey Spacing
Multi-beam echo sounding (MBES)	To provide detailed seabed level variations	50m, infill lines in shallow areas
Single beam echo sounding (SBES)	For cross check of MBES data	50m, infill lines in shallow areas
Side scan sonar (SSS)	To locate anomalous features and map sediment types on the seabed	50m, infill lines along the coast
Seismic sub-bottom profiling (SBP)	To identify sub-bottom features and stratigraphy	50m x 200m grid

Table 8.2 Equipment List

Type	Equipment
Survey Vessel	Class II licenced survey vessel <i>Wing Hung 2</i>
Horizontal positioning	C-Nav Globally Corrected Global Positioning System (GcGPS) Model 3050M
Single beam echo sounding	Knudsen 320M dual frequency Single-beam Echo Sounder TSS 320B Motion Sensor
Multi-beam echo sounding	R2Sonic SONIC2024 Multi-beam Echo Sounder
Side scan sonar	EdgeTech 4200 (100kHz & 400kHz)
Seismic sub-bottom profile	C-Boom Low Voltage high-resolution Boomer system C-Phone hydrophone system
Software	C-Nav computerized navigation suite C-View digital recording and processing system 3-D seismic interpretation environment
Others	A/C generators, computers and bar check equipment

Table 8.3 Sonar contacts Summary Table

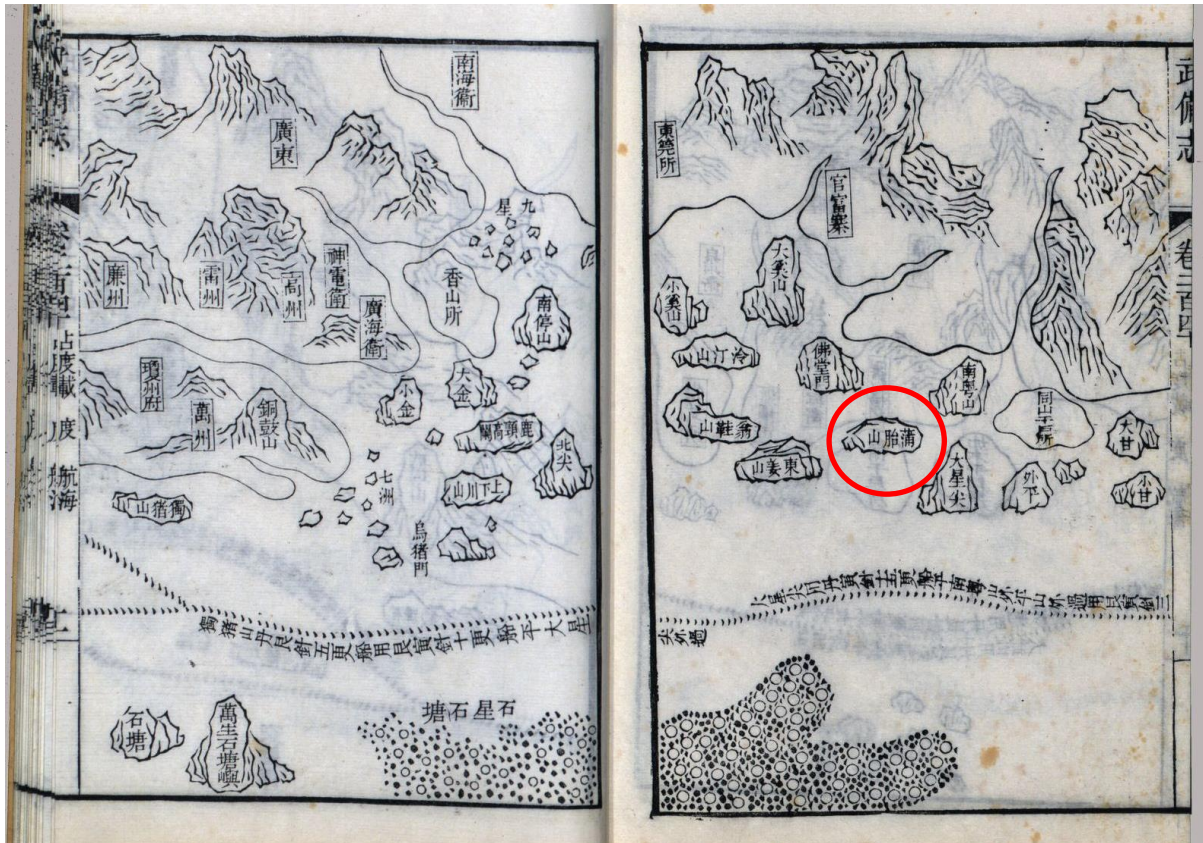
Contact number	Latitude Longitude	Easting Northing	Water depth (m)	Dimensions (m)	Description
D-SC001	22° 9.486' N 114° 16.946' E	847156.1E 802186.8N	35.4	0.9x0.9xnmh	Debris
D-SC002	22° 9.487' N 114° 16.949' E	847162.1E 802188.2N	35.4	1.2x0.9xnmh	Possible debris / Gravel patch
D-SC003	22° 9.489' N 114° 16.957' E	847174.9E 802192.2N	35.4	1x0.9xnmh	Possible debris / Gravel patch
D-SC004	22° 9.512' N 114° 16.943' E	847151.2E 802235.2N	35.4	1.2x0.9xnmh	Debris
D-SC005	22° 9.530' N 114° 16.978' E	847210.7E 802267.4N	35.3	2.0x1.0x<0.5	Debris
D-SC006	22° 9.533' N 114° 16.980' E	847215.3E 802273.0N	35.3	1.2x0.8xnmh	Debris
D-SC007	22° 9.534' N 114° 16.905' E	847085.9E 802274.2N	35.3	1.2x0.9xnmh	Debris
D-SC008	22° 9.541' N 114° 16.915' E	847102.4E 802287.3N	35.4	0.9x0.8xnmh	Debris
D-SC009	22° 9.551' N 114° 16.928' E	847125.7E 802306.2N	35.4	1.3x1.2xnmh	Debris
D-SC010	22° 9.661' N 114° 16.720' E	846767.6E 802508.3N	35.9	190x<0.5xnmh	Linear debris

