

Civil Engineering and Development  
Department

**Pier Improvement at Tung Ping  
Chau**

Environmental Impact Assessment –  
Executive Summary

This report takes into account the particular  
instructions and requirements of our client.

It is not intended for and should not be relied  
upon by any third party and no responsibility  
is undertaken to any third party.

**ARUP**

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# 1 Introduction

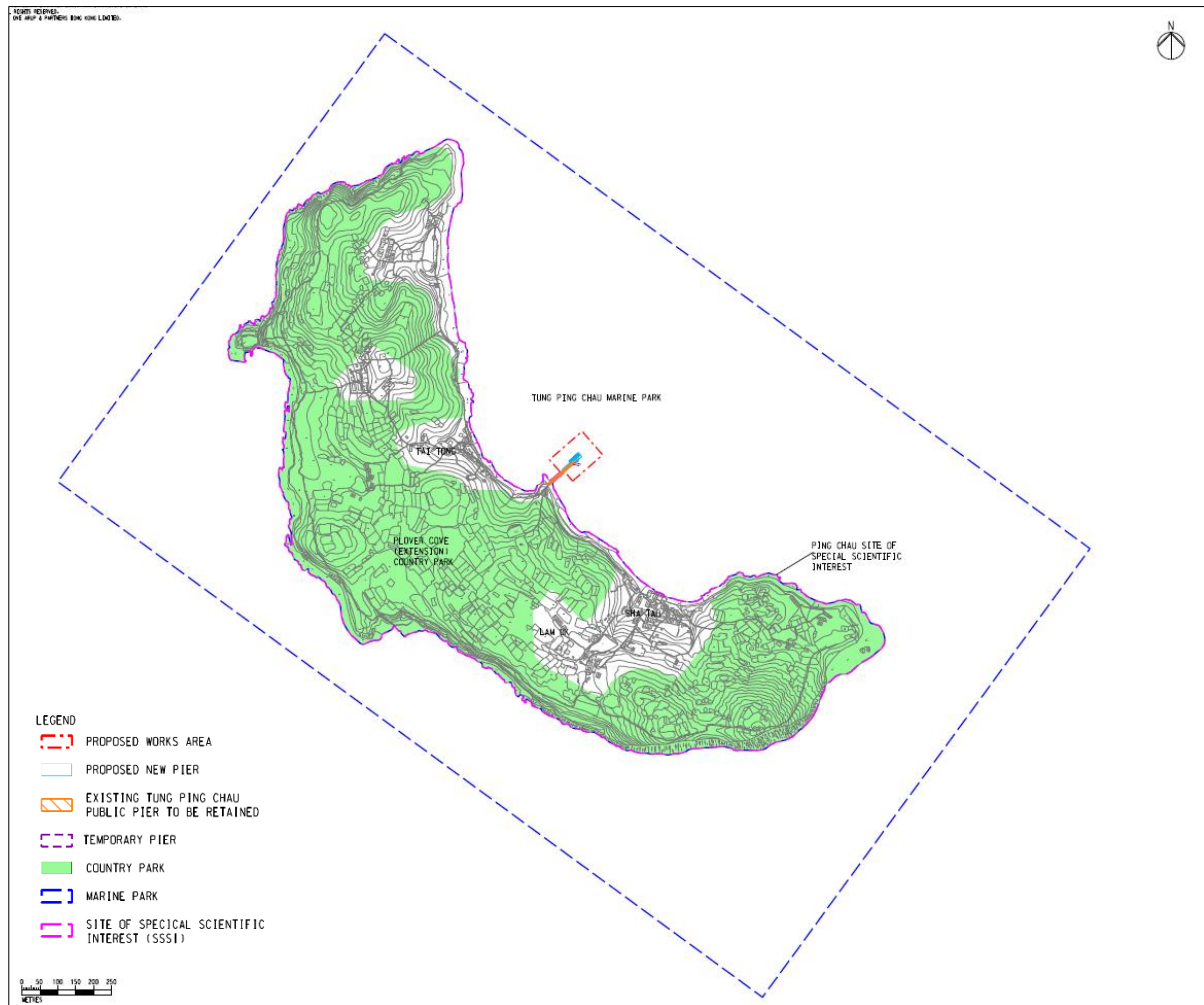
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## 1.1 Background

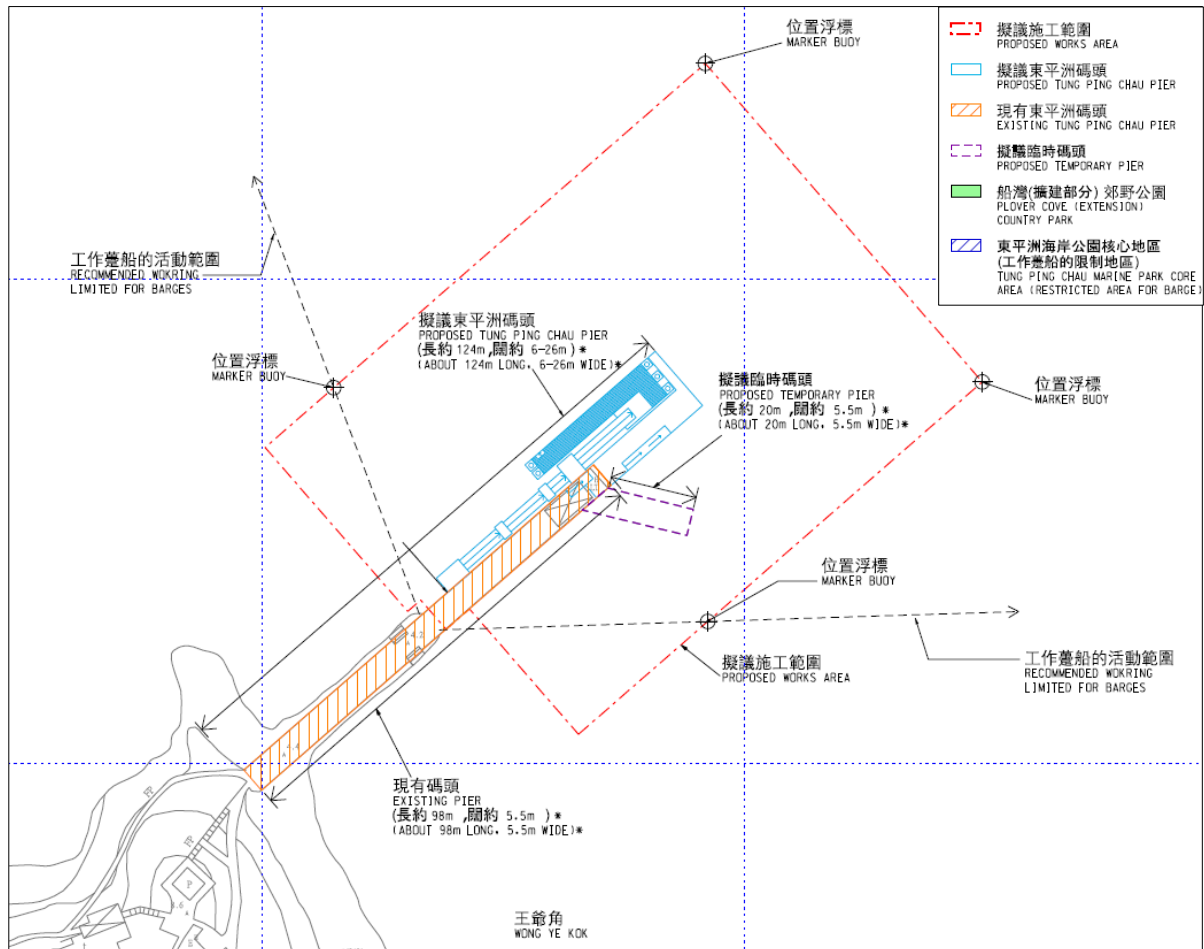
- 1.1.1.1 In Hong Kong, there are currently 117 public piers built, maintained and managed by the Government. Whilst the Government has carried out regular inspections and maintenance for public piers to ensure their structural integrity, some public piers at remote areas are in service for many years suffering from aging problem, or cannot cope with the current needs/ usages, such as:
- unsatisfactory boarding condition of small or primitive piers leading to potential safety concerns to passengers especially for kids and the elderly;
  - inadequate water depth for larger vessels to berth especially during low tide;
  - limited berthing space or narrow accesses which cannot cope with the fluctuating utilization rate during festive times or weekends; and
  - aged pier structures with a need for improvement works.
- 1.1.1.2 In 2017 Policy Address, the Government committed to improve a number of remote public piers to facilitate public access to outing destinations and natural heritage such as Hong Kong UNESCO Global Geopark. To take forward the policy initiative, the Government has launched the Pier Improvement Programme (PIP) for the implementation of improvement works for piers at remote areas.
- 1.1.1.3 A Committee on Piers spearheaded by the Development Bureau, comprising members of relevant bureaux and departments was set up to examine the requests received by different departments concerning improvement suggestions for public piers in the New Territories and outlying islands and set priority for pier improvement items under the PIP taking into account a host of factors including structural and public safety concerns. The Committee has recommended implementing a list of 10 proposed pier improvement items under the first implementation phase of the PIP. Tung Ping Chau Public Pier is one of the recommended proposed pier items.
- 1.1.1.4 In June 2018, Civil Engineering and Development Department (CEDD) commissioned Ove Arup and Partners Hong Kong Limited (Arup) to provide consultancy services for Agreement No. CE2/2018 (CE) “Study for Pier Improvement at Lai Chi Wo and Tung Ping Chau – Investigation” (the Study).
- 1.1.1.5 This Environmental Impact Assessment (EIA) report covers the EIA of the proposed Pier Improvement at Tung Ping Chau. The EIA Report for Lai Chi Wo Pier is separately submitted.

