

7. VISUAL

7.1 Introduction

In accordance with *Clause 3.4.7* and *Appendix F* Requirements for Visual Impact Assessment (VIA) of the EIA Study Brief, a VIA has been conducted based on mapping with a Geographic Information System (GIS) and field surveys to help identify the existing conditions so as to be able to assess the potential visual impacts during construction and operation and glare associated with the light sources of the Project. The VIA presented here covers the elements of the Project that are located above sea level.

7.2 Legislative Requirements and Evaluation Criteria

This VIA has been prepared according to *Clause 2.1 (vi)*, *Clause 3.2.1 (vi)*, *Clause 3.4.7* and *Appendix F* of the EIA Study Brief.

Environmental Impact Assessment Ordinance (EIAO) legislation (Cap.499, S.16) and the Technical Memorandum on EIA Process (EIAO-TM), particularly Annexes 10 (*Criteria for Evaluating Visual and Landscape Impact, and Impact on Sites of Cultural Heritage*) and 18 (*Guidelines for Landscape and Visual Impact Assessment*) have been referred to in carrying out this assessment.

In addition, the following standards and guidelines have been referred to for assessing the visual impacts associated with the Project:

- Environmental Impact Assessment Ordinance Guidance Note 8/2010 (Preparation of Landscape and Visual Impact Assessment under the Environmental Impact Assessment Ordinance);
- Hong Kong Planning Standards and Guidelines (HKPSG) issued by the Planning Department (November 2015), in particular Chapter 11 Urban Design Guidelines;
- Study on Landscape Value Mapping of Hong Kong.

7.3 Review of Existing Planning and Development Control Framework

The Project site is located at the waters off southeast Po Toi (**Figure 7.1**). With its unique natural scenery (such as rugged rocks) and heritage sites (including the Rock Carvings on Po Toi, non-graded Tin Hau Temple and non-graded Mo's Old House), Po Toi Island is one of the local tourist and hiking destinations. The nearest village and residential area is located at Tai Wan of Po Toi Island, which is more than 2 km away from the Project site. The Project site at Po Toi (Southeast) is approximately 100 hectares (~850 - 1500 m long and ~850 m wide) in size. It is not covered by any existing outline zoning plan (OZP) (**Figure 7.2**).

7.4 Methodology

7.4.1 Baseline

The Assessment Area for visual impact assessment shall be defined by the Visual Envelope of the Project. A Visual Envelope is an area within which views of the Project will be possible. Identification of the visual envelope has been achieved by site visit and desk-top study of topographic maps and photographs, and GIS analysis, to determine potential visibility of the Project from various locations. GIS analysis uses known data regarding the proposed built structures to model the area that can potentially see the developments. It should be noted that GIS analysis uses topographic data as a baseline, disregarding existing built forms and vegetation which reduce the actual visual envelope. **Figure 7.1** illustrates the GIS Visual Envelope for this Project.

The visual envelope of the Project site is determined based on its potential dimensions of 850-1,500 m x 850 m across the horizontal plane, with FCZ facilities no higher than 3 m in height above water (except during maintenance). Considering that the visual impact of this Project would be mainly

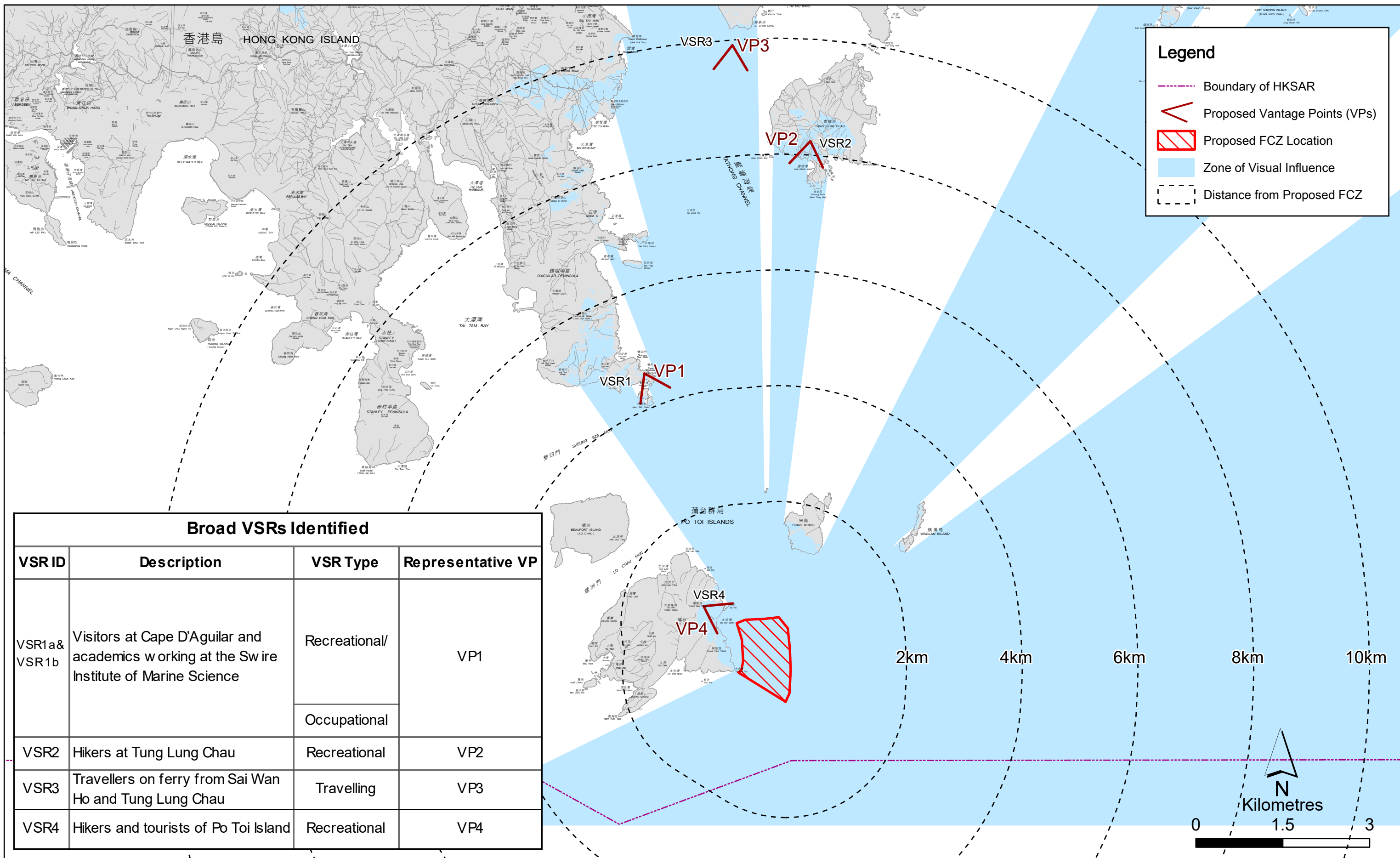


Figure 7.1

VIA Assessment Area and Locations of Proposed Vantage Points (VPs) for Po Toi (Southeast) FCZ

