Civil Engineering and Development Department

Kau Yi Chau Artificial Islands Development

Project Profile

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1 Basic Information

1.1 Project Title

1.1.1 Kau Yi Chau Artificial Islands Development (hereinafter named as the Project)

1.2 Purpose and Nature of the Project

1.2.1 The study of "Enhancing Land Supply Strategy: Reclamation Outside Victoria Harbour and Rock Cavern Development" (ELSS), commenced in 2011, assessed the feasibility of enhancing land supply through two land supply options: reclamation outside Victoria Harbour and rock cavern development. It was identified that, apart from five near-shore reclamation sites, the Central Waters have good potential for artificial island development, and sizeable reclaimed land could be supplied for comprehensive land use planning. Taking on board the findings of the ELSS, the 2014 Policy Address announced the initiative to explore ways to further develop the eastern waters off Lantau Island and neighbouring areas, with a view to developing an East Lantau Metropolis (ELM) for accommodating new population and a core business district (CBD) in addition to Central and Kowloon East for promoting economic development and providing job opportunities in Hong Kong.

1.2.2 The public engagement booklet “Hong Kong 2030+ Towards a Planning Vision and Strategy Transcending 2030”, promulgated in October 2016, has proposed a conceptual spatial framework to optimise the locational advantage for different sectors/economies, including the development of ELM that covers also the Kau Yi Chau (KYC) area, providing about 1,000 ha of land for development as a strategic growth area (SGA) with a capacity of accommodating a population of about 400,000 to 700,000 and the development of a third Core Business District (CBD3) generating a total of 200,000 employment opportunities as a new and smart financial and producer services hub.

1.2.3 The Sustainable Lantau Blueprint, published in 2017, proposed developing ELM as a potential long-term SGA under the principle of balancing between development and conservation and stipulating the future direction of "Development in the North, Conservation for the South" for Lantau.

1.2.4 In the 2018 Policy Address, the Chief Executive announced the “Lantau Tomorrow Vision” (LTV) to provide a sizeable developable land to meet the long-term development needs of Hong Kong. LTV covers various development components around Lantau, and at its centre is to study the phased formation of artificial islands in the Central Waters around KYC and Hei Ling Chau which will be supported by a set of new strategic road and railway networks linking up the artificial islands with the Hong Kong Island, Lantau and the coastal areas of Tuen Mun. The first phase will focus on studying the KYC Artificial Islands (KYCAI), with a total reclaimed area of about 1,000 ha accommodating a population of 400,000 to 700,000. It is estimated that the KYCAI are capable of providing about 150,000 to 260,000 housing units and will also support the development of the CBD3 providing some 200,000 diversified employment opportunities.

1.2.5 In June 2021, the Civil Engineering and Development Department (CEDD) and Planning Department (PlanD) jointly commenced a consultancy agreement

"Artificial Islands in the Central Waters - Investigation" (the CW Study). The Study is expected to be completed within 42 months. The KYCAI is about 1,000 ha in size and will provide housing for 400,000 to 700,000 population, together with about 200,000 employments upon full development. The KYCAI development is targeted for the first population intake in year 2033/34.

1.2.6 Transport infrastructures connecting the KYCAI to other parts of the territory will be provided. These transport infrastructures include a priority road link between Hong Kong Island (HKI) and Northeast Lantau (NEL), via KYCAI and a rail link connecting KYCAI to other parts of Hong Kong which will be further studied. This priority road link is referred to as HKI-NEL Link, which comprises two sections. The first section connects between HKI and KYCAI (HKI-KYC Link), and the second section connects between KYCAI and NEL (KYC-NEL Link).

1.2.7 In view of the large scale and extent of the aforementioned development and infrastructure under the CW Study, three Environmental Impact Assessment (EIA) studies will be carried out according to their distinctive natures to facilitate more focused discussions individually on the associated environmental impacts, mitigations, etc. Therefore, three associated Project Profiles (PPs) have been prepared based on the nature of the works involved:

- Item (A) – Reclamation for Kau Yi Chau Artificial Islands;
- Item (B) – Kau Yi Chau Artificial Islands Development; and
- Item (C) – Hong Kong Island – Northeast Lantau (HKI-NEL) Link.

