

9. CULTURAL HERITAGE ASSESSMENT

9.1 Environmental Legislation

9.1.1 Environmental Impact Assessment Ordinance

9.1.1.1 The Environmental Impact Assessment Ordinance (EIAO) stipulates that consideration must be given to issues associated with cultural heritage and archaeology as part of the EIA process. Respectively Annexes 10 and 19 of the Technical Memorandum on EIA Process (TM) outlines the following:

- (i) the criteria for evaluating the impacts on sites of cultural heritage; and
- (ii) guidelines for impact assessment.

9.1.1.2 The TM identifies a general presumption in favour of the protection and conservation of all sites of cultural heritage and requires impacts upon sites of cultural heritage to be *'kept to a minimum'*. There is no quantitative standard for determining the relative importance of sites of cultural heritage, but in general sites of unique, archaeological, historical or architectural value should be considered as highly significant.

9.1.1.3 In addition, since the introduction of the EIAO, the Antiquities and Monuments Office (AMO) may request a Marine Archaeological Investigation (MAI) for developments affecting the seabed.

9.1.2 Hong Kong Planning Standards and Guidelines

9.1.2.1 Chapter 10 of the HKPSG provides guidelines relating to the conservation of historic buildings, archaeological sites and other antiquities. The guidelines detail the methods for the conservation and preservation of protected monuments, the method of identifying and recording antiquities, particularly buildings which should be conserved and the recording and grading of the such buildings and archaeological sites. The process of monuments and development control through the planning process is also highlighted.

9.1.3 Antiquities and Monuments Ordinance

9.1.3.1 Legislation relating to antiquities is set out in the Antiquities and Monuments Ordinance (Chapter 53 of the Laws of Hong Kong), which came into force on January 1st 1976. The legislation applies equally to sites on land and underwater. The purpose of the Ordinance is to prescribe controls for the discovery and protection of antiquities in Hong Kong. A summary of the key aspects of the legislation relevant to the current study is presented below:

- (i) Human artefacts, relics and built structures may be gazetted and protected as monuments. The Antiquities Authority may, after consultation with the Antiquities Advisory Board (AAB) and with Government approval, declare any place, building, site or structure which the Antiquities Authority considers to be of public interest by reason of its historical, archaeological or palaeontological significance, to be a monument, historical building, archaeological or palaeontological site or structure.

- (ii) Once declared a site of public interest, no person may undertake acts, which are prohibited under the Ordinance, such as to demolish or carry on building or other works, unless a permit is obtained from the Antiquities Authority.
- (iii) For archaeological sites, all relics dated prior to 1800 AD belong to the Hong Kong Government. Archaeological sites are classified into three categories, as follows:
 - ◆ *Designated* – those that have been declared as monuments and are to be protected and conserved at all costs;
 - ◆ *Administrative Protection* – those which are considered to be of significant value but which are not declared as monuments and should be either protected, or if found not possible to protect these sites then salvaged; and
 - ◆ *Monitored* – those which are of lesser significance or whose potential is not fully assessed which should not be disturbed with the exception of minor works if they are permitted and monitored by AMO.
- (iv) The Legislation sets out the procedures for the issuing of Licences to Excavate and Search for Antiquities, the effect of which is to forbid all such activities being undertaken without such a licence. It also provides for the penalties exacted for infringement of the Ordinance, including fines and imprisonment.

9.1.3.2 The Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department is part of the Government Secretariat and comprises the executive arm of the Antiquities Authority. The Antiquities and Monuments Office services the Antiquities Advisory Board who are responsible for advising the Government on sites which merit protection. The office further has responsibility for the protection of buildings and items of historical interest and areas of archaeological significance.

9.1.4 Cultural Heritage

9.1.4.1 The AMO provide guidelines and Criteria for Cultural Heritage Impact Assessment (CCHIA) which stress that preservation in totality must be taken as the first priority. Projects undertaken are not to cause excessive impact on archaeologically and historically important sites unless there are adequate protection or mitigation measures or a satisfactory rescue plan is proposed.

9.1.4.2 The AMO considers all buildings and structures in the following categories to be historical and deserving of consideration for preservation:

- ◆ all pre-1950 buildings and structures; and
- ◆ selected post-1950 buildings and structures of high architectural and historical significance and interest.