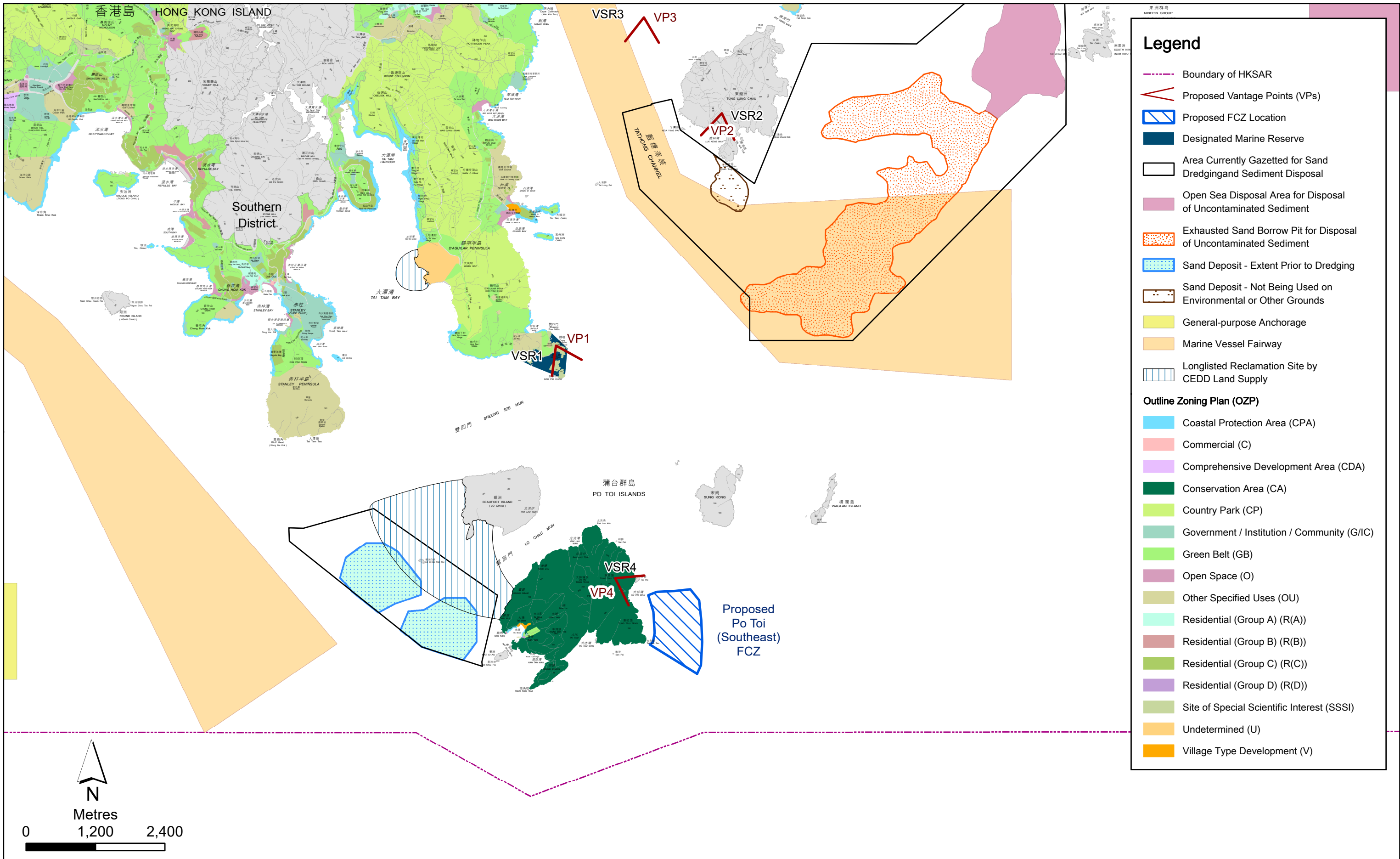


Figure 7.2

Planning & Development Context near Proposed Po Toi (Southeast) FCZ

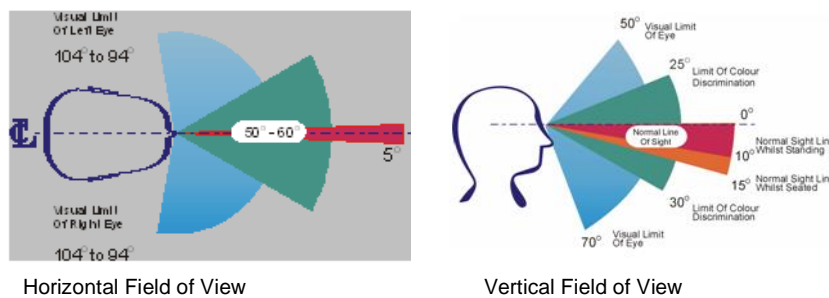
associated with the horizontal field of view of fish farms, it is proposed to use the horizontal field of view of individual fish farms within the whole FCZ area when assessing the visual extent of impact for this Project.

Figure 7.1 also gives an indication of how far viewers are from the Project site. As a viewer moves further away from the Project site, the visual impact decreases until it is no longer visible. However, before the point of invisibility is reached, the FCZ would have reduced in scale such that it no longer has a significant visual effect on the view.

Boxes 1 and 2 below show that for an individual fish farm, the horizontal field of view will be visually dominant for distance <170 m and insignificant further than 2.3 km away, whereas the vertical field of view will be visually evident for distance <70m and insignificant for distance >340 m. Therefore, the maximum distance which the fish farm is considered insignificant will be at >2.3 km.

Box 1 - EXTENT OF HUMAN VISION

The visual impact of a development can be quantified by reference to the degree of influence on a person's field of vision. The following diagrams illustrate the typical parameters of human vision and are based on anthropometric data (*Human Dimension & Interior Space – A Source Book of Design Reference Standards*, Julius Panero and Martin Zelnik, The Architectural Press Ltd. London, 1979). This data provides a basis for assessing and interpreting the impact of a development by comparing the extent to which the development would intrude into the central field of vision (both horizontally and vertically).



Horizontal Cone of View - The central field of vision for most people covers an angle of between 50° and 60°, within which both eyes observe an object simultaneously within this 'binocular field' images are sharp, depth perception occurs and colour discrimination is possible. These physical parameters are illustrated in the images above.

The visual impact of a development will vary according to the proportion to which the development consumes the central field of vision. Developments, which take up less than 5% of the central binocular field, are usually insignificant in most landscapes (5% of 50° = 2.5°).

Vertical Field of View - A similar analysis can be undertaken based upon the vertical line of sight for human vision. A person's natural or normal line of sight is normally a 10° cone of view below the horizontal and, if sitting, approximately 15°. Objects which take up 5% of this cone of view (5% of 10° = 0.5°) would only take up a small proportion of the vertical field of view, and are only visible when one focuses on them directly. Objects that take up such a small proportion of the vertical view cone are not dominant, nor create a significant change to the existing environment when placed within a disturbed or man-modified landscape. They may, however, be more noticeable in a pristine environment.