Contact number	Latitude Longitude	Easting Northing	Water depth (m)	Dimensions (m)	Description
D-SC011	22° 9.671' N 114° 16.707' E	846744.5E 802527.8N	36.1	1.2x0.7xnmh	Debris
D-SC012	22° 9.673' N 114° 16.806' E	846914.7E 802531.5N	35.4	1.1x0.8xnmh	Possible debris / Gravel patch
D-SC013	22° 9.684' N 114° 17.012' E	847269.9E 802552.4N	35.1	1.3x0.8xnmh	Debris
D-SC014	22° 9.693' N 114° 16.787' E	846883.0E 802568.4N	35.6	1.0x0.8xnmh	Possible debris / Gravel patch
D-SC015	22° 9.697' N 114° 16.833' E	846960.8E 802575.8N	35.3	1.7x1.2xnmh	Possible Tire / Debris
D-SC016	22° 9.697' N 114° 16.798' E	846901.9E 802576.3N	35.5	1.7x0.7xnmh	Debris
D-SC017	22° 9.701' N 114° 16.632' E	846616.4E 802582.0N	36.7	60x<0.5xnmh	Linear debris
D-SC018	22° 9.706' N 114° 16.596' E	846554.5E 802591.2N	38	40x<0.5xnmh	Linear debris
D-SC019	22° 9.719' N 114° 16.841' E	846974.8E 802615.9N	35.4	1.2x0.9xnmh	Debris
D-SC020	22° 9.731' N 114° 16.719' E	846765.5E 802637.6N	36.4	1.7x1.5xnmh	Debris
D-SC021	22° 9.731' N 114° 16.954' E	847169.8E 802638.1N	35.2	1.0x0.7xnmh	Debris
D-SC022	22° 9.732' N 114° 16.959' E	847178.8E 802641.0N	35.2	1.1x0.8xnmh	Debris
D-SC023	22° 9.743' N 114° 16.647' E	846641.4E 802660.4N	37.3	0.9x0.8x<0.5	Debris
D-SC024	22° 9.743' N 114° 16.907' E	847088.1E 802660.7N	35.3	1.3x0.8xnmh	Debris
D-SC025	22° 9.752' N 114° 16.998' E	847244.3E 802677.0N	35.1	1.4x0.6xnmh	Debris
D-SC026	22° 9.753' N 114° 16.778' E	846867.6E 802679.3N	35.9	1x0.6xnmh	Possible debris / Gravel patch
D-SC027	22° 9.754' N 114° 16.922' E	847114.7E 802681.8N	35.1	0.8x0.8xnmh	Debris
D-SC028	22° 9.762' N 114° 16.784' E	846877.1E 802695.7N	35.9	1.9x0.8xnmh	Debris
D-SC029	22° 9.762' N 114° 16.975' E	847205.9E 802696.1N	35.1	1.2x0.8xnmh	Possible debris / Gravel patch
D-SC030	22° 9.771' N 114° 16.974' E	847203.2E 802712.7N	35.1	1.4x0.9xnmh	Debris
D-SC031	22° 9.782' N 114° 16.942' E	847148.1E 802732.5N	35.2	1.3x1.0xnmh	Possible debris / Gravel patch
D-SC032	22° 9.797' N 114° 16.891' E	847062.0E 802759.5N	35.2	1.2x0.8xnmh	Debris
D-SC033	22° 9.800' N 114° 16.665' E	846673.0E 802764.9N	36.7	1.0x0.7xnmh	Possible debris / Gravel patch
D-SC034	22° 9.806' N 114° 16.974' E	847204.7E 802777.0N	35	1.6x1.2xnmh	Debris
D-SC035	22° 9.813' N 114° 16.997' E	847243.7E 802790.2N	34.9	1.5x0.8xnmh	Debris
D-SC036	22° 9.816' N	846880.3E	35.8	1.0x0.7xnmh	Debris

Contact number	Latitude Longitude	Easting Northing	Water depth (m)	Dimensions (m)	Description
D-SC037	114° 16.786' E 22° 9.818' N 114° 16.990' E	802795.7N 847231.3E 802798.7N	34.9	1.2x0.8xnmh	Debris
D-SC038	114° 16.866' E 22° 9.823' N	802807.6N 847018.4E	35.3	1.0x0.7xnmh	Debris
D-SC039	114° 17.025' E 22° 9.823' N	802809.1N 847291.5E	34.9	1.3x1.2xnmh	Debris
D-SC040	114° 16.792' E 22° 9.824' N	802809.7N 846891.0E	35.8	1.6x1.1xnmh	Debris
D-SC041	114° 16.866' E 22° 9.824' N	802811.1N 847017.4E	35.3	1.2x1.2xnmh	Debris
D-SC042	114° 16.877' E 22° 9.829' N	802819.9N 847036.8E	35.3	0.9x0.7xnmh	Debris
D-SC043	114° 17.020' E 22° 9.830' N	802820.6N 847282.8E	35	0.9x0.7xnmh	Debris
D-SC044	114° 17.009' E 22° 9.837' N	802834.5N 847264.8E	35	1x0.7xnmh	Debris
D-SC045	114° 16.793' E 22° 9.838' N	802836.5N 846892.1E	35.9	1.4x0.7xnmh	Debris
D-SC046	114° 16.841' E 22° 9.840' N	802838.8N 846975.5E	35.5	1.2x0.8xnmh	Possible debris / Gravel patch
D-SC047	114° 16.802' E 22° 9.860' N	802876.3N 846908.8E	35.6	1.2x0.7xnmh	Debris
D-SC048	114° 16.929' E 22° 9.861' N	802879.3N 847126.0E	35	1.0x0.5x<0.5	Debris
D-SC049	114° 16.908' E 22° 9.869' N	802893.7N 847090.5E	35.1	0.8x0.5xnmh	Possible debris / Gravel patch
D-SC050	114° 16.970' E 22° 9.872' N	802898.8N 847196.7E	34.9	0.6x0.6xnmh	Debris
D-SC051	114° 16.985' E 22° 9.894' N	802939.5N 847222.4E	35	1.1x1.0xnmh	Debris
D-SC052	114° 16.813' E 22° 9.900' N	802949.9N 846927.1E	35.5	1.5x0.9xnmh	Debris
D-SC053	114° 16.828' E 22° 9.908' N	802965.0N 846952.9E	35.3	1.1x0.8xnmh	Possible debris / Gravel patch
D-SC054	114° 16.843' E 22° 9.927' N	802999.6N 846977.9E	35.2	1.8x0.8xnmh	Debris
D-SC055	114° 16.801' E 22° 9.928' N	803002.2N 846905.5E	35.3	1.8x1x<0.5	Debris
D-SC056	114° 16.879' E 22° 9.933' N	803011.6N 847040.4E	35.1	1.5x0.9xnmh	Debris
D-SC057	114° 16.694' E 22° 9.937' N	803018.3N 846722.3E	35.6	1.4x1.1x<0.5	Debris
D-SC058	114° 16.883' E 22° 9.940' N	803023.8N 847047.5E	35	0.8x0.7x<0.5	Debris
D-SC059	114° 16.889' E 22° 9.942' N	803028.3N 847057.5E	35	1.2x0.8xnmh	Possible debris / Gravel patch
D-SC060	114° 16.738' E 22° 9.943' N	803030.2N 846798.2E	35.5	1.3x1.0xnmh	Debris
D-SC061	114° 16.687' E 22° 9.962' N	803064.1N 846710.5E	35.4	1.5x1xnmh	Possible debris / Gravel patch