9.1.4.3 Once identified as having the potential for conservation, buildings are entered into the record. They are then graded by AMO to show their relative value. Evaluation is based on the following criteria:

- ◆ outstanding architectural merits - especially features emphasising certain period, technological and artistic merits;
- ◆ special historical interest - accommodating important civic or social function, for example, ancestral halls, religious buildings, post offices, city halls, courts of law, railways station, etc;
- ◆ associations - with important events or well-known persons; and
- ◆ group value - especially in historic villages.

9.1.4.4 Archaeological sites are identified and recorded by the AMO as they are revealed through systematic survey, casual finding and/or the EIA process. All such archaeological sites are considered to be of cultural heritage value and their preservation in totality is taken as the primary aim of the EIA process. The CHIA stipulate that if this is not possible, amelioration must be achieved by reduction of potential impacts and preservation achieved by means of detailed cartographic and photographic survey or preservation of an archaeological site “by record”, i.e. through excavation to extract the maximum data as the very last resort. The search for and excavation of all archaeological material requires a license from the Antiquities Authority.

9.1.5 Marine Archaeology

9.1.5.1 The AMO issue Guidelines for Marine Archaeological Investigation (MAI) which details the standard practice, procedures and methodology which must be undertaken in determining the marine archaeological potential, presence of archaeological artefacts and defining suitable mitigation measures.

9.2 Objectives of the Cultural Heritage Impact Assessment

9.2.1 A Cultural Heritage Impact Assessment (CHIA) must be undertaken in order to identify the impact that the proposed project construction may have on the cultural heritage of the Study Area. The specific objectives of the CHIA include the following:

- ◆ to identify and highlight the known archaeological resources, including those under the seabed, and historical buildings and structures;
- ◆ to identify and map the potential for archaeological remains in the works area;
- ◆ to identify any additional heritage resources in the Study Area;
- ◆ to identify any negative impacts on the sites of cultural heritage; and
- ◆ to propose measures to mitigate these impacts.

9.3 Assessment Methodology

9.3.1 Background

9.3.1.1 The cultural heritage impact assessment has been broadly divided into the identification of marine and terrestrial cultural heritage impacts and the methodology for each of these tasks is highlighted below.

9.3.2 Terrestrial Cultural Heritage

9.3.2.1 The key aim of the terrestrial cultural heritage assessment was to identify any archaeological sites in the vicinity of the proposed project, identify any activities that may disturb these areas and recommend measures to avoid and minimise any impacts. However, based upon a review of the designated archaeological sites in the study area, as shown in Figure 9.1, it can be seen that no sites will be affected either directly or indirectly as a result of the construction and operation of the project. In addition, there are no declared monuments in the area of the PAFF, the closest being at Yuen Long. As a result, terrestrial cultural heritage impacts will not occur and this aspect is not discussed further.

9.3.3 Marine Archaeology

9.3.3.1 A Marine Archaeological Investigation (MAI) comprises the following tasks:

(i) Baseline Review

9.3.3.2 The research establishes if there are records of shipwrecks occurring within the Study Area and its immediate vicinity, including Hong Kong archives, reports held by the AMO, examination of old navigation charts, archaeological, historical and geological publications. Since marine archaeology is a new research discipline in Hong Kong, there is little existing collated information to draw upon and it is therefore necessary to examine primary reference material.

(ii) Marine Geophysical Survey

9.3.3.3 A geophysical survey is the most effective method to assess the seabed and subsurface for archaeological material. The following equipment is required:

- ◆ a marine seismic profiler (high resolution boomer);
- ◆ dual channel side scan sonar;
- ◆ Single frequency survey echo sounder; and
- ◆ DGPS positioning system with navigation software.

(iii) Establishment of Archaeological Potential

9.3.3.4 Detailed analysis of the geophysical data sets and integration with the results of the Baseline Review to map features and anomalies with archaeological potential. This enables the design of a strategy for their investigation and evaluation.

(iv) Remote Operated Vehicle (ROV) and/or Visual Diver Survey.

9.3.3.5 Visual inspection and assessment of all anomalies identified in the geophysical survey data. A dGPS system is required to locate each dive target and accurately record its position and both still and video cameras used to record features with archaeological potential. Hand held probes and an airlift are used to inspect buried features. If archaeological material is found, the significance will be determined and appropriate mitigation measures will be prepared.