Box 2 – DISTANCE FROM WHICH PROJECT WILL BE VISIBLE

In assessing the visual impact of the proposed FCZ it is assumed that the largest horizontal component is the longest dimension of the FCZ layout, which is approximately 1.63 km wide and a maximum height of 3 m. However, as the fish culture zone is comprised of multiple fish farms of the same dimensions with a separation distance of ~100m in between, therefore, it would not be accurate to examine the entire width of the FCZ when reviewing the horizontal field of view. This effect can also be demonstrated by the example of a farm fence that may be many kilometres in width, yet as one moves further away it becomes less apparent, until at some distance it is not possible to separate this element from the horizontal plane of the landscape. In essence, as soon as one fish farm becomes visually insignificant, so do all of the fish farms in the entire FCZ. In assessing the visual impact of the fish farms it is therefore assumed that the largest horizontal component is the diameter of a fish farm. Considering that on fish farm will be ~1 ha, its maximum width would be of 100 m wide.

The tables below show the calculations for horizontal and vertical fields of view respectively.

Horizontal Field of View	Impact	Distance from an observer to a fish farm of 1 ha
100 m wide		
<2.5° of view	<i>Insignificant</i> The development will take up less than 5% of the central field of view. The development, unless particularly conspicuous against the background, will not intrude significantly into the view. The extent of the vertical angle will also affect the visual impact.	>2.3 km
2.5° – 30° of view	<i>Potentially noticeable</i> The development may be noticeable and its degree of visual intrusion will depend greatly on its ability to blend in with its surroundings and how far someone is from the terminal.	170 m–2.3 km
>30° of view	<i>Potentially visually dominant</i> Developments that fill more than 50 percent of the central field of vision will always be noticed and only sympathetic treatments will mitigate visual effects.	<170 m
Vertical Line of Sight	Impact	Distance from an observer to a facility that is
3m high		
< 0.5° of vertical angle	<i>Insignificant</i> A thin line in the landscape.	>340m
0.5° – 2.5° of vertical angle	<i>Potentially noticeable</i> The degree of visual intrusion will depend on the development's ability to blend in with the surroundings.	70m – 340m
> 2.5° of vertical angle	<i>Visually evident</i> Usually visible, however the degree of visual intrusion will depend on the width of the object and its placement within the landscape.	<70m

7.4.2 Identification of Visual Sensitive Receivers (VSRs) and Vantage Points (VPs)

Having determined the Assessment Area for the VIA, VSRs have been broadly identified within the visual envelope. VSRs may include the people who would reside, work, play within, or travel through the Assessment Area and be potentially under the impact of the proposed Project.

Subsequently Vantage Points, or Viewpoints (VPs), were selected. VPs are positions selected to represent some potential VSRs from where the proposed Project can be viewed, and are selected to help illustrate the visual change that would be brought about by the proposed Project. The VPs have been selected to ensure that in combination they give a good overall representation of how the

Project will appear to different types of VSRs, both near and far and at sea level as well as lower and higher ground elevations.

7.4.3 VSR Sensitivity

Assessment of the sensitivity of VSRs is influenced by a number of factors including the following:

- Type of VSR. VSRs are categorized according to whether the viewer is at home, at work or school, at play or leisure, or travelling (ranked by the major VSR types, as described below):
 - *Occupational VSRs* – These VSRs are people working or in education in the area, who view the proposed Project from their workplace or education centre. Visual amenity is in general not considered a top priority within the average workplace and these VSRs are considered to be relatively less sensitive than residential VSRs as their view will have a less important, although still material, effect on their perception of quality of life. The degree to which this applies to workers depends on whether their location is industrial, retail or commercial. The VSRs in industrial areas, such as factories, are generally considered to be the least sensitive, due to the relatively low quality of their existing view in an industrial area.
 - *Recreational VSRs* – These VSRs are people engaging in recreational activities such as hikers on established trails and footpaths, recreational fishers near the coast and outlying islands. Sensitivity of these VSRs depends on duration of stay, nature of the activity and how enclosed the location is.
 - *Travelling VSRs* – These VSRs are people travelling on marine vessels. They have varying sensitivity depending on the speed, nature and frequency of travel, but are generally considered to be transitory to the area with less regard for the surrounding views and with low sensitivity.
- Number of individuals (ranked as very many, many, few or very few);
- Quality of existing view (ranked as good, fair or poor);
- Availability of alternative views (ranked as yes or no);
- Degree of visibility (ranked as full, partial or glimpse);
- Duration of view (ranked as long, medium or short); and
- Frequency of view (ranked as frequent, occasional or rare).

The sensitivity of each VSR is based on the values of all the above factors in totality and classified as follows:

- **High:** The VSR is highly sensitive to any change in their viewing experience.
- **Medium:** The VSR is moderately sensitive to any change in their viewing experience.
- **Low:** The VSR is only slightly sensitive to any change in their viewing experience.

7.4.4 Identification and Assessment of Impacts

The magnitude of change caused by a visual impact is quantified according to a number of factors including the following:

- Distance between the closest source of impact and the VSR (given in meters);
- Scale of the development. This is assessed using a number of factors, including: absolute dimensions of new built structures visible to the VSR; relative dimensions of the new built structures compared to other structures visible to the VSRs in their existing view (ranked as small, medium or large);
- Potential blockage of view (ranked as full, partial or nil);

- Duration of the impacts (ranked as temporary or permanent);
- Compatibility of the Project and associated works with the existing and planned landscape in the vicinity (ranked as good, fair or poor); and
- Reversibility of change (ranked as reversible or irreversible).

The magnitude of change caused by visual impacts on each VSR is based on the values of all the above factors in totality and classified as follows:

- **Large:** VSRs would suffer a major change in their viewing experience.
- **Intermediate:** VSRs would suffer a moderate change in their viewing experience.
- **Small:** VSRs would suffer a small change in their viewing experience.
- **Negligible:** VSRs would suffer no discernible change in their viewing experience.

7.4.5 Ranking Significance of Impact

By understanding the magnitude of change caused by the various impacts and the sensitivity of the various sensitive receivers, it is possible to categorize impacts in a logical, well-reasoned and consistent fashion. **Table 7.1** shows the rationale for dividing the degree of significance into four thresholds, namely insignificant, slight, moderate, and substantial, depending on the combination of a magnitude of change and sensitivity of sensitive receiver.

Table 7.1 Relationship between receptor sensitivity and magnitude of change in defining impact significance

		Magnitude of Change			
		Negligible	Small	Intermediate	Large
Receptor Sensitivity (VSR)	Low	Insignificant	Slight	Slight / Moderate*	Moderate
	Medium	Insignificant	Slight / Moderate*	Moderate	Moderate / Substantial*
	High	Insignificant	Moderate	Moderate / Substantial*	Substantial

* In those instances where the lower level of impact is predicted, this will be justified in the description of the impact

The four thresholds for the degree of significance are explained below. Noting impacts can be either adverse or beneficial, it should be noted that any impacts described in the text of the Report are assumed to be adverse unless specifically identified otherwise.

- **Substantial:** Adverse / beneficial impact where the proposed Project will cause significant deterioration or improvement in existing landscape quality.
- **Moderate:** Adverse / beneficial impact where the proposed Project will cause a noticeable deterioration or improvement in existing landscape quality.
- **Slight:** Adverse / beneficial impact where the proposed Project will cause barely perceptible deterioration or improvement in existing landscape quality.
- **Insignificant:** No discernible change in the existing landscape quality

7.4.6 Mitigation Measures

Having identified and ranked the significance of potential impacts, measures, if required, will be proposed to mitigate the impacts. Firstly, means by which impacts can be avoided will be considered, then possible means that might reduce the impact magnitude, and also measures that potentially enhance existing visual quality. To ensure their effectiveness throughout the construction and operation phases of the Project and associated works, the relevant responsible parties for the

implementation and management / maintenance of the proposed mitigation measures will be identified as appropriate.