Contact number	Latitude Longitude	Easting Northing	Water depth (m)	Dimensions (m)	Description
D-SC062	22° 9.963' N 114° 16.997' E	847242.7E 803067.3N	34.9	2.5x1.8x<0.5	Debris
D-SC063	22° 9.966' N 114° 16.707' E	846744.2E 803071.5N	35.4	1.4x0.8xnmh	Debris
D-SC064	22° 9.966' N 114° 17.011' E	847267.7E 803072.1N	34.9	1.4x0.8xnmh	Possible debris / Gravel patch
D-SC065	22° 9.998' N 114° 16.814' E	846928.2E 803130.8N	35.1	1.1x0.6x<0.5	Debris
D-SC066	22° 10.000' N 114° 16.620' E	846594.6E 803134.5N	34.8	3.2x1.4x<0.5	Debris
D-SC067	22° 10.020' N 114° 16.820' E	846939.4E 803171.5N	35	1.2x0.6xnmh	Debris
D-SC068	22° 10.036' N 114° 16.582' E	846529.3E 803202.0N	34.1	1.3x1.3x<0.5	Debris
D-SC069	22° 10.039' N 114° 16.582' E	846529.8E 803206.9N	34.2	1.3x0.9x<0.5	Debris
D-SC070	22° 10.111' N 114° 16.898' E	847072.5E 803340.4N	34.6	1.5x0.8x<0.5	Debris
D-SC071	22° 10.135' N 114° 16.929' E	847126.9E 803384.1N	34.7	1.3x0.9xnmh	Possible debris / Gravel patch
D-SC072	22° 10.137' N 114° 16.721' E	846767.8E 803387.9N	33.9	1.7x0.5x<0.5	Debris
D-SC073	22° 10.148' N 114° 16.845' E	846981.7E 803407.5N	34.5	2.5x1.3x<0.5	Debris
D-SC074	22° 10.151' N 114° 16.613' E	846582.5E 803413.3N	33.1	2.7x1.0xnmh	Possible debris / Gravel patch
D-SC075	22° 10.157' N 114° 16.875' E	847033.4E 803424.9N	34.6	2.2x1.0x<0.5	Debris
D-SC076	22° 10.160' N 114° 16.703' E	846738.0E 803430.6N	33.1	4.6x1.8x1.8	Debris
D-SC077	22° 10.163' N 114° 16.822' E	846942.7E 803435.2N	34.3	1.4x1.2xnmh	Possible Tire / Debris
D-SC078	22° 10.172' N 114° 16.720' E	846766.4E 803452.1N	33.7	1.2x0.9xnmh	Debris
D-SC079	22° 10.179' N 114° 16.710' E	846749.8E 803464.3N	33.7	2.1x2.0xnmh	Possible Tire / Debris
D-SC080	22° 10.201' N 114° 16.893' E	847063.3E 803505.3N	34.4	5.7x3.1x0.5	Debris
D-SC081	22° 10.210' N 114° 16.610' E	846577.4E 803523.0N	32.7	3.2x3.0xnmh	Possible Tire / Debris
D-SC082	22° 10.212' N 114° 16.837' E	846968.4E 803526.6N	34.2	3.5x0.8xnmh	Linear debris
D-SC083	22° 10.223' N 114° 16.934' E	847134.4E 803545.9N	34.5	1.9x1.6xnmh	Debris
D-SC084	22° 10.238' N 114° 16.862' E	847010.3E 803573.5N	34.3	1.2x1.1xnmh	Possible Tire / Debris
D-SC085	22° 10.240' N 114° 16.866' E	847018.0E 803577.9N	34.3	2.5x2.2xnmh	Debris