## 1.2 Site Location and History

- 1.2.1.1 Tung Ping Chua Public Pier is located along the north-eastern coast of Tung Ping Chau facing towards Ping Chau Hoi. It falls within the Tung Ping Chau Marine Park and the Hong Kong UNESCO Global Geopark (Geopark). It is also adjacent to the Ping Chau Site of Special Scientific Interest (SSSI) and the Plover Cove (Extension) Country Park. The location plan of Tung Ping Chau Public Pier is shown at **Figure 1.1**.



**Figure 1.1** Location of Project (Tung Ping Chau)



**Figure 1.2 Layout of Project (Tung Ping Chau)**

- 1.2.1.2 Tung Ping Chau Public Pier was constructed more than 50 years ago. It is composed of a causeway, catwalk and a pier head. The pier is about 98m long and 5.5m wide. One landing steps of 1.1m wide is located at each side of pier head. The catwalk in the middle section and the pier head were re-constructed in 2008. The pier level is about +4.4 mPD at the causeway rising to about +4.9 mPD at the pier head.
- 1.2.1.3 The pier is the only access for public to Tung Ping Chau. Currently, there are public ferry services operating between Ma Liu Shui Ferry Pier and Tung Ping Chau Public Pier on weekends and public holidays. Vessels of private operators also bring tourists to the island during weekdays. As the width of the landing steps is less than the standard width of 2m, there are safety concerns for passengers embarking on/disembarking off vessels.
- 1.2.1.4 There have been repeated requests from Sai Kung North Rural Committee members, Tai Po District Council members and Tung Ping Chau Village Representative (VRs) to improve the safety of the passengers using the pier.
- 1.2.1.5 The existing pier consists of narrow staircases and is inadequate to meet the current operational needs. Therefore, Pier Improvement at Tung Ping Chau (the Project) is being proposed and taken forward.
- 1.2.1.6 The overall objective of this Project is to conduct an EIA study and preliminary engineering studies before proceeding with the detailed design and construction of the Project.

## 1.3 Scope of the Project

- 1.3.1.1 According to the latest design, the length of the improved pier will increase from 98m to approximately 124m with the landing steps shifted seawards. The pier head will be lengthened from around 14m to about 40m, and will be widened from 5.5m to 6m. It also includes associated facilities such as renewable energy provisions, covered waiting area with seats, floating platform to enhance the accessibility of people in need by the addition ramps between the catwalk and the floating platform to facilitate boarding.
- 1.3.1.2 The major works items for the Project include the following:
- (a) Carrying out site investigation works for detailed design;
  - (b) Provision of plants, equipment and materials on working barge(s) for implementation of the Project;
  - (c) Provision of temporary berthing and mooring facilities (temporary pier) using a working barge and/or steel structures supported by piles to maintain access to Tung Ping Chau until a new berth of the pier is available for use;
  - (d) Removal of temporary pier, modification of the existing pier and installation of piles for the new pier;
  - (e) Construction of new pier structures (e.g. installation of precast elements on the pier structure etc.); and
  - (f) Construction of associated facilities on the new pier.
- 1.3.1.3 The Project comprises demolition, construction and operation works within Tung Ping Chau Marine Park. The Project is a Designated Project by virtue of Item Q.1, Part 1 of Schedule 2 of the EIAO which specifies “*All projects including new access roads, railways, sewers, sewage treatment facilities, earthworks, dredging works and other building works partly or wholly in an existing or gazetted proposed country park or special area, a conservation area, and existing or gazetted proposed marine park or marine reserve, a site of cultural heritage, and a site of special scientific interest, ...*”.

## 1.4 Scope of this EIA Report

- 1.4.1.1 In accordance with the requirements of Section 5(1) of the EIAO, a Project Profile (No. PP-562/2017) for the Project was submitted to the Director of Environmental Protection (DEP) for application for an EIA Study Brief on 27 December 2017. Pursuant to Section 5(7)(a) of the EIAO, the DEP issued a Study Brief (No.: ESB-306/2017 dated 9 February 2018) for the EIA study.

## 1.5 Purpose of this Executive Summary

- 1.5.1.1 This Executive Summary (ES) highlights the key information and assessment findings of the EIA Study for Pier Improvement at Tung Ping Chau.

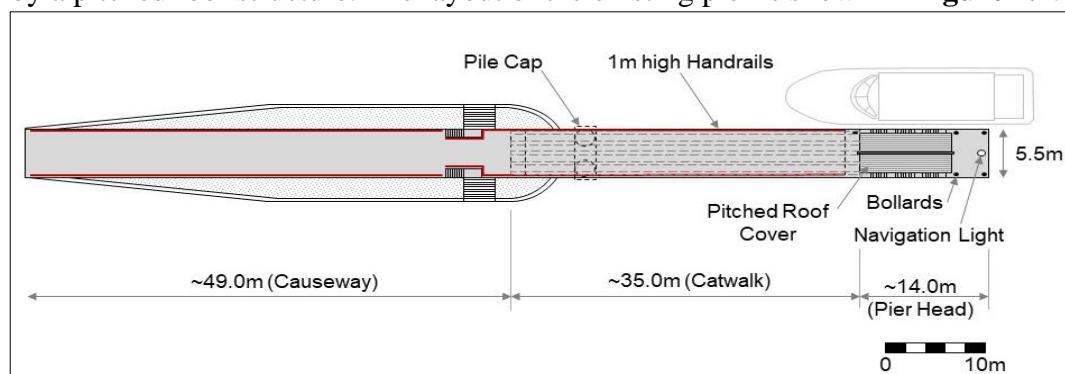
## 2 Project Description

### 2.1 Purposes and Objectives of the Project

- 2.1.1.1 The Project aims to upgrade the structural and facility standards of Tung Ping Chau (TPC) Public Pier for safe pier usage by local villagers, mariculturists, visitors and tourists.
- 2.1.1.2 The existing TPC Public Pier has two landing steps of 1.1m wide each. The width of these landing steps is less than the standard width of 2m, and there are safety concerns for passengers boarding on / disembarkation off vessels. The solid pier at the pier head is only 14-15m long, which is not long enough for side-berthing of typical public vessels.
- 2.1.1.3 There have been repeated requests from Sai Kung North Rural Committee members, Tai Po District Council Members and Tung Ping Chau Village Representatives (VRs) to improve the safety of the passengers using the pier.
- 2.1.1.4 This Project will address these operational and safety problems and provide opportunities to bring benefits in enhancing TPC Public Pier with upgraded facilities such as barrier-free access, canopy, seats, etc.

#### 2.1.2 Description of the Existing Pier

- 2.1.2.1 TPC Public Pier was originally constructed in the 1960s and was upgraded in 2008 to address certain structural problems. The pier is located within the Tung Ping Chau Marine Park, which is well known for the protection of coral communities, algal bed and unique geological features. The existing TPC Public Pier is about 98m long, comprising an about 14m long solid pier head, about 35m long catwalk and an about 49m long rubble causeway. The solid pier head is about 5.5m wide, and consists of a 1.1m wide flight of steps on each side of the pier head. The pier head level is about 4.9m above the Principal Datum (PD), and the pier head is covered by a pitched roof structure. The layout of the existing pier is shown in **Figure 2.1**.



**Figure 2.1** Layout of Existing TPC Public Pier

#### 2.1.3 Safety Concerns

- 2.1.3.1 Due to poor structural conditions of the walkway at Tung Ping Chau Public Pier in 2004, improvement works had been proposed to replace it by a new walkway spanned between new piles and the existing pier head. The improvement works also comprised widening of the causeway and catwalk. The pier head was covered by a



new canopy, and the structure of the pier head remained as it had been (see **Figure 2.2** and **Figure 2.3**).