As outlined in **Section 7.1**, the photomontages will illustrate options of design schemes as well as mitigation measures by showing baseline conditions, Day 1 with no mitigation measures, Day 1 with mitigation measures and Year 10 with mitigation measures.

7.4.7 Acceptability of Visual Impacts

An overall assessment of the acceptability, or otherwise, of visual impacts in accordance with the five criteria set out in Annex 10 of the EIAO-TM will be provided, considering the guidelines in paragraph 3.11 of Environmental Impact Assessment Ordinance *GN No. 8/2010*.

7.5 Visual Baseline Conditions

As detailed in **Figure 7.1**, **Figure 7.3** and **Figure 7.4**, the indicative location of the Project site is in open waters about 4.5 km south of Cape D'Aguilar and 8.2 km south of Tung Lung Chau. The Project is located in a relatively open sea area with high degree of visibility to a large area from a visual perspective.

The Project site will be visible to east facing coastline on Po Toi and south facing coastline on Hok Tsui. Hikers at Cape D'Aguilar, workers at Swire Institute of Marine Science and ferry passengers will have view to the Project site (**Figure 7.1**).

Overall, VSRs have been identified within the predicted Visual Envelope, including three types as identified in the methodology: recreational, occupational and travelling. The VSRs include receivers at ground level, sea level and on elevated ground. The quality of most existing views for these VSRs affected by the FCZ, are generally good, respectively, with a high degree of visibility to natural views containing limited or no anthropogenic structures. The details of VSRs are summarised in **Table 7.2** which includes their sensitivity.

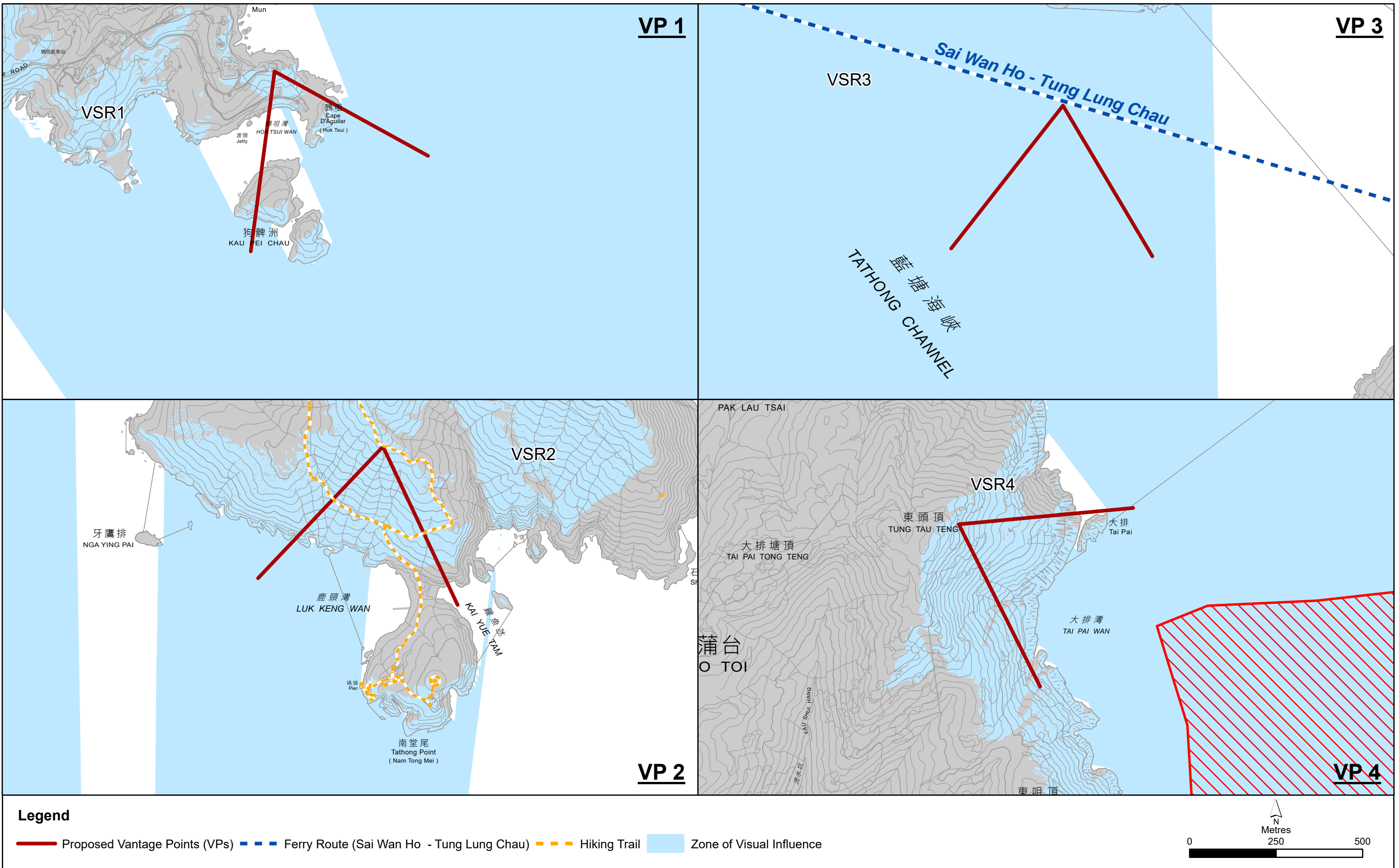


Figure 7.3

Detailed Locations of Proposed Vantage Points (VP1 to VP4) and Zone of Visual Influence for Po Toi (Southeast) FCZ