9.4 Marine Archaeology Baseline Review

9.4.1 Background

9.4.1.1 Practically nothing is known about the archaeological potential of the seabed deposits in Hong Kong. The only marine archaeological discovery is that of a late Song/early Ming Dynasty boat uncovered during construction of the High Island Reservoir, near Sai Kung (Frost, 1974). Since then, no other historic shipwreck has been found. However, this is probably because there were no dedicated marine archaeological surveys until the introduction of the 1998 EIA Ordinance. Marine archaeology is, therefore, a new area of study in Hong Kong with very little baseline data to draw upon.

9.4.1.2 Formation of archaeological sites underwater is mainly due to shipwrecks (Muckelroy, 1978). Since these are random and haphazard events it is difficult to predict their exact location if no written references survive. The aim of this review is to examine the evidence for maritime activity within the study area of the project site and pipeline route to predict the potential for shipwrecks.

9.4.2 Early Maps of the Study Area

9.4.2.1 Tuen Mun is shown on a late 16th century coastal map of Kwang Tung by Kwok Fei (Figure 9.2). Although it is drawn in panoramic style looking from land to sea, many of the names are still in use today. There are numerous ships on the sea which could be either junks or Portuguese carracks. Tuen Mun is also shown on a map by Chan Lun Kwing in his book *Hoi Kwok Man Kin Luk* (A record of the Countries of the Sea) printed in Ngai Hoi Chu Chan, 1744. This map is presented as Figure 9.3. These maps are particularly important as they indicate that Tuen Mun was established as a known coastal settlement from the 16th century. The first map which clearly depicts Hong Kong harbour in detail is an 1810 marine chart (Figure 9.4). This chart was prepared for the East India Company by Daniel Ross and Philip Maughan, Lieutenants of the Bombay Marine.

9.4.3 Archive Search

9.4.3.1 The UK Hydrographic Office (UKHO) holds a database of surveyed shipwrecks in Hong Kong, including those not shown on Admiralty Charts. The database contains no record of shipwrecks close to the study area.

9.4.3.2 The UKHO holds navigation charts of the study area dating from 1853 (Figure 9.5) 1856 (Figure 9.6), 1888 (Figure 9.7), 1899 (Figure 9.8) and 1966 (Figure 9.9). These charts are particularly useful as they may show wrecks which have been subsequently buried or broken up. However, none of these charts indicates a shipwreck within the study area.

9.4.4 Historical Background of Tuen Mun

9.4.4.1 As early as the Tang Dynasty (618-907), Tuen Mun was regarded as strategically important by the imperial government, which had expanded its control over south China and Vietnam in the 7th century. The inward swing of the sea, forming Castle Peak Bay is sheltered to the west by Castle Peak Mountain and by the island of Lantau to the

south, making it an excellent harbour and typhoon shelter. Today, it is the main waterway for vessels entering the Pearl River estuary of Kwantung Province from Hong Kong. At various times, the bay was an important harbour for Persian, Indian, Arab and other merchants. They would gather at Tuen Mun before entering the Pearl River to trade in China.