Figure 8.2 Zhenghe Navigation Map from Wu Bei Zhi showing Po Toi Island



**Figure 8.3 SSS Mosaic Showing the Overview of the Seabed of Po Toi
(Southeast) FCZ**

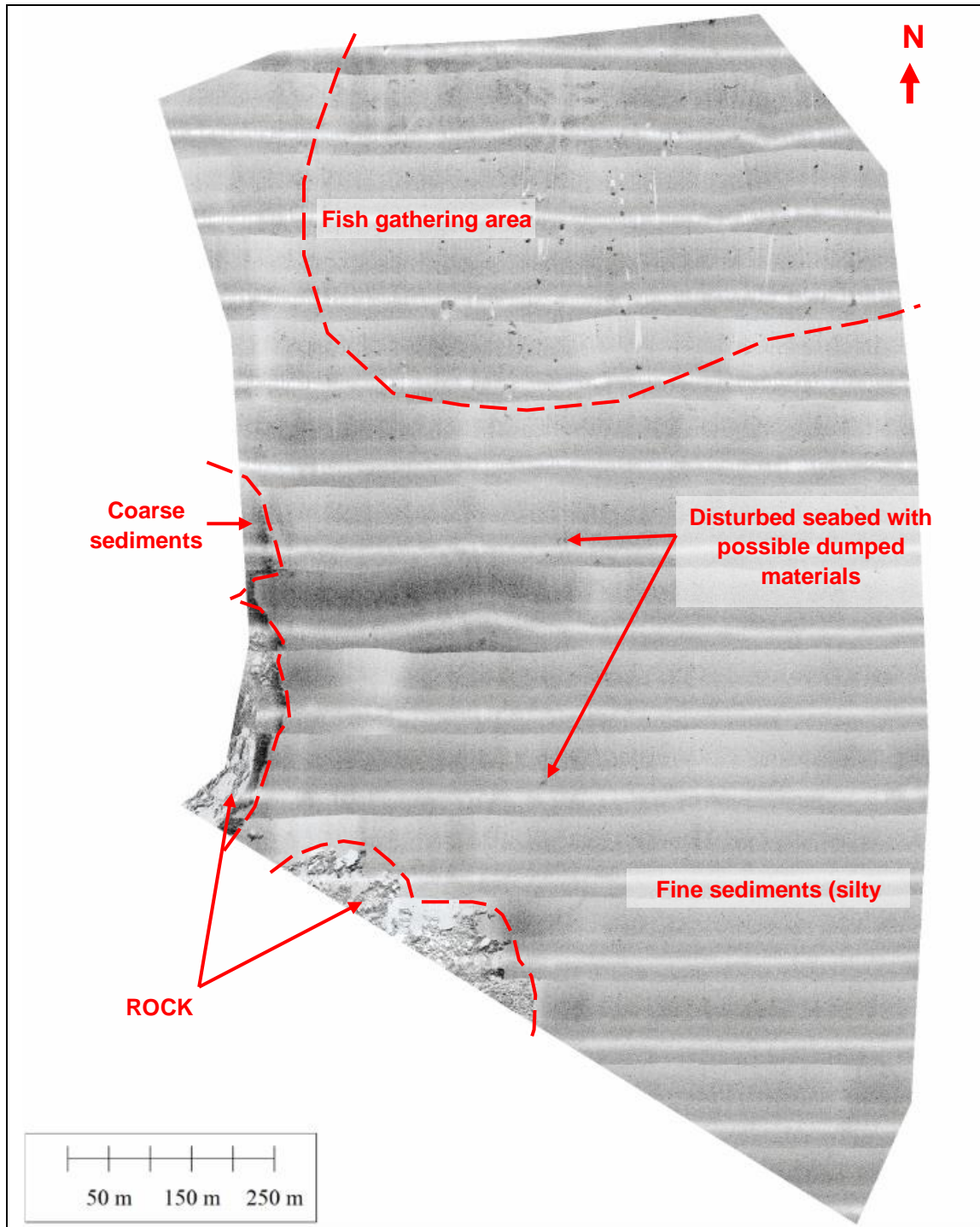


Figure 8.4 SSS Rectified Image Showing Seabed Sediments, Seabed Features and Shadows from Objects in Water Column