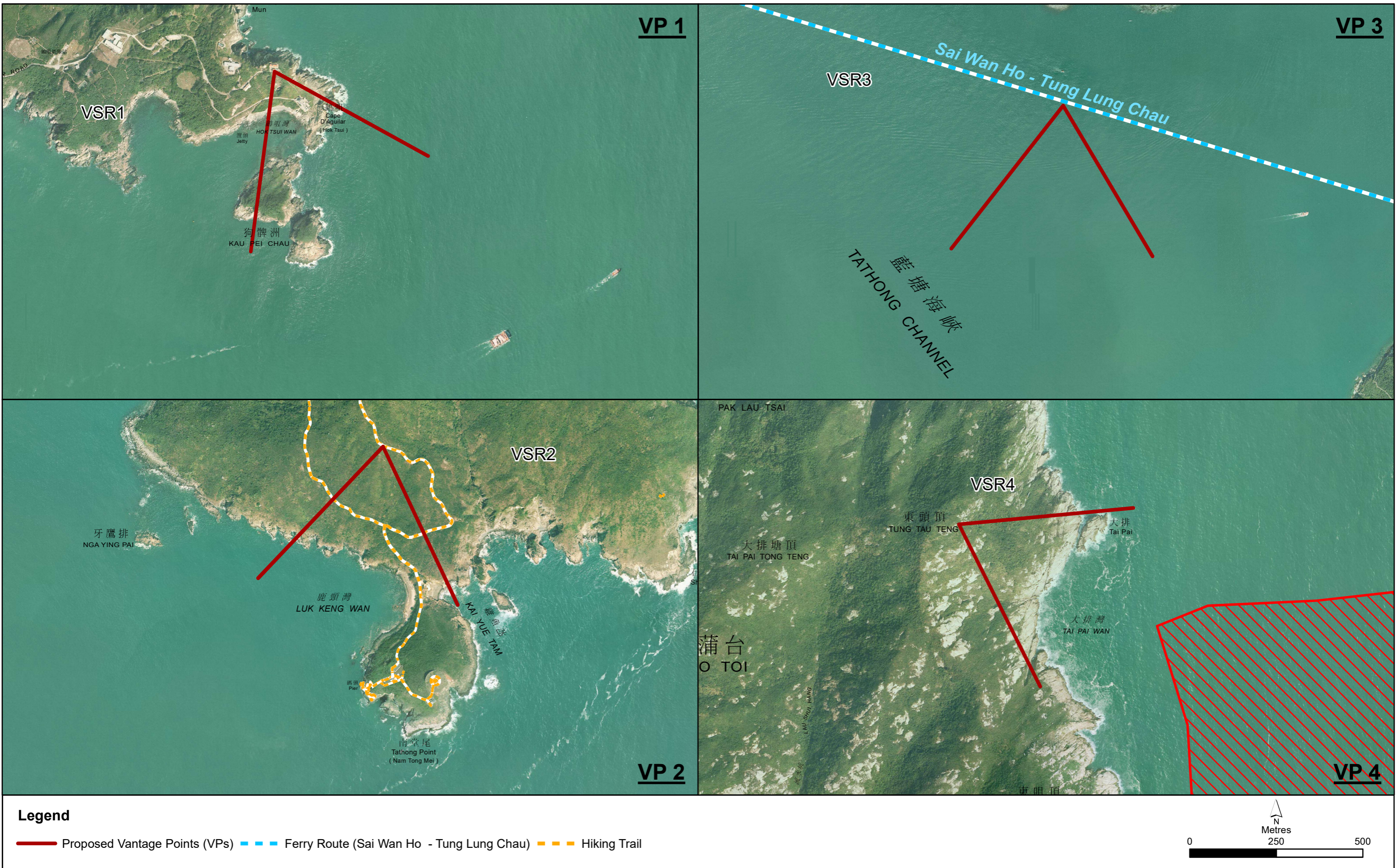


Figure 7.4

Aerial View of Detailed Locations of Proposed Vantage Points (VP1 to VP4) for Po Toi (Southeast) FCZ

Table 7.2 VSRs within the Predicted Visual Envelope

VSR ID / Representative VP	Representative VP	VSR Type	Distance with the FCZ (m)	Quality of Existing View	Alternative Views	Receiver Population	Duration of View	Frequency of View	Degree of Visibility	Sensitivity
VSR 1a – Visitors at Cape D'Aguilar	VP1 (Note 1)	Recreational	4,596	Good	Yes	Few	Short	Occasional	Full	High
VSR 1b – Academics working at the Swire Institute of Marine Science		Occupational					Long	Frequent		
VSR 2 – Hikers at Tung Lung Chau	VP2	Recreational	8,241	Good	Yes	Few	Short	Occasional	Full	Medium
VSR 3 – Travellers on ferry from Sai Wan Ho and Tung Lung Chau	VP3	Travelling	9,911	Good	Yes	Few	Short	Occasional	Full	Medium
VSR 4 – Hikers and tourists visiting Po Toi Island	VP4	Recreational	645	Good	Yes	Few	Short	Occasional	Full	Medium

Note 1: Residents of Hok Tsui Village are not considered as a VSR as they would not be able to see the proposed FCZ at the residential area of Hok Tsui Village.

7.6 Selected VPs to Represent VSRs

As shown in **Figure 7.1**, computer modelling suggests coastal areas of eastern Po Toi Island, and the offshore waters located on the north-western to south-western side of the island, reaching D'Aguilar Peninsula, Tung Lung Chau, Sung Kong and Waglan Island, fall within the visible area for the Project site. Broad VSR areas and specific locations of VPs are illustrated in **Figure 7.1** and **7.3**.

Generally VPs have been selected to represent the most affected VSRs and a total of 4 nos. of VPs have been selected from which to develop photomontages. **Figure 7.1** and **7.3** show the suggested VP locations and their corresponding details are provided below. **Figure 7.4** shows the aerial photos of the suggested VP locations. **Figure 7.5a&b – 7.8a&b** show the existing conditions of VP1 – VP4.

VPs selected to represent VSRs of the proposed Po Toi (Southeast) FCZ

Views from Scenic Lookout and Marine Reserve

VP1 – Cape D' Aguilar. VP1 is selected to represent visitors (VSR 1a) at Cape D' Aguilar and academics working at the Swire Institute of Marine Science (VSR 1b). The selected VP is located near the Cape D' Aguilar Marine Reserve, which is popular for its rock formations at the coastline and scenic lookout for southern offshore waters and outlying islands, including the Beaufort Island, Po Toi Island and Sung Kong. It is located approximately 4,596 m northwest of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. The two VSRs have alternative views to the sea. The number of VSRs is few due to the limited number of visitors (VSR 1a) and workers (VSR 1b) at Cape D' Aguilar. Both VSRs have a full degree of visibility. For visitors at Cape D' Aguilar (VSR 1a), although they have short and occasional view of the Project, they are recreational VSR, who aim to enjoy the view, hence having medium sensitivity. For workers at Swire Institute of Marine Science (VSR 1b), although they have and frequent view of the Project, considering they mainly focus on their work, their sensitivity is regarded as medium.

VP2 – Tung Lung Chau. VP2 is selected to represent hikers and tourists viewing the southern waters of Tung Lung Chau from elevated grounds. Locations such as hiking trails with unobstructed view and areas near the heliport can provide a panoramic view of the Hong Kong southern waters where the proposed Po Toi (Southeast) FCZ is located. The selected VP is located at a hiking trail and will provide occasional view of the Po Toi FCZ at unobstructed sites along the way. It is located approximately 8,241 m north of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. This VSR has alternative views to the sea. The number of VSRs is few due to the limited number of hikers visiting Tung Lung Chau. The duration and frequency of view is short and occasional as this VSR only spends a limited amount of time along the trail during holidays. This VSR has a full degree of visibility. Therefore, VSR 2 is considered to have medium sensitivity.

Views from Ferry and Other Marine Vessels

VP3 – Marine traffic near Tung Lung Chau. VP3 is selected to represent viewers on the sea, including ferry passengers travelling between Sai Wan Ho / Sam Ka Tsuen to Tung Lung Chau. Other viewers would include passengers on recreational marine vessels, fishing boats etc. The selected VP is located near the ferry routes in Tathong Channel and represents the view from marine vessel users. Other viewers would include passengers on recreational marine vessels, fishing boats etc. It is located approximately 9,911 m north of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. This VSR has alternative views to the sea. The number of VSRs is few due to the limited number of travellers commuting between Sai Wan Ho / Sam Ka Tsuen to Tung Lung Chau. The duration and frequency of view is short and occasional as this VSR only spends a limited amount of time on the ferry. This VSR has a full degree of visibility. Therefore, VSR 3 is considered to have medium sensitivity.