- 9.4.4.2 Before the invention of steam-propelled boats, sea voyages were largely determined by the prevailing winds. In summer, when the southwest monsoon arrived, trading vessels from Arabia, Persia, India, Indochina and the east Indies set a northeasterly course for China backed by the prevailing winds. Ships would converge on Tuen Mun before proceeding to Canton and elsewhere. Chinese ships bound for foreign countries and foreign ships on their return journey had to wait for the northeast winter monsoon. Leaving Canton, they would also call at Tuen Mun before setting sail for distant lands. Tuen Mun had been an outer port for Canton from the Tang down to the Ming Dynasty. Because of this important connection it is much talked about by contemporary scholars, yet very little of its former glory and bustling activity remain. Current knowledge is almost totally derived from written accounts.
- 9.4.4.3 It is impossible to know with any certainty when Tuen Mun first served as a centre for overseas communication but it seems to have become very active during the Tang Dynasty (618-907). This is demonstrated by the Tang authorities introduction of the special military defence unit called the *Chên*. An account is given of the military administration under the jurisdiction of Canton in the *Hsin T'ang-shu*, in *chüan* 43, part 1, under *Ti-li Chih* which says:
- “There are two fu, namely Sui-nan and P'an-yu, and a body of regular troops in addition to the garrison stationed at T'un-Mên Chên.”*
- 9.4.4.4 The so-called *fu* was one of the units for training recruits and is an abbreviation for *Chê-ch'ung-fu*, a fundamental element in the conscription system. The *Chên* troops were members of a garrison stationed at strategic positions. Since Tuen Mun was made a *Chên* with a garrison commanded by an officer, it is obvious that numerous ships had been passing through Tuen Mun. This can be verified from both the *Chiu T'ang shu* and the *Hsin T'ang shu*. During the reign of T'ang Hsüan Tsung, a prefect of Nan-hai called Liu Chü-lin had once led the troops of T'un-Mên Chên northwards by sea to destroy the piratical band headed by Wu Ling-kuang who used to ravage the area of Yung-chia in Chekiang.
- 9.4.4.5 As traffic increased, more travellers passed through Tuen Mun and literary men began to learn of the place and its trading activities. Of the literature written about Tuen Mun, mostly ballads and poems, the works of Han Yü and Liu Yü-hsi are most prominent. The latter gave a detailed description of the place in his poem *‘the surging tide’* which he wrote after a typhoon had struck the area.
- 9.4.4.6 In 736, the Tang government set up a 2,000-strong garrison at Tuen Mun, called the Tuen Mun Battalion (Tuen-Mun chen). The garrison was led by “Commander” Sau-chuck-shih, who belonged to the Annam prefecture based at Nam Tau. The region of present day Hong Kong including Hong Kong Island, the Kowloon Peninsular, the outlying islands and the New Territories all came under the military protection of this garrison.

- 9.4.4.7 After the collapse of the Tang, Mount Pei-tu at Tuen Mun was re-named Jui-ying Mountain by the authority of King Liu, founder of the Nan Han. On the northern slope of the mountain, barracks were constructed to lodge a garrison, while a special naval unit was created to maintain security in the offshore areas. The T'un-Mên Chên was under the joint jurisdiction of the heads of the garrison and naval unit. The sovereign of Nan Han, who seized power during the disintegration of the Tang and established himself in southern China, made it his policy to secure the support of outlaws. By doing this he aimed to extend his way to the non-Chinese people and derive maximum profit from trade with foreign countries. Consequently, special attention was paid to Tuen Mun.
- 9.4.4.8 When the Song (960-1279) emperors assumed power, government control in the area was extended. In addition to the royal garrison, an officer was installed whose duty it was to pursue and arrest bandits. A system of administration for the land-locked waters and more remote seas was put into force at Tuen Mun.
- 9.4.4.9 During the Yuan Dynasty (1279-1368), corruption prevailed within the government bureaucracy. The former brisk trade along the coast of Kwantung declined and the garrison at Tuen Mun seems to have been discontinued. With the rise of the Ming (1368-1644), the defence of the country's sea bases was re-organised, with *Wei* (military bases) being established at various places along the coast. The defence unit responsible for the Tung-can area was stationed at what is now the country town of Pa-an Hsien, while only an insignificant watch tower for giving alarm signals was posted at Tuen Mun.
- 9.4.4.10 One reason for the neglect of Tuen Mun is that it was no longer acting as the outer port of Canton, its place having been taken by Nan-t'ou in the present Pai-an Hsien. In addition, foreign ships also came in smaller numbers and with less frequency. The most important commercial powers, Arabia and Persia were then very much under the sway of the newly risen Turkish Empire, a situation which did not encourage trade and navigation. Tuen Mun therefore lost its importance.
- 9.4.4.11 The Nan Han Emperor is known to have been interested in the Hong Kong area. He visited Tuen Mun in 955, and proclaimed Castle Peak to be the Holy Mountain of his empire. At the same time, he began reorganising and strengthening the local garrisons.
- 9.4.4.12 For a brief interval in the first quarter of the sixteenth century (1514-1521), Tuen Mun was occupied by the Portuguese. The early Portuguese presence at Lintin and Tuen Mun is well documented. The first European navigator known to have reached the China coast, a Portuguese named Jorge Alvares, made his landfall in 1513. Alvares commenced his mission in Malacca, now in Malaysia, which the Portuguese had captured in 1511. Merchandise brought from China, especially porcelain, sold for extremely high prices, with good quality ceramics fetching twice their weight in silver when re-sold at Goa. Instead of relying on Chinese traders, the Portuguese intended to establish a sea-route to China and purchase for themselves at source. Most of Alvares' time was spent at Lintin, the island known as "Solitary Nail" in Chinese due to its sharply-pointed shape.
- 9.4.4.13 The local mandarin at Tuen Mun anchorage, based at nearby Nam Tau, received the Portuguese in a friendly manner and trade commenced. A *padrão* (stone carved with the

Portuguese cross and crest) was erected by Alvares at Lintin, though nothing of it now survives. These stones functioned more as a marker of passage for later seafarers than as a territorial claim. Such stones were erected wherever the Portuguese mariners sailed from Mombassa and Ormuz to western India and the Moluccas. Alvares' young son accompanied him on the voyage from Malacca, but he died at Lintin and was buried at the base of the padrão erected by his father (Braga, 1955).