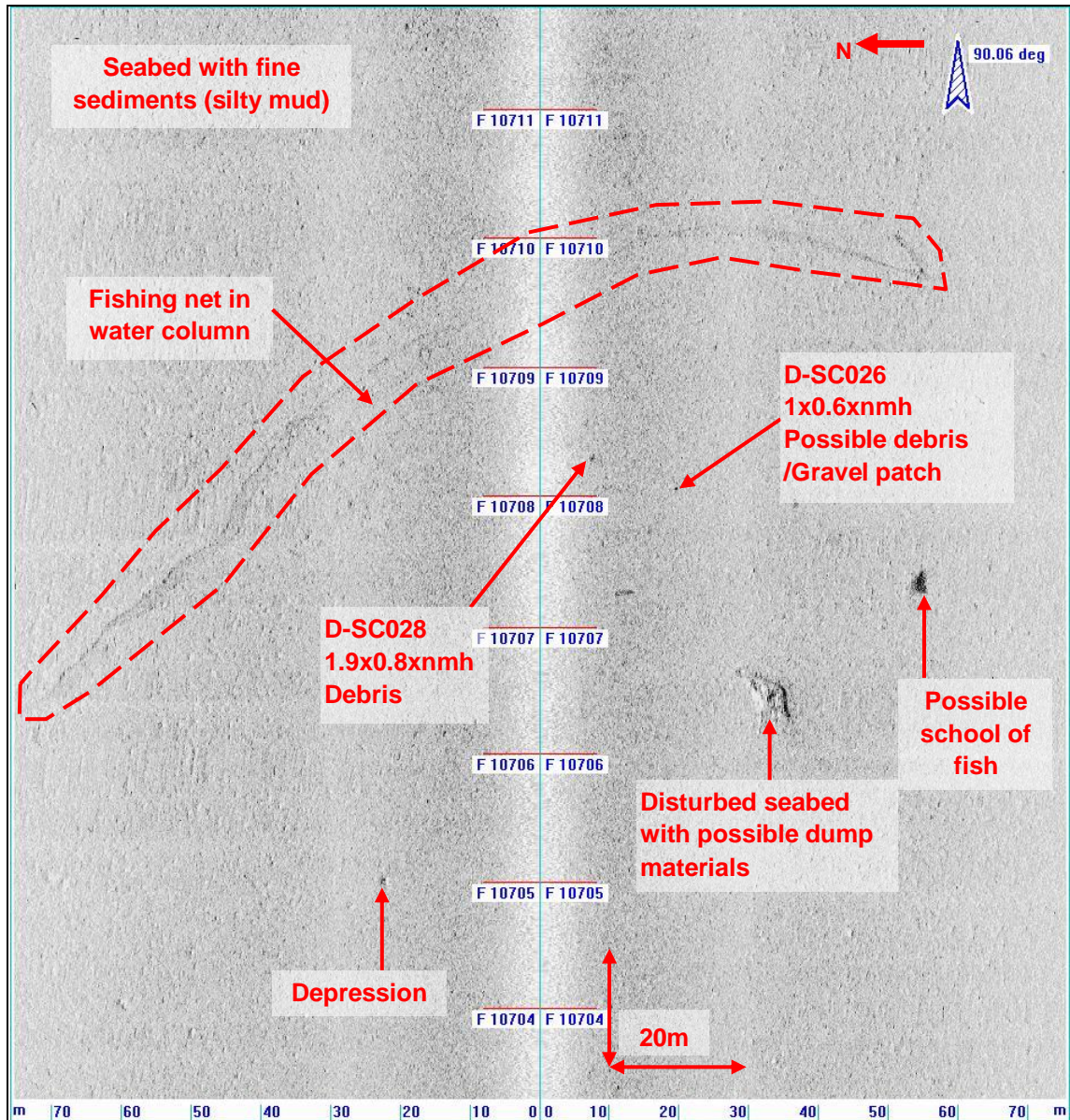


Figure 8.5 SSS Rectified Image Showing Seabed Sediments, Seabed Features and Shadows from Objects in Water Column