Existing View

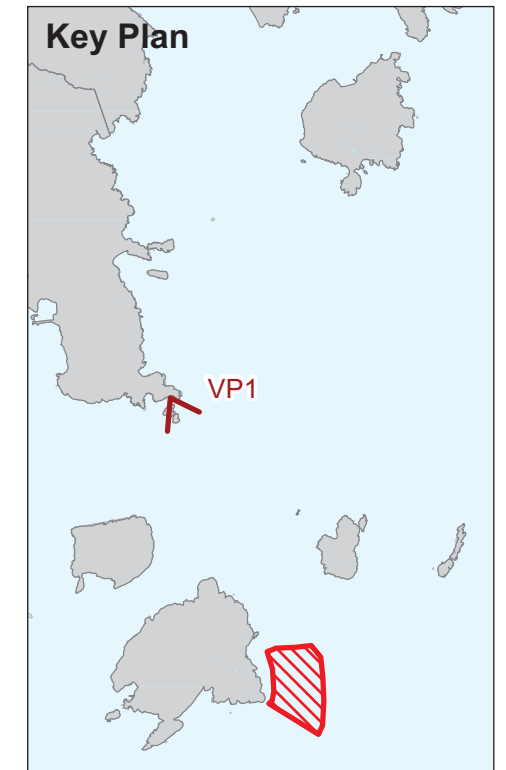


View without Mitigation at Day 1 Operation

Fish Culture Zone Area

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: September 2021





Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: September 2021





Existing View



View without Mitigation at Day 1 Operation

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: September 2021

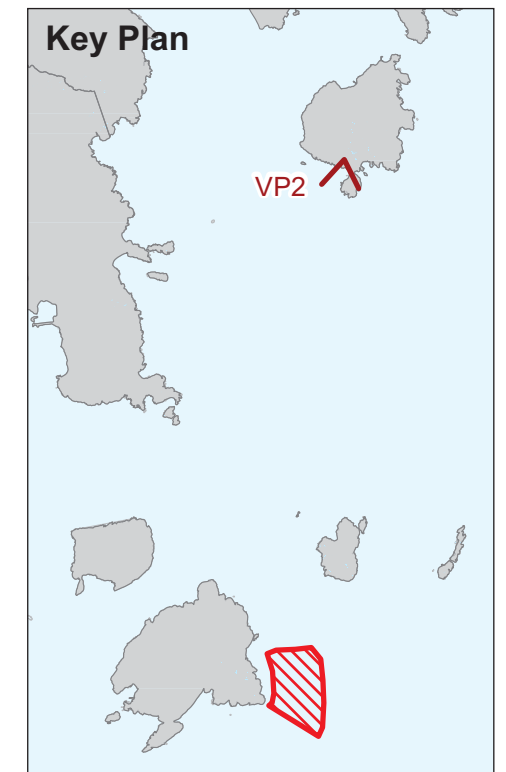
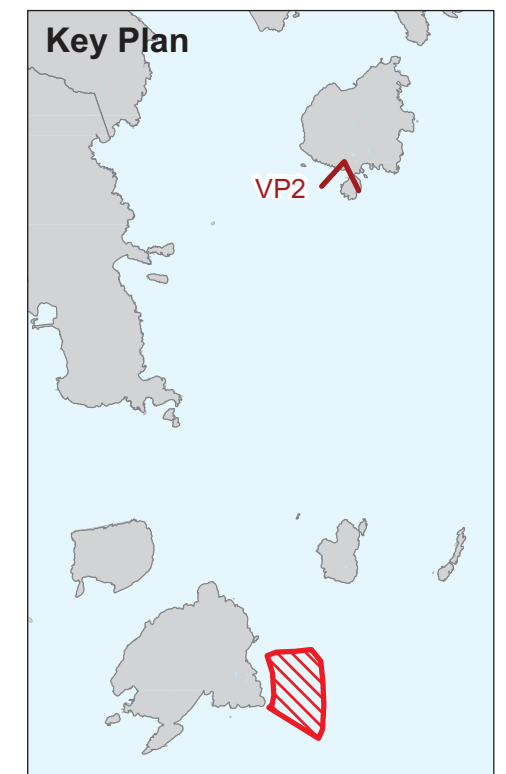


Figure 7.6a

Po Toi Viewpoint 2 - View to Project Site from Tung Lung Chau



Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: September 2021



Figure 7.6b

Po Toi Viewpoint 2 - View to Project Site from Tung Lung Chau



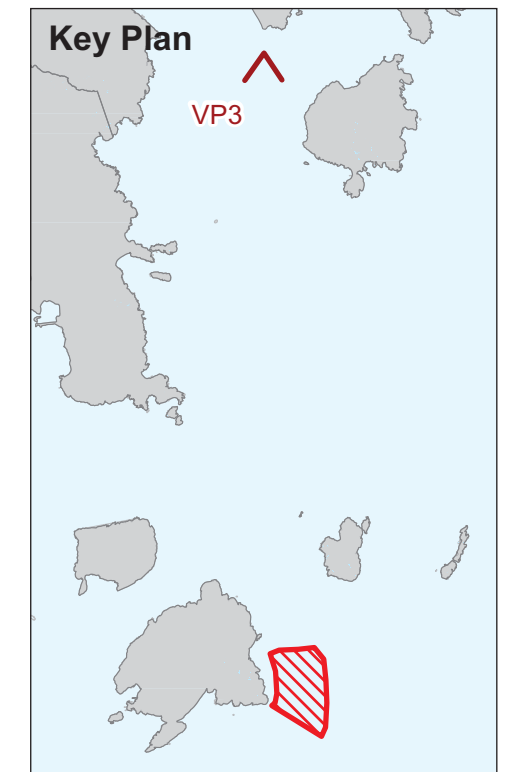
Existing View



View without Mitigation at Day 1 Operation

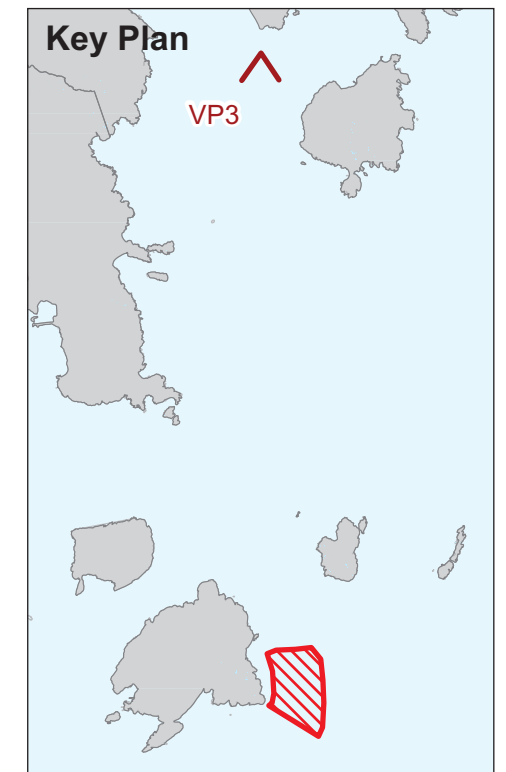
Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: September 2021





Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.