9.4.4.14 Alvares' flotilla remained at Tuen Mun for ten months, finally returning to Malacca when the change in monsoon winds permitted them to sail. While not given much freedom of movement, early traders visiting Lin Tin were not as confined in their activities by the Chinese authorities as they were in later centuries.

9.4.4.15 Jorge Alvares made two more voyages to China, in 1519 and again in 1521. On his last voyage to the China coast, he died on 8th July 1521 and was buried beneath the padrão in the same spot as his son (Braga, 1955). Ming Dynasty gazetteers record that in 1516 the Portuguese came again under the command of Simao d'Andrade with a warship and three unarmed sailing vessels. Simao was stern and impudent. He established enclosures on nearby islands for the execution of prisoners, he resisted the payment of customs duties on goods, and allowed his men to rob the Chinese inhabitants. His behaviour aroused the indignation of both the peasantry and the local Chinese government officials. In 1521, a considerable force was led against them by Wan Hung, superintendent of the patrol guards for the sea frontier of Kwantung.

9.4.4.16 After heavy fighting around Tuen Mun, the Portuguese were decisively beaten. In an essay describing the Memorial Chapel of General Wang by Ch'ên Wên-fu he describes the battle:

“some strangers who called themselves Franks (Portuguese) suddenly appeared. They set themselves up along the shores of Tuen Mun and Kuei-yung mingling with other foreign scoundrels... Bitterness and enmity were aroused among the local inhabitants. Dreading the atrocious acts of the Franks, there was much talk of migrating elsewhere to be out of the way. But most people could not tolerate the thought of leaving their homes and the burial places of their ancestors. When the tale of their distress was told to the worthy Wang Hung, his wrath was terribly roused. Ordering his men to make all preparations for fighting, he himself led them to battle to assault the Franks....

The warships of the Franks were bulky, and could only be propelled by the wind, but just then the south wind was blowing furiously. Fearless yet shrewd, General Wang decided to take advantage of the wind and ordered the exterminating of the pirates and the destruction of their vessels. Small boats were prepared to be loaded with firewood and dried reeds, over which oils were to be sprayed. These were set on fire and launched towards the enemy. Fanned by wind, the mass of flame and smoke rushed furiously towards the enemy's fleet. This unexpected action dismayed the Franks, and consequently they could do nothing to avert their dreadful fate. Presently the threatening flames of fire were raging among their vessels. The warriors of Wang then advanced, shouting battle-cries, and crushed the enemies, killing every one of them.”

9.4.4.17 After this battle, no more Portuguese resided in the Tuen Mun area.

9.4.4.18 After the reign of Chia-ching (1522-1566), the maritime districts along the coasts of Kiangsu, Chekiang, Fukien and Kwantung were frequently attacked by Japanese pirates. Wars of extermination were vigorously waged against them and Yü Ta-yu and Ch'i Chi-kuang, two Ming commanders, after twenty years succeeded in breaking down their power. Yet, such were the inroads made by the pirates that the maritime districts never recovered their former wealth and busy sea traffic. Wang Ch'ung-his, who edited the *Hsin-an Hsien-chih* wrote an account of the geography of the region stretching from present day Nan-t'ou in Pao-an Hsien to Tuen Mun and the important events that had taken place there since the Ming Dynasty. The book describes that during the Ming Dynasty, traffic in the estuary of the Pearl River no longer centred on Tuen Mun and that the coast from Nan-t'ou to Tuen Mun was the constant prey of Japanese pirates and outlaws. Tuen Mun never re-gained its importance as port and most of the harbour has now been reclaimed.