1.2.8 **Item (A)** focuses on the potential environmental impacts and corresponding mitigation measures in relation to the reclamation works for the formation of the KYCAI, including but not limited to those on marine ecology, fisheries, water quality, etc.; **Item (B)** focuses on the potential environmental impacts and corresponding mitigation measures in relation to the development upon the reclaimed KYCAI, including but not limited to those on planned sensitive receivers on KYCAI as well as existing sensitive receivers near KYC during construction and operation stage; **Item (C)** focuses on the potential environmental impacts and corresponding mitigation measures in relation to the construction and operation of the road link concerned, including but not limited to air quality and noise impact on the existing sensitive receivers on HKI.

1.2.9 The rail link as one of the infrastructures connecting KYCAI to other parts of Hong Kong will require another separate EIA, which will be carried out by the respective project proponent separately.

1.2.10 This PP covers Item (B) “Kau Yi Chau Artificial Islands Development” (i.e. the Project) and is prepared to provide the Director of Environmental Protection (DEP) with sufficient information in determining the scope of the EIA study together with the technical and procedural requirements that the EIA study for Item (B) shall meet.

1.3 Name of Project Proponent

1.3.1 The Project Proponent is the Sustainable Lantau Office, the Civil Engineering and Development Department (CEDD) of the Government of the Hong Kong Special Administrative Region.

1.4 Location and Scale of Project and History of the Site

1.4.1 As discussed in **Section 1.2**, the Project consists of the KYCAI development only (i.e. Item (B)). Reclamation for KYCAI (i.e. Item (A)) and HKI-NEL Link (i.e. Item (C)) will be covered by separate PPs and EIA studies.

1.4.2 The tentative development area of the Project is about 1,000 hectares to accommodate some 400,000 to 700,000 people as well as 200,000 employments upon full development. The approximate location of the proposed development is shown in **Figure 1.1**, which is tentative and indicative only and subject to design developments and the outcomes of the EIA study. Nevertheless, the development will not encroach upon any existing islands, including KYC, Siu KYC, Peng Chau and Sunshine Island.

1.4.3 The development within the KYCAI will be conducted in phases and hence requires coordinated planning to interface with the reclamation and the HKI-NEL Link.

1.4.4 To support the population and CBD3 on the KYCAI envisaged under the LTV as discussed in **Section 1.2.4**, a number of associated land uses and infrastructures would be required. Details of the possible infrastructures and land uses envisioned at this stage are listed below:

Essential Land Uses and Infrastructure

(a) road networks on KYCAI;

(b) railway system connecting KYCAI and associated depot;

(c) sewage treatment works and sewage pumping stations;

(d) sludge treatment facilities;

(e) water treatment plant and desalination plant;

(f) refuse transfer stations, waste disposal facility and/or waste-to-energy facilities;

(g) flood storage pond;

(h) dangerous goods godown;

(i) helipads;

(j) electricity substations and associated transmission line;

(k) submarine water supply pipelines;

(l) submarine sewage pipelines;

(m) piers and berthing facilities;

(n) breakwater;

(o) district cooling system plant;

(p) Telecommunication facilities

Possible Land Uses and Infrastructure

(q) barging facilities;

(r) effluent reuse facilities;

(s) outdoor sporting facilities and stadium;

(t) high-tech energy (e.g. hydrogen) production plant and storage facilities;

(u) cement works and/or concrete batching plant.

1.4.5 The alignments, scale and/ or locations of the above land uses and infrastructures would need to be further investigated under the CW Study. The submarine utilities may be connected to western HKI, western Kowloon or Lantau Island, subject to the further investigation during the EIA study. Additional land uses and infrastructures on top of the list above may be required as the CW Study progresses. A rail depot may be required within the KYCAI or at other locations beyond the KYCAI.