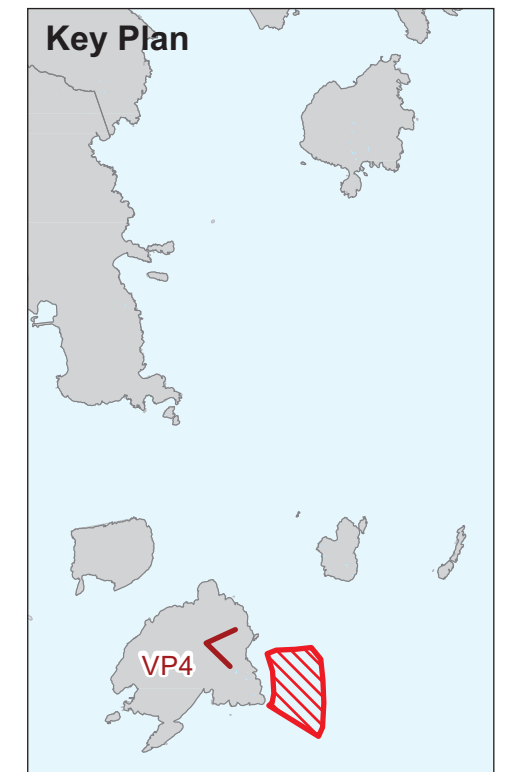
Existing View



View without Mitigation at Day 1 Operation

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: June 2022





View with Mitigation at Day 1 Operation



View with Mitigation at Year 10 Operation

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: June 2022



Views from Scenic Lookout and Marine Reserve

VP4 – Po Toi. VP4 is selected to represent hikers and visitors at Po Toi. The selected VP is located at Tung Tau Teng, a scenic lookout at Po Toi, which can provide a panoramic view of the Hong Kong southern waters where the proposed Po Toi (Southeast) FCZ is located. The selected VP is located at a hiking trail and will provide occasional view of the proposed Po Toi (Southeast) FCZ at unobstructed sites along the way. It is located approximately 645 m north of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. This VSR has alternative views to the sea. The number of VSRs is few due to the limited number of hikers / visitors visiting Po Toi. The duration and frequency of view is short and occasional as this VSR only spends a limited amount of time along the trail during holidays. This VSR has a full degree of visibility. Therefore, VSR 4 is considered to have medium sensitivity.

7.7 Identification of Impacts

Section 2 provides an overview of the Project. The key components which may cause visual impacts are listed below. Construction visual impacts are expected to be minimal and may be caused by:

- Setup of fish rafts / cages, which includes: on-site assembly and anchoring of the fish rafts / cages, small number of marine vessels will be used as supporting vessels; and
- Provision of auxiliary facilities, such as storage and shelters for fish farmers.

Operational visual impacts are expected to be minimal and arise from:

- The presence and operation of the FCZ, including night time lighting for the sake of safety purpose.

The construction of the Project site, including towing the fish rafts / cages to the Site, assembly and anchoring of the fish rafts / cages and provision of auxiliary facilities would normally take a few weeks for each fish raft.

During operation phase, as mentioned in **Section 2.6.2**, four types of advanced aquaculture technologies, i.e. floating gravity cage; submersible gravity cage; integrated multi-trophic aquaculture; and semi-submersible steel truss cage, are considered suitable for this Project. Since the materials adopted in the fish rafts / cages are durable compared to traditional cages, the operation of the fish rafts / cages in the Project site based on advanced aquaculture technologies would be more than 10 years without major repair.

7.8 Visual Impact Assessment Prior to Mitigation

As illustrated in **Figures 7.1, 7.3 and 7.4**, the predicted Visual Envelope for the Project is relatively large and three VSR groups have been identified. Four representative VPs have been selected to represent these VSRs.

Photomontages have been prepared from the VPs to illustrate the existing conditions, as well as conceptual visual impacts, for all of: impacts at Day 1 of operation without implementation of mitigation/ enhancement measures; impacts at Day 1 of operation with implementation of mitigation / enhancement measures and residual impacts at Year 10 of operation with implementation of mitigation / enhancement measures. The photomontages supplement the visual changes described in the text. Photomontages showing the presence of the FCZ help illustrate that the magnitude of visual change for all VSRs are negligible to intermediate. Those VSRs that are closer to the FCZ are expected to experience relatively higher magnitude of change. It should be noted that detailed information on the type of advanced aquaculture technologies as well as the number, size and separation distance of the fish rafts / cages is not available at the current stage. Such information will only be available during the later detailed design stage, subject to the mariculturists' proposals on the type of advanced technologies to suit their business need for agreement with AFCD. The photomontages are thus prepared for illustration purpose only.

7.8.1 VSR 1a and VSR 1b – Visitors at Cape D’Aguilar and academics working at the Swire Institute of Marine Science (VP1)

The construction of the Project will take a few weeks for each fish raft. Due to the considerable distance to the Project (4,596 m), the construction activities will not be noticeable, and the magnitude of change is considered negligible. For visitors at Cape D’ Aguilar (VSR 1a), although they have short and occasional view of the Project, they are recreational VSR, who aim to enjoy the view, hence having medium sensitivity. For academics working at the Swire Institute of Marine Science (VSR 1b), although they have long and frequent view of the Project, they are occupational VSR, who would mainly focus much on work, hence having medium sensitivity. As the magnitude of change is considered negligible, the resulting significance for both VSR 1a and VSR 1b during construction is considered insignificant.

The photomontage in **Figure 7.5a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, they would only block part of the view, and the scale of development is small. In addition, as the fish rafts / cages adopt simple design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. Due to the considerable distance to the Project (4,596 m), the Project site is inconspicuous, and the magnitude of change is considered negligible. As suggested in the previous section, visitors at Cape D’ Aguilar (VSR 1a) and academics working at the Swire Institute of Marine Science (VSR 1b) are considered to have medium sensitivity. Therefore, the resulting significance during operation is considered insignificant for both visitors at Cape D’ Aguilar (VSR 1a) and academics working at the Swire Institute of Marine Science (VSR 1b).

7.8.2 VSR 2 – Hikers at Tung Lung Chau (VP2)

The construction of the Project will take a few weeks for each fish raft. Due to the considerable distance to the Project (8,241 m), the construction activities will not be noticeable, and the magnitude of change is considered negligible. The resulting significance during construction is considered insignificant.

The photomontage in **Figure 7.6a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, they would only block part of the view, and the scale of development is small. In addition, as the fish rafts / cages adopt simple design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. Despite the considerable distance to the Project (8,241 m), since the viewpoint is at a high altitude, the magnitude of change is considered small. The resulting significance during operation is considered slight.

7.8.3 VSR 3 – Travellers on ferry from Sai Wan Ho and Tung Lung Chau (VP3)

The construction of the Project will take a few weeks for each fish raft. Due to the considerable distance to the Project (9,911 m), the construction activities will not be noticeable, and the magnitude of change is considered negligible. The resulting significance during construction is considered insignificant.

The photomontage in **Figure 7.7a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, they would only block part of the view, and the scale of development is small. In addition, as the fish rafts / cages adopt simple

design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. Due to the considerable distance to the Project (9,911 m), the Project site is inconspicuous, and the magnitude of change is considered negligible. The resulting significance during operation is considered insignificant.