**Figure 2.2** Pier was built in 1960s



**Figure 2.3** Improvement Works in 2007

- 2.1.3.2 There are two landing steps at the existing pier head, but the landing steps are narrow and steep. They have posed serious safety concerns for passengers boarding on / disembarkation off vessels to the pier; they are sub-standard according to the current code of practice (**Figure 2.4**). Some near-miss accidents at the landing steps were reported by the locals and villagers. There is serious accessibility issue for those who are in need, including aged people, when using this pier.
- 2.1.3.3 Besides, the existing pier head is only 14.5m long and it is too short that it is not possible to berth the full length of typical passenger vessels alongside the pier. Vessels can only berth undesirably at the boat bow (**Figure 2.5**). In view of these people and vessel navigation/berthing safety issues, it is crucial to carry out improvement works at this pier to ensure safe uses of this pier.
- 2.1.3.4 These concerns are listed as follows and are elaborated in the following paragraphs.
- (1) Narrow and steep flights of landing steps; and
  - (2) Undesirable berthing arrangement.

#### **Narrow and Steep Flights of Landing Steps**

- 2.1.3.5 The two flights of landings at the existing pier are about 1.1m wide, which is less than the standard width of 2m. In addition, the gradient of landing steps is 1v:1.3h, which is steeper than the standard gradient of 1v:2h. Besides, the landing steps could be crowded with patrons boarding on / disembarking off vessels. There is a higher risk of fall when using these narrow and steep flights of landing steps. Especially, when villagers use it to deliver relatively large goods.

#### **Undesirable Berthing Arrangement**

- 2.1.3.6 The pier head is about 14m-15m long. Due to the short length of the pier head, the pier head is not adequate lengthwise for allowing complete side berthing of the full length of Kaito ferry vessels which are typically 25m to 30m. Vessels can only berth undesirably at the boat bow. In view of vessel navigation/berthing safety issues, it is crucial to carry out improvement works at the pier to provide a sufficient length for vessels to complete side berthing.



**Figure 2.4 Existing Narrow and Steep Landing Steps of Tung Ping Chau Public Pier**



**Figure 2.5 Undesirable berthing at the Boat Bow of Existing Tung Ping Chau Public Pier**

## **2.1.4 Villagers' / Pier Users' Concerns**

- 2.1.4.1 There have been repeated requests from Village Representatives (VRs) of the five villages on TPC, SKNRC members and TPDC members over the years to improve the safety condition when using the pier. During the consultation meetings held with elected-by-villagers VRs, SKNRC members and TPDC councillor in May 2019 for this Project, they reported that there had been accidents or near-misses happened in the past due to the narrow and steep landing steps. They expressed support to this Project and urged the earlier implementation of this improvement works.

## **2.1.5 Barrier-Free Facilities**

- 2.1.5.1 It has been the Government's established policy to provide barrier-free facilities for people in need with a view to enabling them to freely access premises and make use of community facilities and services on an equal basis with others. Accessible facilities would provide opportunities for these people to live independently, participate in various social activities and integrate into the community. To improve accessibility of public pier, the accessibility (1) between the vessel and the pier, and (2) within the pier shall be improved.

## **2.1.6 Sustainable Development of the Geopark**

- 2.1.6.1 As mentioned in Section 1.2.1.1, the Tung Ping Chau Public Pier is located within Hong Kong UNESCO Global Geopark (Geopark). The Hong Kong UNESCO Global Geopark is currently a member of the Global Geoparks Network (GGN), which one of the key features is to promote earth science and sustainable development through geo-tourism and education. According to the protection level of Geopark, Tung Ping Chau belongs to "Integrated Protection Area", which carries function for geo-tourism due to its carrying capacity is comparatively higher than in other areas of Geopark. With the implementation of the proposed pier improvement works, the Tung Ping Chau Public Pier would be provided with safer access for the public to visit, so as to improve the experience of travellers visiting the geopark and thus supporting the sustainable development of the geopark.

## **2.1.7 Enhancement of Recreation and Education Potential of Country Parks**

- 2.1.7.1 Tung Ping Chau, being the easternmost outlying island in Hong Kong, is part of the Plover Cove (Extension) Country Park and Tung Ping Chau Public Pier is the only access point on the island. According to the Consultancy Study on Enhancement of the Recreation and Education Potential of Country Parks and Special Areas by AFCD, the general public in Hong Kong hopes for enhancement of existing facilities in Country Parks especially on the accessibility of Country Parks as well as facilitating visits by people-in-need. After implementing the proposed pier improvement works, it would provide upgraded facilities and barrier-free access in responding to the public aspiration.

## **2.1.8 Scenarios "With" and "Without" the Project**

### **Without Project Scenario**

- 2.1.8.1 Without the Project, the current users including villagers and visitors still have to rely on the existing TPC Public Pier for waterborne transport to access TPC.



Considering that the safety issues such as narrow and steep flights of landing steps and insufficient berth length for side berthing of vessels continue to exist, posing threats to pier users, especially to those with special needs. Enhancing accessibility using barrier-free facilities would not be possible if the Project was not implemented. From the environmental perspectives, the amenity and visual aesthetic of the pier cannot be enhanced without the Project.

### With the Project Scenario

- 2.1.8.2 With the Project, the TPC Public Pier will be upgraded to be integrated with a new pier structure that can allow construction of wider and shallow gradient landing steps providing safer means of access for the patrons and pier users. Other enhancement facilities such barrier-free facilities, canopy, seats, etc. could enhance the convenience, pleasures and satisfaction of pier users.
- 2.1.8.3 From the environmental perspectives, the pier improvement works can benefit the coral communities for the long term by increasing the surface area of hard substratum for the attachment of coral. After the pier improvement works, a pier with modern design and more compatible colour scheme and texture will be provided. This enhances the visual amenity of the pier. More comfortable environment will be provided to the passengers awaiting the ferries. In addition, the proposed pier will be lengthened so that the berthing areas are located further away from the air sensitive receivers and noise sensitive receivers.
- 2.1.8.4 As there would be no planned increment in the frequency of licenced Kaito services after the pier improvement work, no operational environmental impact is anticipated.

## 2.2 Environmental Benefits of the Project

- 2.2.1.1 A summary of environmental benefits of the Project is given in **Table 2.1**.

**Table 2.1 Summary of Environmental Benefits**

Environmental Benefits	Descriptions
Increase surface area for corals	The project will extend the TPC Public Pier towards the sea to allow safety side berthing for vessels and the new pier structures comprise underwater hard structural elements, thus providing additional hard surface areas for corals to attach and grow.
Enhance visual amenity	By the implementation of the pier improvement works with modern design and more compatible colour scheme and texture, the visual appearance of the TPC Public Pier can be better enhanced. Hence, the status of TPC, as a popular destination for eco-tourism, can be uplifted.
Reduce air quality and noise impacts during operational phase	As the length of the improved pier will increase from 98m to approximately 124m with the landing steps shifted seawards, the proposed berthing locations associated with the marine traffic emissions and marine traffic noise will be farther away from the coast and the sensitive receivers as compared with the current condition without pier improvement. Hence, the sensitive receivers may result in a slight improvement of air quality and noise impacts.

## 2.3 Tackling Environmental Challenges and Options Considered

2.3.1.1 Due consideration has been given in formulating the pier design to overcome the environmental challenges faced by the Project. The hierarchy of “Avoid, Minimize and Mitigate” has been adopted during the process to protect the environment as much as practicable. The key principles adopted to tackle all the environmental challenges are discussed in **Table 2.2**.

**Table 2.2 Environmental Challenges of the Project**

<b>Environmental Challenges</b>	<b>Approaches to Tackle Environmental Challenges</b>
Avoidance of open sea dredging	Open sea dredging works would not be adopted to avoid any adverse water quality impacts during the construction phase and hence ecological impacts on the neighbouring coral colonies which are sensitive to suspended solids.
Avoidance of wastewater / effluent discharge during both construction and operational phases	All practicable measures will be implemented to avoid any discharge of wastewater / effluent discharge into Tung Ping Chau Marine Park during both the construction and operational phases. During the construction phase, any wastewater and effluent would be transported away for proper treatment and disposal. During the operational phase, the Project has been designed to avoid any need for using detergents/chemicals during routine maintenance.
Avoidance of works in country park and SSSI	Plover Cove (Extension) Country Park is located at approximately 70m from the existing pier. The works will not encroach upon the Plover Cove (Extension) Country Park. The habitat between the Plover Cove (Extension) Country Park and the existing pier is the footpath and the intertidal shore which have ecological values of Low to Moderate. Besides, the Project also avoids any works to be undertaken within the Ping Chau SSSI to protect the special geological features of the island.
Minimisation of impacts on corals	The abundance of corals within and in the vicinity of the Project. The ecological value of the coral communities has been ranked as High. In order to minimise the impacts on coral, the design of the Project has adopted concrete decks on top supported by piled foundation. This would largely reduce the seabed disturbance and hence the direct and indirect impacts on corals.
Minimisation of hydrodynamic change	The structure of the proposed pier would adopt concrete decks on top supported by piled foundation. The diameter of the foundation would be approximately 0.8m to 1m and the pile spacing is approximately 5m to 8m. Such a configuration is typical for other similar piers improvement works in Hong Kong, for instance, the Reconstruction of the Sharp Island Pier. Due to small footprint of the new supportive piles, changes in the flow regime and hydrodynamic in Ping Chau Hoi are limited.
Minimisation of waste generation during	The Project aims to minimise the waste generation in relation to integrate the structures of the existing pier to the new pier structures. The Project will also limit works on land and avoids tree felling during the construction of pier and hence further reduce waste generation.