1.4.6 Part of the KYCAI falls within the boundaries of the NEL OZP No. S/I-NEL/12 and is zoned "Other Specified Uses" which was previously identified as the primary area of Hong Kong's Port Facilities while the whole KYC, except the hilltop which is occupied by an existing radar station, is zoned as "Conservation Area". According to the Explanatory Statement of the NEL OZP, the "Conservation Area" zone is intended to conserve the existing natural landscape and character of KYC and to protect the area from encroachment by the adjacent development.

1.5 Number and Types of Designated Projects to be Covered by the Project Profile

1.5.1 According to the indicative population size and reclamation scale as stated in **Section 1.2.2**, the Project falls within the definition of the Item 1 of Schedule 3 under Environmental Impact Assessment Ordinance (EIAO), i.e. a Schedule 3 Designated Project (DP), as an engineering feasibility study of urban development projects with a study area covering more than 20 hectares or involving a total population of more than 100,000, requiring an Environmental Impact Assessment (EIA) report (see **Table 1.1**).

1.5.2 The following elements of the Project listed in Table 1.1 below, which are not exhaustive, are identified as the Schedule 2 DPs under the EIAO that may be updated in the course of the Study.

Table 1.1 List of designated projects

Item No.	Designated Project	Remarks
Schedule 2 of the EIAO [1]		
A.1	Construction of expressways, trunk roads, primary distributor roads and district distributor roads	- All the mentioned road types are required within the KYCAI.
A.2	A railway and its associated stations	- A railway and its associated stations are required to serve the development.
A.4	A railway siding, depot, maintenance workshop, marshalling yard or good yard	- A railway depot is required to serve the development.

Item No.	Designated Project	Remarks
A.6	Transport depots located less than 200m from the nearest boundary of any existing or planned (a) residential area; (b) place of worship; (c) educational institution; or (d) health care institution	- Transport depots are required within the KYCAI and may be located less than 200m from the (a) residential area; (b) place of worship; (c) educational institution; or (d) health care institution
A.7	Roads or railway tunnels more than 800m in length between portals	- The development may involve roads within the KYCAI or railway tunnels connecting to other parts of Hong Kong more than 800m in length between portals
A.8	Roads or railway bridges more than 100m in length between abutments	- The development may involve roads within the KYCAI or railway bridges connecting to other parts of Hong Kong more than 100m in length between abutments
A.9	Roads fully enclosed by decking above and by structure on the sides for more than 100m	- The development may involve roads within the KYCAI fully enclosed by decking above and by structure on the sides for more than 100m
B.2	A helipad within 300 m of existing or planned residential development	- The development may involve a helipad on the KYCAI within 300 m of the planned development
C.1	Reclamation works (including associated dredging works) more than 5 ha in size	- Reclamation works of more than 5 ha in size may be required for rail links
C.2	Reclamation works (including associated dredging works) more than 1 ha in size and a boundary of which --- (a) is less than 500 m from the nearest boundary of an existing or planned--- (i) site of special scientific interest; (ii) site of cultural heritage; (iii) bathing beach; (iv) marine park or marine reserve; (v) fish culture zone; (vi) wild animal protection area; (vii) coastal protection area; (viii) conservation area; (ix) country park; or (x) special area; (b) is less than 100 m from a seawater intake point; or (c) is less than 100 m from an existing residential area.	- Reclamation works for rail links may be more than 1 ha in size - Possibly less than 500m from the conservation area at KYC etc.
C.3	Reclamation works (a) resulting in 5% decrease in cross sectional area calculated on the basis of 0.0 mPD in a sea channel or (b) occupying an area on plan in excess of 10% of any enclosed or semi-enclosed waterbody	- Reclamation works for rail links may result in 5% decrease in cross sectional area across the Adamasta Channel