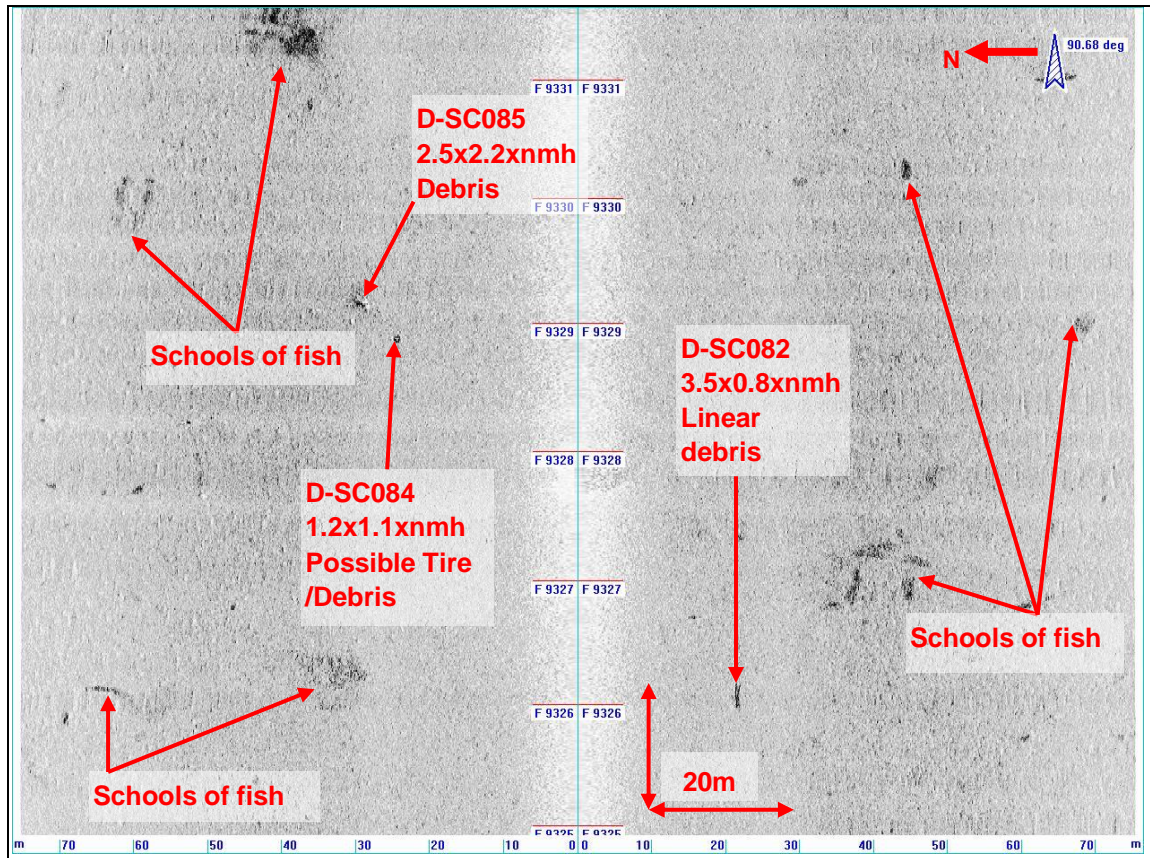


Figure 8.6 SSS Rectified Image Showing Sonar Contacts D-SC005 and D-SC006

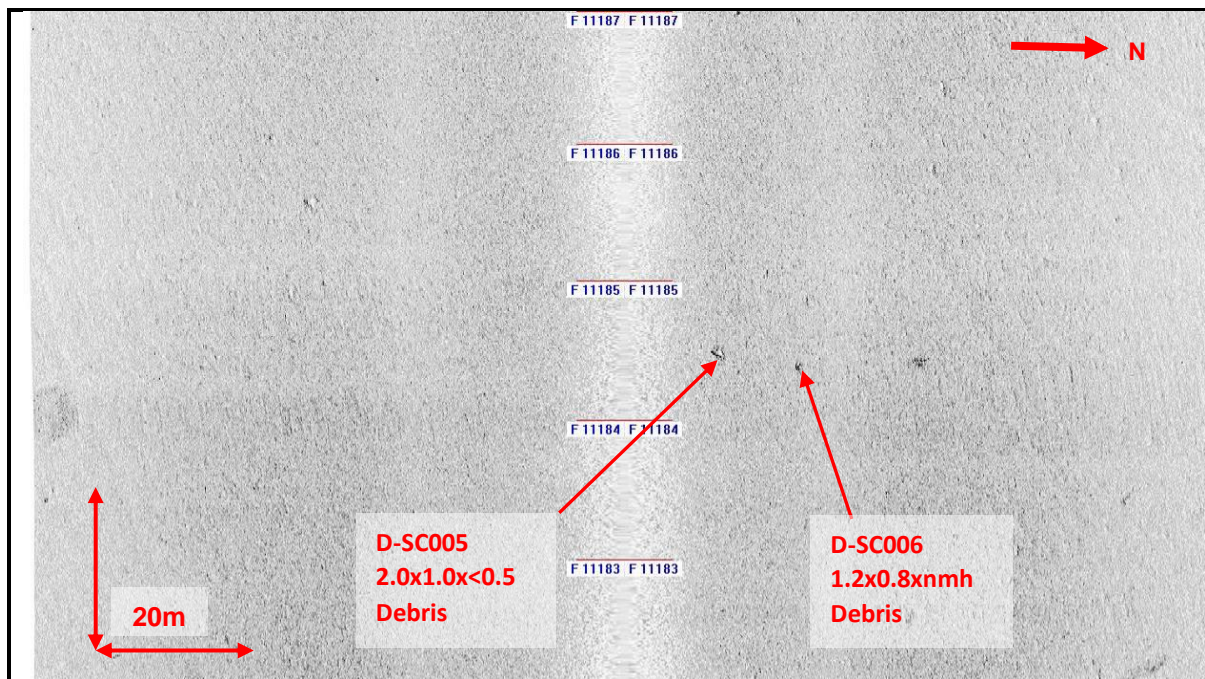


Figure 8.7 SSS Rectified Image Showing Sonar Contacts D-SC007, D-SC008 and D-SC009