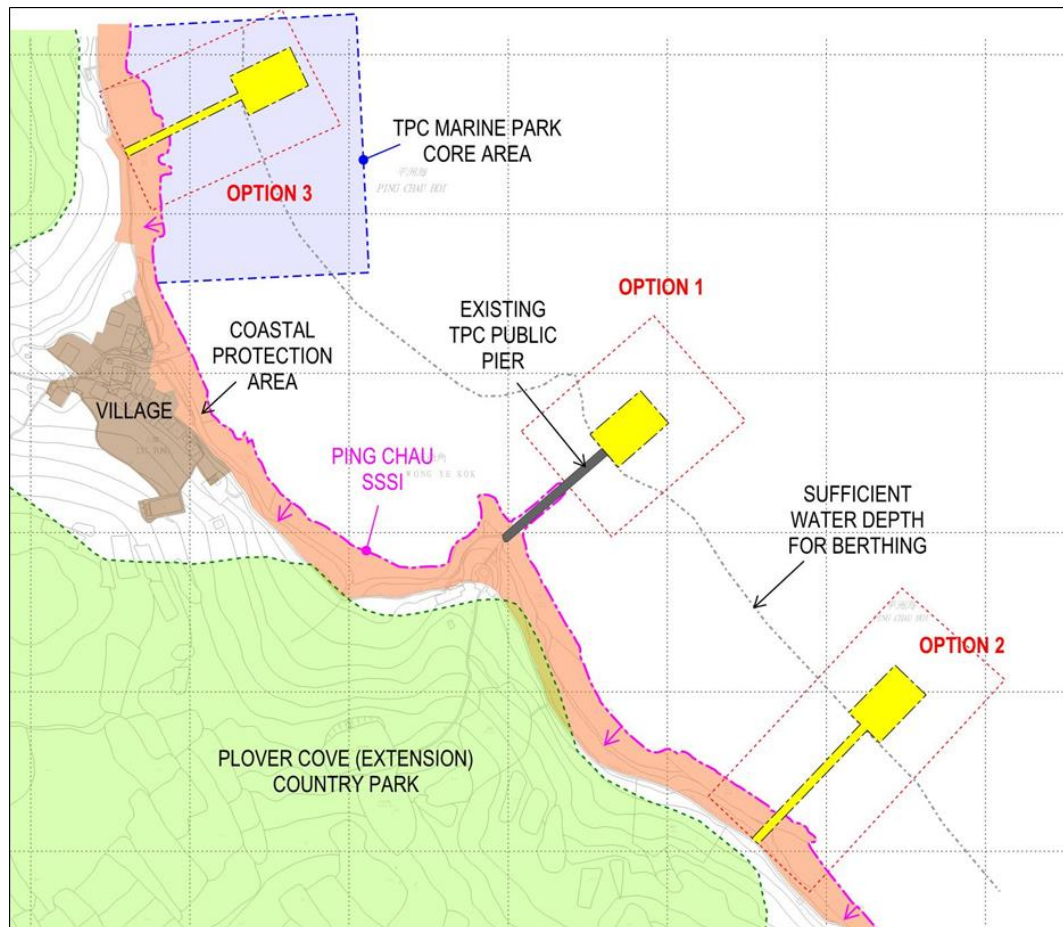
Environmental Challenges	Approaches to Tackle Environmental Challenges
construction phase	
Minimisation of construction vessels during construction phase	As open sea marine dredging would be avoided and pre-cast elements would be adopted as much as practicable, the number of construction vessels would also be minimised. Since the Project is located within the Tung Ping Chau Marine Park, any indirect impacts caused by those vessels on the marine park would also be minimised. Nevertheless, appropriate good practices would be adopted by the Contractor to operate the construction vessels.

## 2.3.2 Options Considered

2.3.2.1 Due considerations have been given in formulating the pier design to address environmental challenges in this Project. The hierarchy of “Avoid, Minimise and Mitigate” has been fully adopted in the process to protect the environment as much as practicable. Hence, the design has given due consideration on the locations of the pier improvement works to minimise the environmental impacts (see **Figure 2.3**).

2.3.2.2 The options that have been duly considered include the following:

- **Option 1:** Extension of the existing TPC Public Pier to provide a new structure for construction of landing steps and incorporation of floating pontoon;
- **Option 2:** A new pier to the south of the existing TPC Public Pier; and
- **Option 3:** A new pier to the north of the existing TPC Public Pier



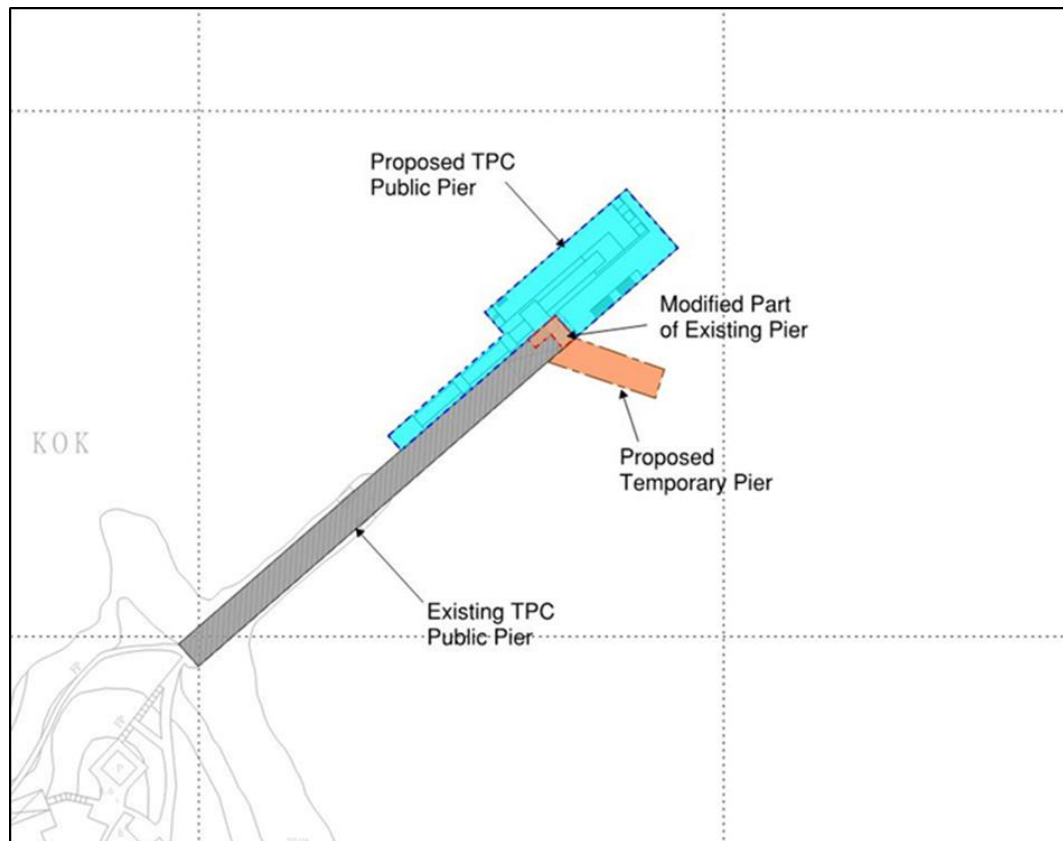
**Figure 2.6 Location Options of TPC Pier Improvement**

- 2.3.2.3 Taking the potential environmental impacts into consideration, **Option 1** has been selected as the preferred option. Though this Option will require the construction of a temporary pier, it avoids any land-based work within the Coastal Protection Area (CPA) and SSSI which are zoned to conserve, protect and retain the natural coastlines and sensitive natural environment as well as the attractive geological features. It also avoids the demolition of the existing pier, and therefore minimise the generation of construction and demolition (C&D) materials. **Option 1** will also avoid encroaching upon the relatively high coral distribution near the shore and the core area of Tung Ping Chau Marine Park.

## 2.4 Proposed Development Scheme

### 2.4.1 Proposed TPC Public Pier

- 2.4.1.1 The existing TPC Public Pier extends from the land towards the sea in the northwest direction. The proposed TPC Public Pier will integrate and extend from the existing pier head and will align in the same direction as the existing pier. The location of the proposed TPC Public Pier is shown in **Figure 2.4**.