Item No.	Designated Project	Remarks
C.4	Breakwaters more than 1 km in length or breakwaters extending into a tidal flushing channel by more than 30% of the channel width	- Breakwaters more than 1 km in length or breakwaters extending into a tidal flushing channel by more than 30% of the channel width may be required for the development such as piers and berthing facilities
C.12	Possible dredging operation exceeding 500,000m^3 or a dredging operation which (a) is less than 500m from the nearest boundary of an existing or planned--- (i) site of special scientific interest; (ii) site of cultural heritage; (iii) bathing beach; (iv) marine park or marine reserve; (v) fish culture zone; (vi) wild animal protection area; (vii) coastal protection area; or (viii) conservation area; or is less than 100m from a seawater intake point. [1]	- Dredging operation exceeding 500,00m^3 for rail links connecting to other parts of Hong Kong may be required
E.2	Water treatment works with a capacity of more than 100,000m^3 per day	- Water treatment work with a capacity of more than 100,00m^3 per day may be required to support the development.
E.3	Submarine water supply pipelines with a diameter of 1,200 mm or more and a length of more than 1 km	- Submarine water supply pipelines with a diameter of 1,200 mm or more and a length of more than 1 km may be required to support the development
F.1	Construction of sewage treatment works with an installed capacity of more than 15,000 m^3 per day	- Sewage treatment works with an installed capacity of more than 15,000 m^3 per day may be required to support the development
F.2	Sewage treatment works--- (a) with an installed capacity of more than 5,000 m^3 per day; and (b) a boundary of which is less than 200 m from the nearest boundary of an existing or planned--- (i) residential area; (ii) place of worship; (iii) educational institution; (iv) health care institution; (v) site of special scientific interest; (vi) site of cultural heritage; (vii) bathing beach; (viii) marine park or marine reserve; (ix) fish culture zone; or (x) seawater intake point.	- Sewage treatment works with an installed capacity of more than 5,000 m^3 per day may be required to support the development - Sewage treatment works may be located less than 200m from the nearest boundary of the planned development within the KYCAI such as residential area, educational institution, seawater intake point etc.

Item No.	Designated Project	Remarks
F.3(b)	Construction of sewage pumping station with an installed capacity of more than 2,000 m^3 per day and a boundary of which is less than 150m from an existing or planned (i) residential area; (ii) place of worship; (iii) educational institution; (iv) health care institution; (v) site of special scientific interest; (vi) site of cultural heritage; (vii) bathing beach; (viii) marine park or marine reserve; (ix) fish culture zone; or (x) seawater intake point.	- Sewage pumping station with an installed capacity of more than 2,000 m^3 per day may be required to support the development - Sewage pumping station may be located less than 150m from the planned development within KYCAI such as residential area, educational institution, seawater intake point etc.
F.4	Activities for the reuse of treated sewage effluent from a treatment plant	- Reuse of treated sewage effluent from a treatment plant may be considered for the development.
F.5	Submarine sewage pipelines with a diameter of 1,200mm or more and a length of 1 km or more	- Submarine sewage pipelines with a diameter of 1,200mm or more and a length of 1km or more may be required for the development.
F.6	Construction of submarine sewage outfalls	- Submarine sewage outfalls may be proposed under the development.
G.2	Refuse transfer station	- Refuse transfer stations may be required for waste treatment for the development.
G.4	Waste disposal facilities (excluding any refuse collection point), or waste disposal facilities, for (a) reuse; or (b) chemical, industrial or special wastes	- Waste disposal facilities may be required for chemical, industrial or special wastes for the development
H.1	A 400 kV electricity substation and transmission line	- A at least 400kV electricity substation and transmission line may be required to support the development.
I.2	A flood storage pond more than 10 ha in size.	- A flood storage pond may be required to protect the development within KYCAI.
K.5	A cement works or concrete batching plant with a total silo capacity of more than 10,000 tonnes in which cement is handled and manufactured.	- Cement works or concrete batching plant may be required for the construction of the Project.
K.13	A dangerous goods godown with a storage capacity exceeding 500 tonnes	- Dangerous good godown may be required for the development.
O.7	An outdoor sporting facility with a capacity to accommodate more than 10,000 persons	- Outdoor sporting facility may be proposed within the KYCAI.