9.4.5 Lung Kwu Chau and Sha Chau Islands

9.4.5.1 Lung Kwu Chau (Dragon Drum Island) and Sha Chau (Sandy Island) feature prominently in early accounts of the Hong Kong region's maritime history. A Portuguese pilot book written in 1514 contains detailed descriptions of the islands (Braga, 1955). In the sixteenth and seventeenth centuries, the junk trade from South-East Asia to China was considerable. Junks anchored in the roadstead between Tuen Mun and Lung Kwu Chau, in the lee of Castle Peak. The chief merchandise was pepper but also cloves, nutmeg, incense, elephant's tusks, tin, Borneo camphor, white sandalwood, large quantities of Straits-grown blackwood known as "Syngapura", carnelians, and coloured woolen cloth.

9.4.5.2 The stretch of sea between Kap Shui Mun Passage, between the island of Ma Wan, and Lantau and Lung Kwu Chau was a particularly popular anchoring point for ships in the days of East India and country trade. Captain James Horsburgh, hydrographer to the East India Company, extensively surveyed coastal waters in the vicinity in 1806-19. In his report to the Foreign Office he enumerates, among the abundant safe harbours near Canton, "*Toong Kwu Bay, as well as Cap Sing Mun*" (Sayer, 1980).

9.4.5.3 By early 1836, the area was in regular use as an anchorage. In December 1836 a party of Americans and Englishmen "[passed] through the safe anchorage known as Urmston's Harbour, or Toon Kwu. Till two or three years past, the opium-laden vessels used to anchor here from July till October for shelter against typhoons" (Sayer, 1980). During the 1840 Anglo-Chinese hostilities, the area was used extensively by British merchant and naval vessels, as they were no longer welcome near Macao.

9.4.5.4 In 1857, during the Second Opium War (1857-60) Castle Peak Bay was used by the French fleet from October to December before the outbreak of hostilities with China (Sayer, 1980). Urmston Road was especially popular for vessels trading illegally at the nearby island of Lintin, a frequently used rendezvous point for opium smugglers. In one particularly bad typhoon, that struck the area the vessel Governor Findlay, the British brig Watkins, the naval sloop Raleigh and the Portuguese brig Santa Anna were all

dismasted. Eleven other vessels including British, Danish, Portuguese, Spanish, American were all forced to cut away their masts or were driven ashore or foundered at anchor, all with great loss of life and armament. The entire crew of a ship's cutter, returning to the East India Company ship Atlas was lost at Urmston's harbour. The body of one was recovered and taken to Macao for burial, but nothing else was found but "*a few hats of the crew, and the stretchers of the boat*" (Ride, 1955).

9.4.6 *Urmston's Harbour*

9.4.6.1 Urmston's Harbour, sometimes referred to as Urmston Bay or Toon-Koo (Tung Koo) Harbour, is the passage of water bounded by coast of Castle Peak Bay and the small islands of Tung Koo (modern Lung Kun Chau), and Saw-Chow (modern Sha Chau) situated just to the west of Castle Peak. Urmston Road was named after Sir James Baboon Urmston, who was the British East India Company's China chief from 1819 to 1826. He joined the Company's service in 1799, and in 1812 was one of the company's supercargoes employed below the Select Committee at Canton (Ride, 1995). The passage received its English name in 1823; prior to that it was referred to as Toon-Koo Bay.

9.4.6.2 Castle Peak Power Station (also known as Black Point Power Station) was built at Tap Shek Kok on the western side of Castle Peak Bay across from Urmston's Harbour. Construction of the power station commenced in October 1979 and required 6.7 square million feet of reclamation work and site formation to be completed before work on the power station itself could commence (Cameron, 1982).

9.4.7 *Urmston Road*

9.4.7.1 Urmston Road is the passage of water that extends from Kap Shui Mun, between the northern coast of Lantau, Castle Peak and the small island of Tung Koo (modern Lung Kun Chau). It is situated to the west of Castle Peak and includes the smaller and more specific Urmston Harbour (see above). In November 1843 the Foreign Office in consultation with the Colonial Office agreed to suspend the exclusion of opium ships from Hong Kong harbour, then in force.

9.4.7.2 Most opium traders had by this time taken the precaution of moving their opium store-ships to outlying areas, and many anchored in the region of Kap Shui Mun at this time (Endacott, 1993). This situation changed with increased stability in Hong Kong waters, and from later in 1844 the anchorages at Kap Shui Mun were abandoned in favour of the more secure hulks in Victoria Harbour, or the on-shore godowns in the city (Endacott, 1993).