**Figure 2.4 Location of Proposed TPC Public Pier and Proposed Temporary TPC Pier**

- 2.4.1.2 The proposed TPC Public Pier will be a piled deck structure in order to minimise any impact on environment and hydrodynamics. The piled deck structure will extend the existing pier head by around 26m towards the sea. Its width ranges from 5.5m to 6m, and increased to a gross width of 15m (including the floating pontoon) at the pier head. The proposed TPC Public Pier will consist of a floating pontoon and a gangway for barrier-free facilities, and may include PV panels, interactive kiosk and/or smart lamppost.

## 2.4.2 Proposed Temporary Pier

- 2.4.2.1 During construction of the proposed TPC Public Pier, concurrent undertaking of improvement works at the existing pier and berthing of vessels is not spatially feasible, and it would not be safe. A temporary pier will be extended from the head of the existing TPC Public Pier to maintain operation of the Kaito ferry service and to serve other public vessels.
- 2.4.2.2 The temporary TPC Pier will be located at the pier head of the existing pier. The proposed temporary pier is in the southeast of the existing pier and is about 20m long and 5.5m wide. The final arrangement of the temporary pier will be determined during the construction stage by the contractor to suit their final method and programme of construction. The pier will be in the form of floating pontoon and/or steel structures supported by piles to minimise any environmental impact. The temporary pier will be demolished after completion of the permanent TPC Public



Pier. The location of the proposed temporary TPC Public Pier is shown in **Figure 2.4**.

### 2.4.3 Ramp Width

- 2.4.3.1 According to the Barrier Free Access Design Manual published by the Buildings Department, the width of a ramp should be at least 1.5m to allow 2 wheelchairs to pass. The pier improvement provides a 2m of clearance for passage of 2 wheelchairs and a 0.5m of width for the installation of handrails and fenders on both sides.

## 2.5 Construction of the Project

### 2.5.1 Construction Sequence

- 2.5.1.1 Project-specific site investigation will be carried out before construction work. Vertical boreholes will be carried out for the Project. Before commencement of the work, the legs of barge and boreholes location will be inspected by diver survey to ascertain no coral colonies will be affected as far as practicable.
- 2.5.1.2 Due to the location of the site, construction materials will be delivered via marine access. They will be transported by barges and installed using derrick barges and/or multi-purpose jack-up barges and/or temporary steel structures.
- 2.5.1.3 Where practicable, prefabrication method will be used for the construction of the proposed TPC Public Pier. All the precast units will be transported by barges and/or derrick barges, and will be installed in-situ on site.
- 2.5.1.4 The prefabricated floating platform and gangway will be delivered via marine access. They will be transported by barges and/or derrick barges.
- 2.5.1.5 The temporary pier will be subsequently demolished after the completion of the new pier.

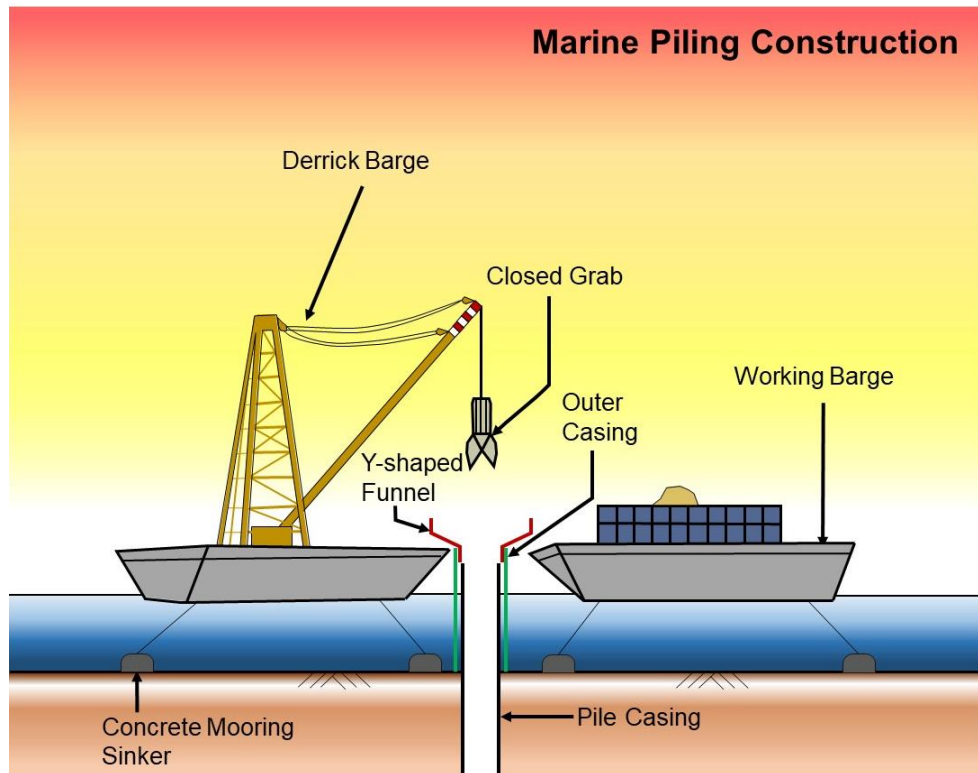
### 2.5.2 Consideration of Environmentally Conscious Construction Methodologies

- 2.5.2.1 Potential environmental impacts have been duly considered and assessed throughout the EIA stage to avoid the adverse environmental impacts of the Project. As such, environmentally conscious construction methodologies have been adopted to avoid, minimise and mitigate environmental impact from the Project as far as practicable.

#### **Use of Double Casing to Confine Pollutants during Bored Pile Construction**

- 2.5.2.2 To avoid the potential water quality impact, the foundations of the proposed TPC Public Pier and the temporary pier will be composed of in-situ bored piles or similar pile types (e.g. rock socketed Steel H-pile). The proposed construction method has totally avoided the need of open sea dredging. For each pile construction, an outer casing shall be first placed on the seabed level to avoid spillage of suspended solids (SS) during piling works. In addition, by using the rigid outer casing, potential injury to coral due to dragging effect of silt curtain by tide and wave actions can be avoided. Besides, a Y-shaped funnel will be installed on top of the outer casing and a closed grab excavator will be used. The barge receiving the grabbed materials will be located as close to the pile casing as possible and underneath the Y-shaped funnel

to avoid the grabbed materials from accidentally dropped into the surrounding water body. All grabbed materials will be conveyed to and be settled in the sedimentation tank, and will be sequentially delivered to the designated disposal outlets by marine transportation. Hence, the practical measures to avoid grabbed materials making in direct contact with the open sea water would be implemented. An illustrative figure of the setup of a marine bored pile construction is shown in **Figure 2.5**.



**Figure 2.5 Outer Casing for Marine Bored Pile Construction**

### **Prefabrication Construction Method**

- 2.5.2.3 Prefabrication approach will be considered when designing concrete superstructures. Selected concrete superstructures will be formed by pre-cast concrete offsite in a controlled environment and installed onsite when ready. This can avoid on-site casting activities that could have potential impact on water quality by minimising the storage of casting materials. Moreover, this approach can minimise the extent and duration of on-site construction activities. The prefabrication method also minimises the waste generation on-site during the construction phase. As a result, the air quality, noise, water quality impacts and waste implications associated with these construction activities including emissions, site run-off, accidental spillage of chemicals and sewage from workforce could thus be avoided or minimised in comparison with on-site casting method.

## **2.6 Environmental Initiatives**

- 2.6.1.1 Whilst a number of design initiatives have been proactively implemented to tackle various environmental challenges, the Project aims to achieve more than the statutory requirements. Thus, various environmental initiatives have been identified for the Project. These initiatives cover different aspects including:

- Clean energy / energy saving;
- Waste minimisation; and
- Enhance biodiversity / greening.

2.6.1.2 However, whilst these initiatives are generally considered as practicable at this stage, the extent of applications and other details have to be revisited and further established during the detailed design stage when the engineering design is further developed. **Table 2.3** summarises all those environmental initiatives envisioned at this stage.