Item No.	Designated Project	Remarks
Schedule 3 of the EIAO		
1.	Engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100,000	- The Project is an urban development project with a study area of approximate 1,000 ha and at least 400,000 population.

[1] Depending on further discussion with the respective project proponents, they may be responsible for the preparation and submission of the respective Schedule 2 EIA to secure their EP as necessary (e.g. railway and its associated stations, etc.)

Note:

1. The Schedule 2 DP under Item (A) and Item (C) are to be covered in separate PPs as discussed in **Section 1.2**. They will be submitted to DEP to apply for the respective EIA Study Briefs.

1.6 Name and Telephone Number of Contact Person

1.6.1 All enquiries regarding the Project can be addressed to:

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2 Outline of Planning and Implementation Programme

2.1 Project Implementation

2.1.1 The Project Proponent, subject to the final recommendation of the planning and engineering study, will be responsible for implementing the proposed works, together with all the environmental mitigation measures, the environmental monitoring and audit requirements as specified in the EIA Report of the Project.

2.1.2 The Consultants of the CW Study are responsible for undertaking the EIA study according to the Study Brief to be issued by the DEP and responding on behalf of the Project Proponent on issues related to the EIA.

2.1.3 The construction works of the proposed developments on the KYCAI will be carried out in phases by contractors to be appointed under various works contracts.

2.2 Project Timetable

2.2.1 Subject to the necessary statutory procedures, the first phase of reclamation will tentatively be completed in year 2029/2030. Development on the reclaimed KYCAI will then commence with first population intake targeted for year 2033/2034. It is anticipated that the reclamation works will be carried out in phases and will continue beyond the first population intake.

2.2.2 The implementation programme of the reclamation of KYCAI (i.e. Item (A)) and HKI-NEL Link (i.e. Item (C)) will be included in separate PPs.

2.3 Interactions with Other Projects

2.3.1 Potential projects that would have interface with the Project have been identified and are listed below. Some of these projects are under planning or the implementation of which has yet to be approved. This list should be revisited during the subject EIA study to ensure all the latest projects available from the respective stakeholders are incorporated.

(1) Reclamation for KYCAI (see Item (A) in **Section 1.2**)

(2) HKI – NEL Link (see Item (C) in **Section 1.2**)

(3) Tung Chung New Town Extension (East) – Design and Construction

(4) Tung Chung New Town Extension (West) – Design and Construction

(5) Siu Ho Wan Water Treatment Works Extension

(6) All the planned and committed public housing developments in Tung Chung Area

(7) Route 11 (Section between Yuen Long and North Lantau) – Investigation

(8) Proposed Siu Ho Wan Development (including, but not limited to, MTRCL's Proposed Comprehensive Residential and Commercial Development atop Siu Ho Wan Depot, Lantau)

(9) Study on Traffic, Transport and Capacity to Receive Visitors for Lantau - Feasibility Study

(10) Strategic Transport Plan under Lantau Tomorrow Vision

(11) Sunny Bay Reclamation

(12) Road P1 (Tai Ho – Sunny Bay Section)

(13) Strategic Study on Railways beyond 2030

(14) Strategic Study on Major Roads beyond 2030

(15) Hong Kong 2030+ Towards a Planning Vision and Strategy Transcending 2030

(16) Hong Kong Disneyland Expansion

(17) Tsing Yi – Lantau Link

(18) Organic Resources Recovery Centre Phase 1 (ORRC1)

(19) Proposed Development on Hong Kong Airport Island and Boundary Crossing Facilities Island

(20) Tung Chung Line Extension

3 Possible Impacts On The Environment

3.1 General

3.1.1 All the prevailing legislative requirements would be considered in the EIA to assess the possible environmental impacts.

3.1.2 This EIA shall include the assessment for both the environment sensitive receivers in the vicinity and those within the KYCAI. The cumulative impact from concurrent projects including the construction phase and operational phase of Item (A) and Item (C) on planned sensitive receivers on the KYCAI would be addressed in this EIA.