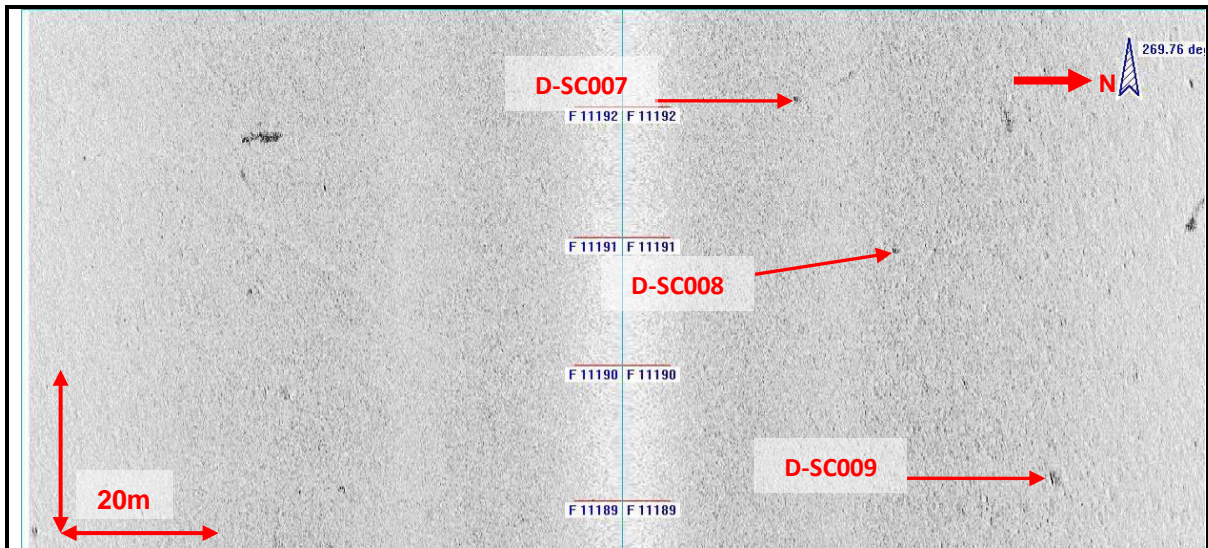


Figure 8.8 SSS Rectified Image Showing Sonar Contact D-SC013

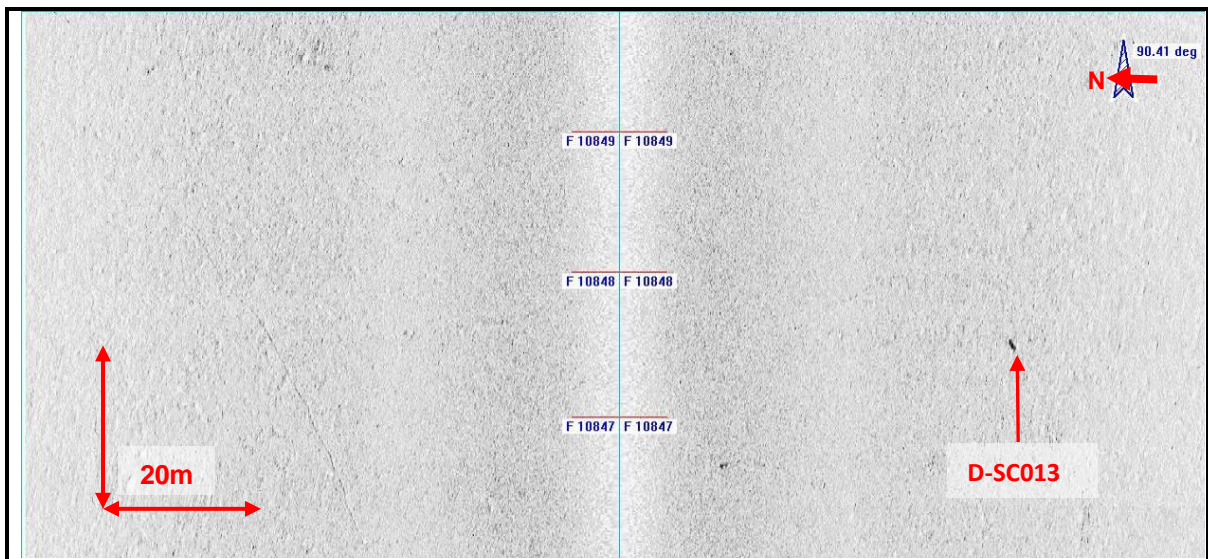
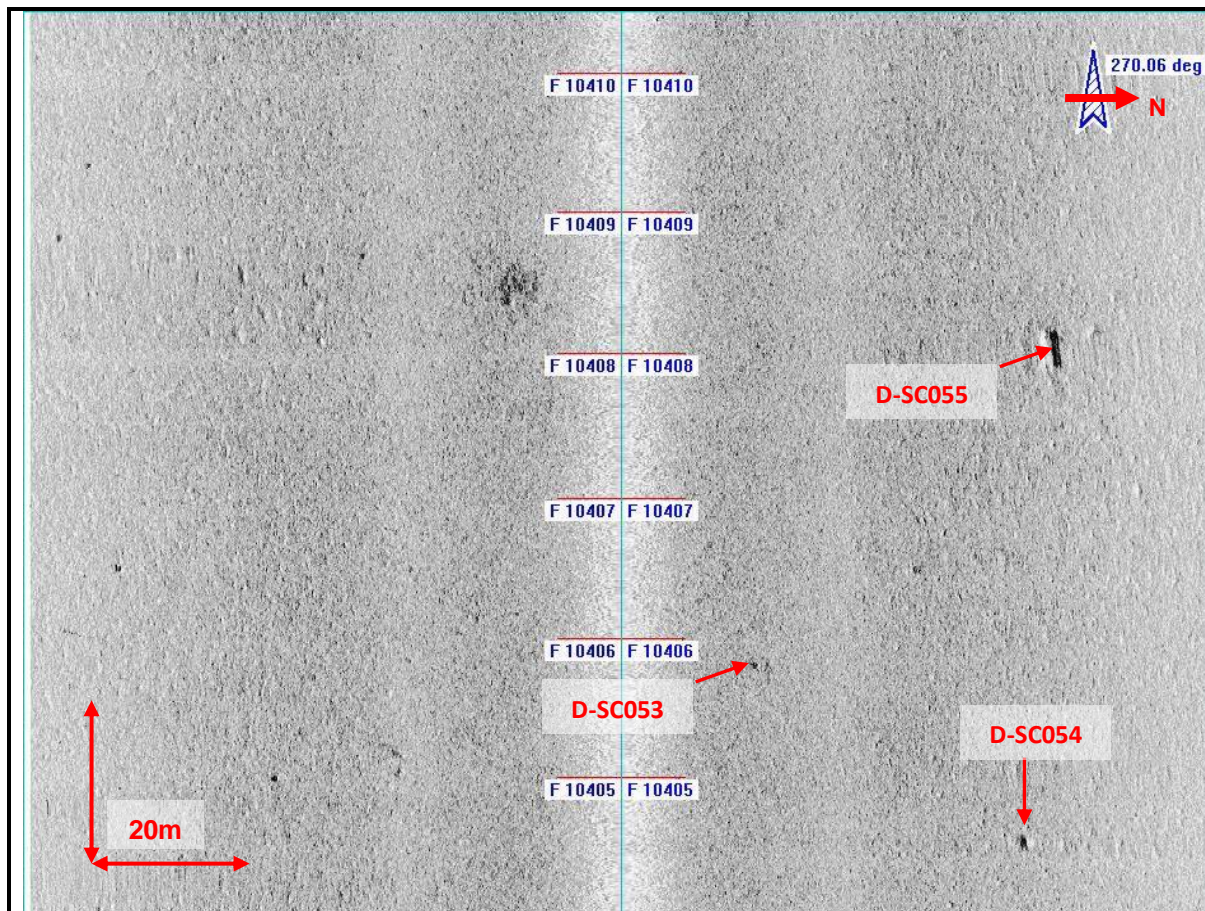


Figure 8.9 SSS Rectified Image Showing Sonar Contact D-SC053, D-SC054 and D-SC055



8.4.3 Establishment of Marine Archaeological Potential

There are 85 sonar contacts (D-SC001 to D-SC085) identified in the Assessment Area, most of the sonar contacts are interpreted as debris, seventeen of sonar contacts are possibly gravel patches (D-SC002, D-SC003, D-SC012, D-SC014, D-SC015, D-SC026, D-SC029, D-SC031, D-SC033, D-SC046, D-SC049, D-SC053, D-SC059, D-SC061, D-SC064, D-SC071 and D-SC074), and four of the sonar contacts are linear debris (D-SC010, D-SC017, D-SC018 and D-SC082). Due to their random placement, the diminished intensity of the sonar contact, small in size, irregular shape, and lack of a shadow to indicate they have some elevation, they have been interpreted as natural material and of no archaeological potential. Sonar Contacts, D-SC005, D-SC009, D-SC013 & D-SC055 have comparatively strong signal strength and are of regular shape, and possibly of marine archaeology potential. Nevertheless, because of the muddy/silty seabed, objects such as cannon would sink into the seabed, these sonar contacts are most likely to be modern, recently deposited debris that would not be of high archaeological potential. There are no wrecks / obstructions found in the UKHO Wrecks database for the MAI Assessment Area. No other features of archaeological interest were observed in the area.

No sub-bottom anomalies of marine archaeology potential were observed.

8.5 Potential Sources of Impact

The construction works of the proposed Po Toi (Southeast) FCZ, would mainly be on-site assembly and anchorage of fish rafts/cages within the Project Area, and will be carried out by the fish farmers who obtain marine fish culture licences in this new FCZ. Maintenance dredging or removal of sediments is not anticipated during FCZ operation under the Project.

Potential impacts arising from these activities include:

- Direct loss of potential marine archaeological deposits due to seabed disturbance works during anchorage of the fish rafts/cages;
- Indirect impact on access for future archaeological surveys; and
- Permanent access disturbance to marine archaeological deposits if they are found to be within the Project Area.

8.6 Impact Assessment

The desktop review found no sites of archaeological interest, declared monuments, proposed monuments, graded historic sites/buildings/structures and Government historic sites identified by the AMO fall within the Assessment Area. No construction phase and operation phase impact to these cultural heritage resources is anticipated. However, sonar contacts are identified from marine geophysical survey. Their impact assessment is discussed below.

8.6.1 Construction Phase

The construction of fish rafts / cages will simply involve the use of tug boats to tow the main part of the fish rafts / cages to within the Project site, and to be assembled and anchored therein. No major marine construction works, such as dredging or works with significant seabed disturbance is expected. The fish rafts / cages will generally be gravity cages and the four corners of each cage will be anchored using weights and ropes and it is expected that the seabed to be disturbed by anchoring will be confined to a thin vertical surface layer (<0.5 m), and < 2m horizontally. Although potential impact on 81 sonar contacts (D-SC001 to D-SC085 except D-SC005, D-SC009, D-SC013 and D-SC055) located in Assessment Area as in **Figure 8.1** is possible, the majority of them are interpreted as debris and gravel patches, and five of them are possibly tires. They are of no marine archaeological potential.