**Table 2.3 Environmental initiatives to be further developed during detailed design stage**

Aspect	Environmental Initiatives	Environmental Benefits
Enhance biodiversity	<ul style="list-style-type: none"> <li>• Priority using eco-tiles or eco-concrete for the surface of the foundation.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote seamless integration of biodiversity into the pier design</li> </ul>
Clean energy / energy saving	<ul style="list-style-type: none"> <li>• PV panels (e.g. for lights at waiting area)</li> <li>• Priority using of LED lighting</li> </ul>	<ul style="list-style-type: none"> <li>• Use of solar energy and energy-saving equipment to minimise energy consumption</li> </ul>
Waste minimisation	<ul style="list-style-type: none"> <li>• Make use of felled trees to produce seats at waiting areas of the pier</li> <li>• Use recycle glass bricks for pavement</li> </ul>	<ul style="list-style-type: none"> <li>• Promote the use if recycle materials / products</li> </ul>

2.6.1.3 Subject to the detailed design of the Project, eco-tile or eco-concrete is recommended for the provision of hard surfaces for vitalising the ecological functions at sub-tidal artificial pier structures such as the downstand wall and piles. The uneven surfaces or selected patterns of eco-tiles provide microhabitats for various marine organisms to colonise and grow, and develop into communities to provide feeding and hiding habitats for juveniles of marine fauna, and thereby effectively enhance biodiversity and ecosystem functions of the new man-made structures. During the detailed design of the Project, the feasibility, detailed design and the implementation programme of the eco-tile or eco-concrete will be submitted for the approval of the authority before commencement of the works.

## 2.7 Summary of Environmental Benefits and Environmental Achievements of the Project

2.7.1.1 Throughout the EIA study, site constraints and impacts have been identified and assessed and mitigation measures/good site practices/enhancement measures, if necessary, have been recommended to avoid negative environmental impacts to the surroundings. In addition, comments from District Councils, residential, green groups and other stakeholders have also been reviewed and incorporated where practicable. A number of environmental initiatives covering good managing practices, waste minimisation and natural conservation have been recommended for incorporation in the detailed design.

2.7.1.2 A summary of the key environmental benefits and achievements of the Project is given in **Table 2.4** for reference:

**Table 2.4 Key Recommended Mitigation Measures/Good Site Practices/Enhancement Measures and their Associated Benefits**

Aspect	Key recommended mitigation measures/good site practices/enhancement measures	Associated Benefits
Air Quality	<ul style="list-style-type: none"> <li>Routing of barges should be as far away from the identified Air Sensitive Receivers (ASRs) as practicable.</li> <li>The number of boat trips should be minimised as far as practicable by appropriate planning.</li> </ul>	<ul style="list-style-type: none"> <li>Protect air sensitive receivers by reducing fugitive dust emission</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Use of Quality Powered Mechanical Equipment (QPME).</li> <li>Use of temporary noise barriers to screen noise from relatively static Powered Mechanical Equipment (PME).</li> <li>Alternative use of plant items within one worksite, wherever practicable.</li> </ul>	<ul style="list-style-type: none"> <li>Protect noise sensitive receivers by reducing construction noise impact</li> </ul>
Water Quality	<ul style="list-style-type: none"> <li>Water quality monitoring.</li> <li>Adoption of good site practices for foundation works, such as adopting double casing system, to avoid and minimize the release of suspended solids.</li> <li>Excavation should only be conducted inside pile casing. Only one closed grab should be used at the same time.</li> <li>Only 1-2 piles to be constructed at the same time.</li> <li>Prefabrication construction method should be adopted as far as practicable.</li> <li>Contractor to prepare Emergency Spillage Plan for accidental spillage of chemicals.</li> </ul>	<ul style="list-style-type: none"> <li>Protect the neighbouring water sensitive receivers in particular coral communities</li> </ul>
Waste Management	<ul style="list-style-type: none"> <li>Good waste management and control practices to avoid generation of excessive amount of waste materials.</li> <li>Employ waste collectors for disposal of general refuse to prevent potential nuisance caused by mistreating general refuse, such as windblown, vermin, water pollution and visual impact.</li> </ul>	<ul style="list-style-type: none"> <li>Minimise waste generation</li> <li>Ensure proper handling of chemical waste</li> </ul>
Land Contamination	<ul style="list-style-type: none"> <li>No mitigation measures would be required.</li> </ul>	<ul style="list-style-type: none"> <li>No land contamination anticipated</li> </ul>
Ecology	<ul style="list-style-type: none"> <li>A coral translocation programme comprising a pre-translocation coral survey, coral translocation and post-translocation coral monitoring will be implemented to minimise the number of corals being encroached or impacted by reduction of sunlight.</li> <li>Conduct diver survey when placing legs of jack-up barge or concrete mooring sinkers.</li> <li>Set up marker buoys to restrict construction vessels in the marked areas.</li> </ul>	<ul style="list-style-type: none"> <li>Translocate the coral colonies under the proposed pier footprint</li> <li>Minimise the impact to coral in proximity to the Project</li> </ul>

Aspect	Key recommended mitigation measures/good site practices/enhancement measures	Associated Benefits
	<ul style="list-style-type: none"> <li>No overlap of new location of the construction vessels with its original location to allow more light penetration for corals.</li> <li>Priority using eco-tiles or eco-concrete for the surface of the foundation to promote seamless integration of biodiversity into the pier design</li> </ul>	<ul style="list-style-type: none"> <li>Enhance biodiversity of the site</li> </ul>
Landscape and Visual	<ul style="list-style-type: none"> <li>Sensitive design and disposition of the pier structures to minimise visual intrusion to VSRs as far as practicable.</li> </ul>	<ul style="list-style-type: none"> <li>Enhance the visual appearance for the operational phase</li> </ul>
Fisheries	<ul style="list-style-type: none"> <li>Adoption of good site practices for water quality in marine works to ensure no adverse fisheries impact would be anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Protect fisheries resources</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>No mitigation measures would be required. As a precautionary measure, Antiquities and Monuments Office (AMO) should be informed in case of discovery of antiquities or supposed antiquities in the course of marine works.</li> </ul>	<ul style="list-style-type: none"> <li>No impact of cultural heritage anticipated</li> </ul>

## 2.8 Tentative Implementation Programme

- 2.8.1.1 Site Investigation works for detailed design will be carried out from Q4 2021 to Q1 2022. Prefabrication method will be adopted as far as practicable for the construction works. Construction is scheduled to commence in Year 2023 and completed by Year 2026. Construction works are planned to be carried out during non-restricted hours (i.e. 0700-1900 hours from Monday to Saturday other than public holidays). The exact schedule of construction depends upon factors such as the granting of necessary permit for its construction and the awarding of the contract to the contractor.

## 3 Summary of Environmental Impact Assessment

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### 3.1 Approach to Environmental Impact Assessment

- 3.1.1.1 The EIA process provides a means of scoping, assessing and reporting the environmental impacts and benefits of the Project. It is an iterative process that has been followed in parallel with the design process to identify the potential environmental effects of various design options, and develop alternatives as well as mitigation measures to be incorporated into the design, construction and operation of the proposed pier at Tung Ping Chau. Public concerns have also been duly considered and incorporated where appropriate. Mitigation measures/good site practices have been proposed to avoid potential environmental impacts, or to minimise or mitigate to acceptable levels.

### 3.2 Air Quality

- 3.2.1.1 Potential air quality impacts associated with the Project have been assessed in accordance with Clause 3.4.4 and Appendix B of the Study Brief and Section 1 of Annex 4 and Annex 12 of the Technical Memorandum on EIA Process (TM-EIAO) to ensure compliance of relevant standards and guidelines.

#### 3.2.2 Construction Phase

- 3.2.2.1 The key air pollution sources in association with the Project have been identified and the potential construction dust and gaseous emission impacts have been evaluated. During construction, since the site investigation and foundation works are mostly below water, there are neither exposed workfronts or heavy construction works which may arise dust emissions. Hence, fugitive dust emissions from its construction are anticipated to be limited. Prefabrication method would be adopted for the construction of the superstructures as much as practicable to further minimise the construction dust impact on-site. Although there is no adverse impact to the identified ASRs, dust control measures and good practices in accordance with Air Pollution Control (Construction Dust) Regulation would be followed to avoid the potential dust impact.
- 3.2.2.2 As the scale of construction works is relatively small, extensive use of the Powered Mechanical Equipment (PME) is not required. Emissions from PME are therefore considered relatively small. Adverse cumulative impact is considered unlikely. Given that the trip frequency of marine transportation for the commuting of site personnel and the delivery of goods per day would be limited and the vessels will be throttled down when they arrive at the Project site, adverse air quality impact from the marine emissions is not anticipated.

#### 3.2.3 Operational Phase

- 3.2.3.1 During operational phase, the Project itself does not intend to increase Kaito services. No additional air pollution sources would be introduced due to the implementation of the Project. Conversely, the main objective of the Project is to enhance the safety and accessibility of the public using the pier. As the Project would increase the separation distance between the ASRs and the vessels, the ASRs would

result in a slight improvement of air quality. Therefore, adverse air quality impact during the operation phase of the Project is not anticipated.

### **3.3 Noise Impact**

- 3.3.1.1 Potential noise impacts associated with the Project have been assessed in accordance with Clause 3.4.5 and Appendix C of the Study Brief and Annexes 5 and 13 of the TM-EIAO to ensure compliance of relevant standards and guidelines.