3.2 Air Quality

Construction Impacts

Marine-based Works

3.2.1 The dust generation from marine activities for dredging and filling for the proposed infrastructures such as submarine utilities and the construction of rail links would not be significant. However, the marine-based traffic as well as gaseous emissions from construction plants are expected to be the major sources of impact during construction phase.

3.2.2 The sediment dredged due to the proposed infrastructures will be loaded to barges and be transported away or if contaminated, treated on vessels or at temporary locations within or in the vicinity of the reclaimed land of KYCAI as soon as possible, and hence there would not be any adverse odour impacts during the construction.

Land-based Works

3.2.3 The construction of the Project on the reclaimed land would also require excavation, backfilling, wind erosion of exposed areas, temporary storage of spoil on site, transportation, handling of spoil, concrete batching, land-based traffic etc., as well as gaseous emissions from constructional plants are expected to be the major sources of impact during construction phase.

Operational Impacts

3.2.4 The major permanent sources of air pollutants are the vehicular emissions from traffic on the KYCAI. Marine emissions would also be generated from the marine vessels at neighbouring fairways and anchorage areas, barging facilities, piers and berthing facilities and the air emission from fireworks at Hong Kong Disneyland and the industrial facilities on KYCAI.

3.2.5 The proposed infrastructures on KYCAI, such as sewage treatment facilities, sewage pumping stations, effluent reuse facilities, refuse transfer stations, waste-to-energy facilities, desalination plants, sludge treatment facilities and waste disposal facility (if any), may cause air quality and odour impact during operational phase.

3.2.6 Depending on the programme of the reclamation for KYCAI development and HKI-NEL Link as well as the population intake years for the planned landuses on the KYCAI, the reclaimed land for the KYCAI and construction of road link would induce dust emissions as of wind erosion to impact on the planned ASRs on the KYCAI. Moreover, the infrastructures of KYCAI may be in operation concurrently. The cumulative air quality impact from these existing and planned emission sources would cause certain impacts on both existing ASRs in the vicinity and the planned ASRs on the KYCAI.

3.3 Noise

Construction Impacts

Marine-based Works

3.3.1 During construction of submarine utilities and the construction of rail links, various construction activities such as dredging, filling, material lifting, concreting, etc. will generate intermittent and transient construction noise.

Land-based Works

3.3.2 During construction of topside development on KYCAI, various construction activities such as dredging, filling, material lifting, concreting, piling, etc. will generate intermittent and transient construction noise.

Operational Impacts

3.3.3 The future noise sources arising from the Project include new roads on the KYCAI, and also number of fixed noise sources, such as district cooling system plant, sewage pumping stations, water treatment plants, railway depot, refuse transfer stations, waste-to-energy facilities, sludge treatment facilities, desalination plants, waste disposal facility and exhausts of ventilation buildings.

3.3.4 Noise impacts would be caused by various sources, including road traffic noise, railway noise, marine traffic noise at adjacent fairways and anchorages, helicopter noise from helipad, and the fixed noise sources as mentioned above on both neighbouring existing/planned NSRs. For aircraft noise, the proposed development on the KYCAI fall outside NEF25 and it has already fulfilled the requirement under the Technical Memorandum of EIAO.

3.3.5 During the interim phase of the KYCAI development, the construction of road links and the infrastructures of KYCAI development may be conducted concurrently at certain periods, the cumulative noise impact on the planned NSRs within the KYCAI caused by the associated construction activities may be anticipated.

3.4 Water Quality

Construction Impacts

Marine-based Works

3.4.1 Marine works would be required for the proposed infrastructures such as submarine utilities, rail links as well as breakwater, barging facilities, piers and berthing facilities. Release and suspension of sediments and backfilling materials may occur during these marine works. During these marine works, contaminants and nutrients

bound inside the sediments may be released into the nearby water bodies. Sewage arising from on-site construction workforce as well as accidental spillage may also cause water pollution if directly discharged into adjacent water bodies without suitable mitigation measures. To control the potential water quality impacts on the nearby Water Sensitive Receivers (WSRs), provision of adequate mitigation measures, adoption of non-dredged methods, optimisation of construction phasing, etc., and environmental monitoring programme, would be considered and implemented as far as practicable.