Potential direct impact on four sonar contacts (D-SC005, D-SC009, D-SC013, and D-SC055) that may be of marine archaeological potential due to construction work of fish rafts / cages is possible. Nevertheless, because of the muddy / silty seabed, objects such as cannon would sink into the seabed, the sonar contacts are most likely to be modern, recently deposited debris that would not be of high archaeological potential.

8.6.2 Operation Phase

Potential direct impact on four sonar contacts (D-SC005, D-SC009, D-SC013, and D-SC055) that may be of marine archaeological potential during operation phase of the Project is possible.

Although potential impact on 81 sonar contacts (D-SC001 to D-SC085 except D-SC005, D-SC009, D-SC013 and D-SC055) located in Assessment Area as in **Figure 8.1** is possible, the majority of them are interpreted as debris and gravel patches, and five of them are possibly tires. They are of no marine archaeological potential.

8.7 Mitigation Measures

As no impacts to sites of archaeological interest, declared monuments, proposed monuments, graded historic sites/buildings/structures and Government historic sites identified by AMO are expected, no construction phase and operation phase mitigation measure for terrestrial cultural heritage is required. However, mitigation measures for the identified sonar contacts are recommended below.

8.7.1 Construction Phase

Sonar contacts (D-SC001 to D-SC004, D-SC006 to D-SC008, D-SC010 to D-SC012, D-SC014 to D-SC054, and D-SC056 to D-SC085) are identified as debris or gravel patches, five of them are possibly

tires, and they are regarded as of no marine archaeological potential. No mitigation measure is required.

According to *Annex 10 of EIAO-TM*, the general presumption is in favour of the protection and conservation of all sites of cultural heritage, the potential direct impact on four sonar contacts (D-SC005, D-SC009, D-SC013, and D-SC055) that may have marine archaeological potential will be avoided by isolating them with a 20 m radius buffer zone from any tug boat anchoring and anchoring of the fish rafts/cages as shown in **Figure 8.1**. The locations and relocations of fish rafts/cages are regulated by the *Marine Fish Culture Ordinance (Cap. 353)*, and AFCD will ensure the locations of anchoring of vessels and fish rafts/cages will not be located within the buffer areas. Site inspections on a regular basis by the Environmental Team are recommended to check if any seabed disturbance work is conducted in the buffer areas.

8.7.2 Operation Phase

The buffer area as shown in **Figure 8.1** with 20 m radius from the four sonar contacts (D-SC005, D-SC009, D-SC013, and D-SC055) should be implemented during operation phase of the Project. AFCD will maintain the record of the buffer area and the locations of the fish rafts / cages. The locations and relocations of fish rafts/cages are regulated by the *Marine Fish Culture Ordinance (Cap. 353)*, and AFCD will ensure the locations of anchoring of vessels and fish rafts/cages will not be located within the buffer area. AFCD will conduct regular inspections to check if any seabed disturbance work is conducted in the buffer areas.

Although potential impact on 81 sonar contacts (D-SC001 to D-SC085 except D-SC005, D-SC009, D-SC013 and D-SC055) is possible, they are of no marine archaeological potential, no mitigation measure is required.

8.8 Cumulative Impacts

At present, there are no planned projects within the Assessment Area that could have cumulative cultural heritage impacts with the proposed Project. No cumulative impact or adverse residual impacts on marine archaeological resources are expected.

8.9 Conclusion

The desktop review supplemented with the results of the marine geophysical survey conducted for the Project identified 4 sonar contacts (D-SC005, D-SC009, D-SC013, and D-SC055) within the Project Area, which may be of marine archaeological potential. Nevertheless, because of the muddy / silty seabed, objects such as cannon would sink into the seabed, the sonar contacts are most likely to be modern, recently deposited debris that would not be of high archaeological potential. A buffer area with 20 m radius from each of the 4 sonar contacts (D-SC005, D-SC009, D-SC013, and D-SC055) is recommended to avoid any tug boat anchoring and anchoring of the fish rafts/cages in the areas so as to avoid any impact to these sonar contacts during both the construction and operation phases of the Project. The locations and relocations of fish rafts/cages are regulated by the *Marine Fish Culture Ordinance (Cap. 353)*, and AFCD will ensure the locations of anchoring of vessels and fish rafts/cages will not be located within the buffer area. Site inspections on a regular basis by the Environmental Team are recommended to check if any seabed disturbance work is conducted in the buffer areas during construction phase of the Project. AFCD will conduct regular inspections to check if any seabed disturbance work is conducted in the buffer areas during operation phase of the Project.

8.10 Bibliography

8.10.1 English

AMO, 2012a, Declared Monuments in Hong Kong, Rock Carvings on Po Toi. From AMO web site.

AMO, 2012b, List of Sites of Archaeological Interest in Hong Kong (as at Nov 2012). From AMO web site.

Davis, S.G.; Edelstein, Shirlee; Madeleine H., Tang (26 September 1973). "Rock Carvings in Hong Kong and the New Territories". Asian Perspectives

EGS, 2021, Marine Geophysical Survey for Fish Culture Zone EIA Study: Site D – Po Toi - Preliminary Report. April 2021.

Morton B (1996) The Marine Biology of the South China Sea III. Proceedings of the Third International Conference on the Marine Biology of the South China Sea. Hong Kong University Press.

Peacock, B.A.V. 1985. *Report of the Hong Kong Archaeological Survey*. (Unpublished)

Rogers, Van Den Bergh et al 1997. Second Territory-wide Survey: Hong Kong and Po Toi Islands.

Antiquities and Monuments Office, Culture and Sports Department, Government of the Hong Kong SAR (Unpublished).

8.10.2 Chinese

東網 2015 年 4 月 9 日網上新聞報導: “潛水意外收獲 蒲台島海域現二戰古炮船錨”

8.10.3 Chart

1845-1849 China Sheet II Eastern Coast from Hong Kong to Chelang Point

1906 Chart No 2593:Hong Kong to Mirs Bay