#### **3.3.2 Construction Phase**

- 3.3.2.1 During construction phase, Tai Tong and Plover Cove (Extension) Country Park are identified as NSRs at approximately 210m and 70m away from the nearest works area respectively. Construction noise level has been predicted for the domestic representative NSR. The predicted construction noise level would comply with the perspective noise criterion in the TM-EIAO under the unmitigated scenario. For Plover Cove (Extension) Country Park in view of small scale of the Project and limited transient hikers using the hiking trail, adverse noise impacts are not anticipated. In addition, good site practices are proposed to further minimise the construction noise impact on the Country Park environment as much as practicable. Adverse construction noise impact is not anticipated. Furthermore, since no construction works will be carried out during the restricted hours, and the prefabrication method for the superstructure construction will be adopted as far as practicable. In addition, a number of enhancement measures including good site practices, the use of quality powered mechanical equipment (QPME), and the use of temporary noise barriers, etc. are proposed to further reduce the construction noise impact. Therefore, no adverse construction noise impact is anticipated

#### **3.3.3 Operational Phase**

- 3.3.3.1 During the operational phase, the improved pier will not have any planned fixed noise sources. In addition, there would be no planned increase in the licensed Kaito services after the pier improvement works. Therefore, no operational noise impact is anticipated.

### **3.4 Water Quality**

- 3.4.1.1 Potential water quality impacts associated with the Project have been assessed in accordance with Clause 3.4.6 and Appendix D of the Study Brief and Annexes 6 and 14 of the TM-EIAO to ensure compliance of relevant standards and guidelines. No dredging is required under the Project.

- 3.4.1.2 Major Water Sensitive Receivers (WSRs) located in the vicinity including Tung Ping Chau Marine Park and nearby coral communities have been included for assessment.

#### **3.4.2 Construction Phase**

- 3.4.2.1 Potential hydrodynamic and water quality impact from the construction activities have been assessed. Given the small scale of the pier and the adoption of piled foundation with sufficient spacing, hydrodynamic impact from the structures of the new pier and the temporary pier is not anticipated.



- 3.4.2.2 Potential water quality impact would arise from the construction activities, in particular the marine-based site investigation and foundation works. Nevertheless, the seabed features in the vicinity of the Project are mostly sand/silt, boulders and rocks, which have much higher settling velocity and could be quickly settled. With the implementation of recommended mitigation measures such as the use of double casing system, Y-shape funnel and closed grab to be implemented during marine-based site investigation and construction works, adverse water quality impact is not anticipated. There will neither be directly discharge on-site, within the Tung Ping Chau Marine Park nor other WSRs. In addition, with good site control practices, emergency spillage plan and provision of portable toilets, adverse impacts from surface runoff from construction site operation, accidental spillage of chemicals and sewage from workforce are not anticipated.

### **3.4.3 Operational Phase**

- 3.4.3.1 The main objectives of the Project are to improve the existing pier facilities such as providing standard landing steps, adequate berthing space and enhancing accessibility to those in need. During operation, there is no planned increase in the existing Kaito services nor alteration of their routing. Therefore, no adverse water quality impact is anticipated from the Project during the operation phase. Given the small scale of the pier and the adoption of piled foundation with sufficient spacing, hydrodynamic impact from the new structures of the improved pier is not anticipated.

## **3.5 Waste Management Implications**

- 3.5.1.1 Waste management implications associated with the Project have been assessed in accordance with Clause 3.4.7 and Appendix E of the Study Brief and the criteria and guidelines stipulated in Annexes 7 and 15 respectively of the TM-EIAO.

### **3.5.2 Construction Phase**

- 3.5.2.1 Potential waste management implications from the generation of waste during the construction phase have been evaluated. Mitigation measures, including on-site sorting, reusing C&D materials etc., are devised in the construction methodology to minimise the surplus materials to be disposed of to a landfill. With the proper implementation of the recommended mitigation measures, adverse environmental impacts from waste management during construction phase are not anticipated.

### **3.5.3 Operational Phase**

- 3.5.3.1 The types of waste that would be generated during the operational phase would be general refuse from the pier users. The Project itself does not intend to increase Kaito services. Hence, it will not induce any additional general refuse from additional visitors and pier users during the operational phase. Sufficient number of trash bins and recycling bins have already been provided for the collection of general refuse generated by visitors and pier users along the existing hiking trail of Tung Ping Chau. No bin will be required to be provided in the Tung Ping Chau Public Pier as no general refuse is anticipated by the Project during the operational phase. Adverse waste management implications are not anticipated.



## 3.6 Land Contamination

- 3.6.1.1 Potential land contamination impacts associated with the Project have been assessed in accordance with Clause 3.4.8 of the Study Brief and Appendix F and the guidelines as stipulated in Section 3.1 and 3.2 of Annex 19 of the TM-EIAO.
- 3.6.1.2 Based on the desktop review findings of the aerial photos, the information collected during site surveys as well as the information provided by EPD and FSD, no potential land contamination issue is identified within the boundary of the Project site. Therefore, no adverse land contamination is anticipated. Further site investigation or mitigation measures are therefore not required.

## 3.7 Ecology

- 3.7.1.1 Potential ecological impacts associated with the Project have been assessed in accordance with Clause 3.4.9 and Appendix G of the Study Brief, and Annexes 8 and 16 of the TM-EIAO.
- 3.7.1.2 Tung Ping Chau Marine Park is one of the marine parks having the best coverage and diversity of stony corals in Hong Kong. 65 species out of 84 species of stony coral were recorded in Tung Ping Chau Marine Park.
- 3.7.1.3 Ecological surveys covering a 14-month duration were conducted. Coral surveys in tiers by different techniques, including detailed coral mapping survey in which 531 coral colonies from 43 species were recorded, were performed. Except 6 colonies classified as rare species, all other coral colonies were common or uncommon species.
- 3.7.1.4 No species of conservation importance identified in intertidal surveys, while several individuals of amphioxus were recorded at more than 250 from the Project Site. Though all the works are marine-based, terrestrial surveys were also conducted to satisfy the EIA study brief requirements.

### 3.7.2 Construction Phase

- 3.7.2.1 Based on the present coral survey results and findings from coral survey for PP-222/2004, areas nearer the existing pier were of lower coral coverage. Boundaries and layouts of the proposed works area, the proposed pier extension and temporary pier were formulated to avoid areas with higher coral coverage. The design of the proposed pier extension has also been adjusted to minimize direct impacts (i.e. direct encroachment) and indirect impact (reduction of sunlight) to hard corals. Most of the structures being constructed will be above water surface, allowing sunlight to reach the seabed, and corals to be directly encroached are limited to those on the vertical seawalls of the outer most part of the existing pier head.
- 3.7.2.2 The plan view area of the proposed TPC Public Pier extension is about 0.056 ha, but the actual marine habitats loss will be only about 0.002 ha of seabed and 0.004 ha of marine waters as only the piled foundation will directly encroach the seabed.
- 3.7.2.3 According to the coral survey results from the present study, a total of 90 coral colonies were recorded within the plan view area of the proposed pier extension together with the temporary pier. It is recommended that the detailed coral

translocation plan should consider all coral colonies within these two areas. Coral translocation is an effective mitigation measure as proven by the previous TPC pier construction in 2006-2007. A detailed coral translocation plan should be prepared during the detailed design stage of the Project, which should include brief descriptions on pre-translocation coral survey / baseline survey, translocation methodology, identification of suitable coral recipient site and post-translocation monitoring methodology. Coral translocation should be conducted between November and April, before commencement of work. The whole stretch of eastern coast of Tung Ping Chau is generally suitable as recipient site for coral translocation. For example, the Hong Kong Reef Check locations in Tung Ping Chau (i.e. A Ma Wan, A Ye Wan and Wong Ye Kok) could all be considered as potential recipient sites for coral translocation. The final recommendation of recipient site will be determined in the detailed coral translocation plan, but it should be located at a reasonable distance away from the proposed works area.

- 3.7.2.4 There will be no dredging for the Project and only one closed grab excavator, and release of suspended solids due to construction works of pile and during site investigation works would be contained due to adoption of bored casing. In order to further minimize the increased suspended solid from the site investigation works and piling works, outer casing to confine the works shall be provided around the bored locations to prevent the accidental release of muddy water to the surrounding marine waters during site investigation works and piling construction. The insertion and removal of casing would only lead to minor disturbance to the seabed and thus insignificant release of suspended solids. The use of outer casing to confine the sediment is effective in local examples such as Kat O Chau Public Pier and the improvement works to Tung Ping Chau Public Pier in 2006-2007. Besides, prefabrication approach will first be considered when designing concrete superstructures.
- 3.7.2.5 While presence of amphioxus in the Project Site is not likely due to the substrates with boulder and gravel embedded in sediments within the Project Site, significant impacts to amphioxus in other locations are not expected due to the scale of the works. Similarly, impacts to other marine organisms of conservation importance such as Green Turtle or seahorse are not expected either.
- 3.7.2.6 As the proposed works area only involve marine habitats, terrestrial habitats including the recognized sites of conservation importance such as Country Park, Geo Park and the SSSI will not be encroached.
- 3.7.2.7 Various monitoring and audit will be conducted for the construction works and the corals. Water quality monitoring will be conducted at the nearby waters prior to the commencement of the construction as well as during the construction phase. to ensure that the water quality complies with the established environmental standards. Besides the monitoring of the translocated corals on the success of translocation exercise, corals monitoring will also be conducted to corals within the proposed work area and the nearest reef check site during construction stage and post-construction stage. General site inspection within Plover Cove (Extension) Country Park will also be conducted to ensure no ecological disturbance on the country park.