7.8.4 VSR 4 – Hikers / Tourists at Po Toi island (VP4)

The construction of the Project will take a few weeks for each fish raft. Due to the short distance to the Project (645 m), the construction activities will be noticeable, and the magnitude of change is considered small. The resulting significance during construction is considered slight.

The photomontage in **Figure 7.8a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, they would only block part of the view, and the scale of development is small. In addition, as the fish rafts / cages adopt simple design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. Due to the short distance to the Project (645 m), the Project site will be noticeable, and the magnitude of change is considered intermediate. The resulting significance during operation is considered moderate.

Table 7.3 Magnitude of Change

VSR ID / Representative VP	Representative VP	Distance with the FCZ (m)	Blockage of View (Full / Partial / Nil)	Scale of Development (Large / Medium / Small)	Compatibility with Surrounding Seascape (Good / Fair / Poor)	Duration of Impact (Temporary / Permanent)	Reversibility of Impact (Reversible / Irreversible)	Magnitude of Change (Large / Intermediate / Small / Negligible)	
								Construction	Operation
VSR 1a – Visitors at Cape D’Aguilar	VP1	4,596	Partial	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Negligible	Negligible
VSR 1b – Academics working at the Swire Institute of Marine Science									
VSR 2 – Hikers at Tung Lung Chau	VP2	8,241	Partial	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Negligible	Small
VSR 3 – Travellers on ferry from Sai Wan Ho and Tung Lung Chau	VP3	9,911	Partial	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Negligible	Negligible
VSR 4 – Hikers and tourists at Po Toi Island	VP4	645	Partial	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Small	Intermediate

Table 7.4 Visual Impacts Prior to Mitigation

VSR ID / Representative VP	Representative VP	VSR Sensitivity	Magnitude of Change (Large / Intermediate / Small / Negligible)		Impact Significance threshold BEFORE Mitigation (Substantial / Moderate / Slight / Insignificant)	
			Construction	Operation	Construction	Operation
VSR 1a – Visitors at Cape D’Aguilar	VP1	High	Negligible	Negligible	Insignificant	Insignificant
VSR 1b – Academics working at the Swire Institute of Marine Science						
VSR 2 – Hikers at Tung Lung Chau	VP2	Medium	Negligible	Small	Insignificant	Slight
VSR 3 – Travellers on ferry from Sai Wan Ho and Tung Lung Chau	VP3	Medium	Negligible	Negligible	Insignificant	Insignificant
VSR 4 – Hikers and tourists at Po Toi Island	VP4	Medium	Small	Intermediate	Slight	Moderate

7.8.5 Night Lighting and Glare

The above analysis examined the visual impacts of the Project during daylight hours. Night-lighting will be used for safety purpose in this Project. Detailed night lighting specifications are not available at this preliminary design stage, however, a preliminary assessment can be made based on similar developments. It is assumed that the light sources will generally be of low intensity, the orientation of light will point towards to the fish rafts / cages, and will not be pointing horizontally and to any VSRs. In addition, no mirrors or polished materials will be installed on the fish rafts / cages, reflectance of light will be low. Therefore, the night lighting and glare impact is considered acceptable.

7.9 Suggested Mitigation Measures

The assessment made in **Section 7.8** shows that visual impacts arising from the Project without any mitigation or enhancement measures in place are between insignificant to moderate. The following mitigation measures are proposed to minimise the visual impacts:

- **VM1 – Construction period.** Pre-construction and construction period for the Project site should be reduced as far as practical to lower visual impact;
- **VM2 – Sensitive design of the fish rafts / cages.** The new structures will be designed in accordance with relevant marine safety standards and regulations. Sensitive architectural design will be considered where practicable. This should take into account material texture, colour, finishes to structures to ensure the fish rafts / cages blend into the existing context, cause least disturbance to the existing seascape, and are the most visually appealing; Please refer to Figure 7.5b, Figure 7.6b, Figure 7.7b, and Figure 7.8b for the implementation of VM2;
- **VM3 – Reinstatement.** After operation, the open water occupied by the Project site will be reinstated to their former state, i.e. the 'existing view' (top photo) shown in Figure 7.5a, Figure 7.6a, Figure 7.7a, and Figure 7.8a;
- **VM4 – Night-time lighting control.** Light intensity and beam directional angle should be controlled at the Project site at the design stage to reduce light pollution and glare (e.g. hooded lights, specific directional focus, etc.). In addition, lighting will be limited to auxiliary structures to reduce night-time impacts.

Table 7.5 Un-mitigated and Mitigated Impacts at the VSRs

VSR ID / Representative VP	Un-Mitigated Visual Impact		Recommended Mitigation Measure	Mitigated Impact (Substantial / Moderate / Slight / Insignificant)		
	Construction	Operation		Construction	Operation Day 1	Operation Year 10
VSR 1a – Visitors at Cape D’Aguilar	Insignificant	Insignificant	VM1-4	Insignificant	Insignificant	Insignificant
VSR 1b – Academics working at the Swire Institute of Marine Science						
VSR 2 – Hikers at Tung Lung Chau	Insignificant	Slight	VM1-4	Insignificant	Insignificant	Insignificant
VSR 3 – Travellers on ferry from Sai Wan Ho and Tung Lung Chau	Insignificant	Insignificant	VM1-4	Insignificant	Insignificant	Insignificant
VSR 4 – Hikers / Tourists at Po Toi Island	Slight	Moderate	VM1-4	Insignificant	Slight	Slight

7.10 Residual Impact Assessment

The assessment made in **Section 7.7** shows that visual impacts arising from the Project prior to any mitigation or enhancement measures in place, are insignificant to moderate.

By operation, auxiliary facilities will have been removed. Therefore with sensitive design of the new structures (materials, textures, colours) and careful design of lighting, impacts would further reduce at operation day 1 for the Project site. The new structures are expected to blend in to the seascape and the residual visual impacts will be insignificant to VSR 1a, VSR 1b, VSR 2, and VSR 3; and slight for VSR 4.

No unacceptable residual visual impact is expected.

7.11 Cumulative Impact Assessment

No existing or committed project is identified in the vicinity of the Project site. Therefore, cumulative impact is not expected for the Project site.

7.12 Environmental Monitoring and Audit Requirements

A number of measures to be implemented during design and construction of the Project are recommended in **Section 7.9**, to further enhance the visual elements associated with the Project. Design measures such as for the design of the new fish rafts / cages are recommended to be integrated into the design and construction stage of the Project as early as possible.

As no tree felling, transplanting or compensatory planting is required for the Project and visual enhancement measures would be provided during the construction phase, therefore no specific EM&A programme is required.

7.13 Conclusion

A visual impact assessment has been undertaken for Project located at Po Toi (Southeast). The VSRs were identified and assessed based on their sensitivity and magnitude of change. Four visual mitigation measures are proposed to minimise the visual impacts. Given the sensitive design of the new structures, small scale of development and good compatibility with the surrounding seascape of the structures, visual impacts of the Project will be subsequently considered as between insignificant and slight. No unacceptable residual visual impact is expected.

No cumulative visual impacts are anticipated for this Project.

According to Annex 10 of the *Technical Memorandum on the Environmental Impact Assessment Process* (EIAO-TM) the visual impacts are considered acceptable with mitigation measures.