9.4.7.3 To the west of Urmston Harbour, is the island of Lun Kwu Chau (Dragon Drum Island). It features prominently in the early accounts of the Hong Kong's maritime history. On many early charts, Lung Kwu Chau is transliterated variously as Tung Koo, Tung Koo, Toon Oo or Toon-quoo. The small island to the south is known as Sha Chau (Sandy Island), and frequently appears on early charts as Saw-Chow, is narrow and about one mile long.

9.4.7.4 Lung Kwu Chau and neighbouring islets are clearly marked in O Livro de Francisco Rodrigues, (translated by Armando Cortesão as The Suma Oriental of Tomé Pires and

The Book of Francisco Rodrigues, written in 1514). Rodrigues was a very early Portuguese pilot, cartographer and captain who sailed in these waters in the early sixteenth century. Rodrigues was one of the commanders of Alvares' flotilla during the voyage from Malacca to China in 1517-18 (Braga, 1955). His book contains the earliest European-drawn maps of the region. Their chief quality is that they are based on actual observation by men who were familiar with the places depicted, rather than approximations drawn from the oral accounts of (usually Malay or Arab) professional pilots (Braga, 1955).

9.5 Marine Archaeological Potential

9.5.1 Tuen Mun

9.5.1.1 The historical data presented above gives the Tuen Mun area a very high archaeological potential. However, this area has been subject to significant disturbance in recent years associated with development and dredging works. In particular, the maintenance dredging for the Castle Peak Power Station within Urmston Road will have reduced the archaeological potential of the area. In addition, the proposed PAFF jetty at Tuen Mun Area 38 is adjacent to recent reclamation. It is therefore possible that the seabed could have been disturbed during construction works. Figure 2.4 shows the key areas of seabed disturbance discussed below.

9.5.2 Sha Chau

9.5.2.1 This area also has very high archaeological potential. However, this will have been diminished by the dredging for the existing pipeline from close to the island to the airport. It will have been further reduced by dredging for a navigation channel from the Urmston Road to the larger turning circle at the fuel vessel berthing area which is right against the island, see Figure 2.4. However, archaeological remains are more likely to be present in areas close to the islands which have not been subject to disturbance.

9.6 Potential Impact of the PAFF Construction

9.6.1 Background

9.6.1.1 The fuel tank farm will be constructed on recently reclaimed land at Tuen Mun Area 38 and, as such, there will be no marine archaeological impact associated with this land based facility.

9.6.1.2 The twin pipeline from the PAFF will be in a trench which is about 2.2-3.5 m deep, 5 m wide at the bottom with fairly shallow side slopes which will be about 26 m wide at the surface. Where the alignment crosses the Urmston Road, the depth of pipeline may increase to 6-7m for enhanced protection against future dredging in this area. There will be another pipeline connecting the berthing jetty to the PAFF which will be approximately 5 m at the bottom and 26 m at the top. Indicative cross sections of these trenches can be seen in Figure 3.3.

9.6.1.3 The dredging required to achieve the trench dimensions will cause disturbance to the seabed and, thus, any archaeological resources along the pipeline route could be destroyed by its construction.

9.6.2 Tuen Mun

9.6.2.1 The jetty for the PAFF is positioned approximately 200m from the existing reclamation, as shown in Figure 3.2, and thus, it is possible that the seabed in this area has already been disturbed, as there would have been barges anchored in this area. Construction of the berths will require piling into the seabed which will create only a very localised disturbance. There will be no capital or maintenance dredging required.

9.6.3 Sha Chau

9.6.3.1 The new pipeline will connect directly to an existing dolphin. It is likely that the seabed adjacent to the dolphin will already have been disturbed. In addition, the pipeline will follow the alignment of the existing access channel and turning circle which is subject to maintenance dredging every 3-4 years. Therefore, the potential for any archaeological resources in this area will be greatly diminished. However, in areas along the pipeline alignment where there has not been any known previous disturbance, the potential for a negative impact on any archaeological resource which may be present will be higher.

9.7 Marine Archaeological Field Evaluation

9.7.1 Geophysical Survey

9.7.1.1 As the baseline review revealed the study area had marine archaeological potential and assessment of the potential impacts showed that the construction of the pipeline trench did have the potential to have a negative impact on any archaeological resources along the alignment, a geophysical survey is required. The geophysical survey was undertaken in June 2002 and the methodology and detailed results are shown in the Marine Archaeological Report in Appendix G.