### 3.7.3 Operational Phase

- 3.7.3.1 The permanent loss of marine habitat (about 0.004 ha water column and 0.002 ha of subtidal seabed) is considered Minor. As there will be only a limited number of piles and a small above-seabed downstand wall will be constructed in the marine habitats, change in hydrodynamics regime or water quality is not expected. It is not anticipated the frequency of vessels or visitor numbers would increase due to the Project. Pollution from marine traffics to marine waters is also not expected. No maintenance dredging would be required for the public pier, and therefore no water quality impacts could be induced. No significant impact is also expected for the water sensitive receivers in the vicinity. Disturbance to terrestrial habitats or fauna due to the lighting at the pier head is not likely. Hence, no significant operational phase impacts to marine ecology, recognized sites or species of conservation importance, are anticipated from the Project. Residual impacts are also acceptable.

## 3.8 Landscape and Visual

- 3.8.1.1 Potential landscape and visual impacts as a result of the Project have been assessed in accordance with Clause 3.4.10 and Appendix H of the Study Brief, EIAO Guidance Note No. 8/2010, and Annexes 10 and 18 of the TM-EIAO.

### 3.8.2 Construction Phase

- 3.8.2.1 The landscape resources (LRs) and landscape character areas (LCAs) within 500m boundary of the Project, as well as the visually sensitive receivers (VSRs) within the visual envelope (VE) of the Project, were identified and assessed.
- 3.8.2.2 During the construction phase, insubstantial impacts are anticipated for most of the LRs and LCAs. Landscape impacts are anticipated to be slightly adverse on LR4 Tung Ping Chau Public Pier and moderately adverse for LR1 Open Sea of Mirs Bay around Tung Ping Chau and LCA1 Offshore Water Landscape of Mirs Bay. With the implementation of mitigation measures in construction phase, the residual landscape impacts are insubstantial on most LRs and LCAs and slightly adverse on the LR1 and LCA1, which are considered acceptable.
- 3.8.2.3 The visual impacts on VSRs are anticipated to be in the range of slightly adverse to moderately adverse without the provision of mitigation measures during construction phase. Nevertheless, with the full implementation of mitigation measures, the residual visual impacts on VSRs are mitigated to slightly adverse to insubstantial and considered acceptable with mitigation measures.
- 3.8.2.4 No tree was identified within 2m from the Project boundary during the tree survey and all associated construction activities will be limited to the site boundary and thus, no direct impact on trees due to the Project are anticipated.

### 3.8.3 Operational Phase

- 3.8.3.1 During operational phase, the residual landscape impacts on most of the LRs and LCAs are considered insubstantial, while on the affected LR1 and LCA1, the impacts will be alleviated to slightly adverse with mitigation measures. The landscape impact of LR4 will be enhanced to moderately beneficial by adopting the enhancement measures of the Project.

3.8.3.2 The impacts of all VSRs will be enhanced from slightly beneficial to moderately beneficial due to the improved appearance of the Pier after adopting the enhancement measures of the Project.

3.8.3.3 Photomontages at the representative viewpoints at the VSRs are shown in **Figure 3.1** and **Figure 3.2**.



**Figure 3.1 Photomontage of Project during Operational Phase**



**Figure 3.2 Photomontage of Project during Operational Phase**

## 3.9 Fisheries

3.9.1.1 Potential fisheries impacts associated with the Project have been assessed in accordance with Clause 3.4.11 and Appendix I of the Study Brief and the criteria and guidelines stipulated in Annexes 9 and 17 of TM-EIAO.

### 3.9.2 Construction Phase

3.9.2.1 As only piles foundation will be constructed at the pier, and pre-cast structures will be built on-top, together with the approaches for avoidance and minimisation of impacts, potential fisheries impacts on fisheries resources due to construction of the pier are considered minor. Since unacceptable adverse impacts on fisheries resources and fishing operations are not anticipated, fisheries-specific mitigation measures are not required.

### 3.9.3 Operational Phase

3.9.3.1 Permanent fishing ground loss occurs during operational phase due to the footprint of proposed TPC Public Pier. About 0.056ha fishing ground loss is considered to be of insignificant proportion as compared with the 1,651 km<sup>2</sup> (approximately

165,100 ha) of Hong Kong's total marine waters which is mostly available for fishing. Hence, the permanent loss of fishing ground is considered insignificant.

### **3.10 Cultural Heritage**

- 3.10.1.1 Potential impacts on cultural heritage as a result of the Project have been assessed in accordance with Clause 3.4.12 and Appendix J of the Study Brief, and Annexes 10 and 19 of the Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO).

#### **3.10.2 Construction Phase**

- 3.10.2.1 A Marine Archaeological Investigation (MAI) was conducted to identify any seabed features with archaeological potential. It is concluded that the marine archaeological potential of the survey area is considered as low by the geophysical survey. No marine archaeological resources were identified by the geophysical survey. It is therefore concluded that no marine archaeological impact from the construction works is anticipated. Further visual diver survey for marine archaeology or any other type of investigation or mitigation are therefore not required. As a precautionary measure, AMO should be informed in case of discovery of antiquities or supposed antiquities in the course of marine works.
- 3.10.2.2 In addition, terrestrial archaeological resources and built heritage are not identified in the vicinity of the Project and adverse terrestrial cultural heritage impact is therefore not anticipated during the construction of the Project.

#### **3.10.3 Operational Phase**

- 3.10.3.1 During the operational phase, with the improved pier head located farther away from the shoreline and at a deeper seabed level, a deeper draft can be provided for vessel berthing. Besides, the Project does not plan to increase the number of Kaito or alter the existing Kaito routing. No adverse impact to marine cultural heritage is anticipated from the Project during the operational phase.
- 3.10.3.2 In addition, terrestrial archaeological resources and built heritage are not identified in the vicinity of the Project and adverse terrestrial cultural heritage impact is therefore not anticipated during the operation of the Project.

## 4 Environmental Monitoring and Audit

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- 4.1.1.1 An Environmental Monitoring and Audit (EM&A) programme has been formulated for Project which is a DP listed under Schedule 2 of the EIAO, with details presented in the separate EM&A Manual.
- 4.1.1.2 The EM&A programme will provide management actions to check the effectiveness of the recommended mitigation measures/good site practices and compliance with relevant statutory criteria, thereby ensuring the environmental acceptability of the construction and operation of the Project.

## 5 Conclusion

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- 5.1.1.1 The existing TPC Public Pier has two landing steps of about 1.1m wide each. The width of these landing steps is less than the standard width of 2m, and there are safety concerns for passengers boarding on / disembarkation off vessels. The solid pier at the pier head is only 14-15m long, and is not long enough for berthing the full length of typical public vessels. Due to its below standard design, the existing TPC Public Pier poses safety concerns to pier users. Hence, TPC Public Pier has been selected as one of the proposed pier items at remote rural areas for priority improvement under the first phase of the Pier Improvement Programme delineated in the 2017 Policy Address in January 2017.
- 5.1.1.2 The Project will provide opportunities to resolve the aforementioned problems and benefits in enhancing the TPC Public Pier with upgraded facilities such as barrier-free facilities, canopy, seats, etc. The Project aims to upgrade the facility standards of TPC Public Pier for safe pier usage by local villagers, mariculturists, visitors and tourists. As the Project comprises construction works within Tung Ping Chau Marine Park, the Project is a DP under the EIAO.
- 5.1.1.3 The Project has considered alternative development options including pier location, pier shape design, pier size, construction methodology and sequence of construction works, to avoid and minimise potential environmental impacts during construction and operational phases of the Project. Based on the coral mapping findings, the Project has also adjusted the pier design to locate in a relatively low coral distribution area, in order to avoid and minimise the impacts on corals. With reference to precedent successful cases of coral translocation in Hong Kong which recorded high survival rates, a coral translocation programme prior to commencement of the construction works of the Project is recommended.
- 5.1.1.4 This EIA Study has demonstrated the overall environmental acceptability of the proposed Pier Improvement at TPC, in accordance with the Study Brief (ESB-306/2017) and the TM-EIAO. The Project will meet all relevant environmental standards with the implementation of suitable mitigation measures/good site practices during both construction and operational stages.