9.7.1.2 Some 26 'exposed targets' or anomalies were detected by side scan sonar and 10 initial sub-surface anomalies were noted. The exposed targets could be surveyed by a visual diver survey as detailed below. The submerged targets however, cannot be investigated using this technique and thus, two areas (termed SS1 and SS2) (see Figure 9.10), considered to have the most likely archaeological potential, were proposed to be subject to a watching brief. This involves careful monitoring of the dredging operations to enable immediate identification and salvage of archaeological material.

9.7.2 Visual Diver Survey

9.7.2.1 Based upon the results of the geophysical survey and the archaeological potential of the area, a visual diver inspection was undertaken of the 26 exposed anomalies identified was undertaken between 4th and 12th November 2003. The circular search survey technique was used including both visual and snag line survey. Further details of the search technique applied are provided in Section 2.3 of Report MIA Task 4.1 in Appendix G.

9.7.2.2 The visual diver survey did not reveal any material of cultural significance but associated with recently dumped terrestrial or littoral material as detailed in Table 3 of Report MIA Task 4.1 in Appendix G.

9.7.2.3 As noted above a watching brief was recommended for the sub-surface anomalies which could not be investigated with the visual diver survey.

9.8 Mitigation Measures

9.8.1 The diver survey did not reveal any material of cultural significance after investigation of the exposed, above surface, anomalies and as such no mitigation measures are required. However, the sub-surface anomalies identified by the geophysical survey could not be examined by the diver survey and as such a watching brief is recommended. This would comprise:

- ◆ Dredge operators to be made aware of the potential presence of cultural heritage material. The operators would be required to report to the AMO any unusual resistance and/or recovery of timbers, anchors or other wreck related material. Any obstacles encountered during the dredging that are of timber should be reported to the maritime archaeologist. The obstacle should be avoided and not removed until it has been assessed by the marine archaeologist as to whether the obstacle is of cultural heritage importance;
- ◆ A marine archaeologist shall be on board the dredging barge during dredging within 25m either side SS1 and SS2 (Figure 9.10 and Figures 5a and 5b, MIA Task 4.1, Appendix G) in the event of any unusual resistance occurring or blockages which requires the dredge head to be brought on deck for cleaning and examination; and
- ◆ Dredging to cease in the nominated area SS1 after 3 metres of sediment removal and after 1 metre for SS2. A dive survey will then be undertaken to examine the trench for possible cultural remains.

9.8.2 The 25 m radius around the coordinates for SS1 and SS2 is based on the detected size of these buried anomalies and that the shipwrecks anticipated would not be greater than 50 m in length. If a wreck is present it is likely that small components may be situated away from the main wreck and hence cause blockages. Having a marine archaeologist on-board a short distance before the coordinates of the buried anomaly is reached would assist in identifying the possible presence of a shipwreck before the main wreckage is reached. This would reduce the likelihood of the main wreck site being significantly damaged by the dredge.

9.8.3 During the course of the watching brief, if the targets are identified as being potentially archaeologically important, then an immediate marine archaeological impact assessment in accordance with EIAO TM Annex 19 will be required to be undertaken by a qualified marine archaeologist.

9.8.4 The details of SS1 and SS2 are detailed in Table 9.1 below.

Table 9.1 Sub-surface Targets

Target	Approximate Depth	Depth below sea bed (m)	Length (m)	Height (m)	Latitude	Longitude
SS1	19	2.5	30	4	22°21.9263'N	113°55.3930'E
SS2	21	(1)	18	2.5	22°21.8318'N	113°55.2557'E

(1) MAI Report does not specify the depth.

9.8.5 In addition, it is recommended that any changes, additions or alterations to the dredging method and alignment should be further assessed by a marine archaeologist to determine if any further assessment is required.

9.9 Residual Impacts

9.8.1 Provided that the mitigation measures recommended above are implemented, no adverse residual archaeological impacts are predicted for the construction phases of the project.

9.10 Environmental Monitoring and Audit

9.9.1 Marine archaeological monitoring and audit during the construction phase will be limited to during pipeline dredging works in the vicinity of sub-surface anomalies SS1 and SS2 in accordance with the watching brief detailed in Section 9.8 above and the MAI in Appendix G.

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