Land-based Works

3.4.2 For land-based works on KYCAI, the construction site runoff as well as other wastewater generated by the construction activities may cause blockage of drainage channels and increase the suspended solid levels. Sewage arising from on-site construction workforce as well as accidental spillage may also cause water pollution if directly discharged into adjacent water bodies without suitable mitigation measures.

3.4.3 These aforementioned impacts arising from the construction of the Project will be assessed and studied in the EIA study and appropriate mitigation measures will be recommended.

Operational Impacts

3.4.4 The water flow pattern in the vicinity of the submarine utilities, rail links, breakwater, piers and berthing facilities would be permanently altered. It is anticipated that some areas would experience hydrodynamic and water quality impacts.

3.4.5 Sewage and wastewater will be generated from the developments as listed in **Section 1.4.4** such as waste-to-energy facilities, effluent reuse facilities, if any, on the KYCAI. The sewage arising from the development shall be collected by a network of trunk sewers to designated sewage treatment works for suitable treatment before discharging to the receiving waters. There shall be own provision for the collection, treatment (if necessary) and disposal of the sewage arising from the Project. The sewage collection, treatment and disposal infrastructure will be developed as an integral part of the essential infrastructures for supporting the Project. Emergency discharge from sewage pumping stations and sewage treatment works to the nearby water bodies may be encountered. Standard preventive design measures including standby/ spare pumps, buffer tanks and backup power supply of the sewerage system to avoid any emergency discharge of raw sewage would be provided, which are considered effective to minimize the emergency discharge. In addition, certain amount of residual chlorine and biocide may be discharged from the district cooling system plant. Due consideration shall be given to potential cumulative impact from other emission sources including the Harbour Area Treatment Scheme's (HATS) discharge points and other existing and proposed discharges.

3.4.6 Surface runoff from the roads, open spaces, roofs of the future developments during rainfall events is anticipated. Accidental chemical spillage would be another water pollution source. Release of pollutants carried by surface runoff into the marine water might affect the water quality if in abundant amount. Proper drainage system, designed with pollution management measures, e.g. oil interceptors, needs to be provided to avoid pollution to marine waters and WSRs.

3.4.7 For the desalination plant, concentration with high salinity and trace amount of residual chemicals and other operational discharges from auxiliary systems will be discharged into the surrounding waters during its operation. The location of the outfall will be reviewed and selected to allow dilution upon discharge and with due consideration of WSRs.

3.4.8 These aforementioned impacts arising from the operation of the Project will be assessed and studied in the EIA study and appropriate mitigation measures will be recommended.

3.5 Waste Management

Construction Impacts

Marine-based Works

3.5.1 Marine sediment would be generated from the dredging works for the proposed infrastructures such as submarine utilities and rail links. Therefore, dredged sediment would be generated.

Land-based Works

3.5.2 The construction of basements and piling works for the topside developments would likely generate certain amount of land-based sediment. As the area near KYC was previously used as a spoil ground, due consideration shall be given to ascertain the contaminated level of the land-based sediment.

General Construction Works

3.5.3 Construction and demolition (C&D) materials will be generated from the site formation activities, construction of roads and drainage, construction of the proposed developments on KYCAI.

3.5.4 Chemical waste generated during construction without careful and proper handling may pose environmental, health and safety hazards.

3.5.5 The construction workforce will generate general refuse comprising food scraps, waste paper, empty containers etc. The general refuse may give arise to adverse environmental impacts e.g. odour generation, windblown litter, vermin, if the waste storage areas are not properly maintained and regularly cleared.

Operational Impacts

3.5.6 Municipal, commercial and industrial waste will be generated from the future population on KYCAI. The quantity of municipal, commercial and industrial waste to be generated during the operational phase of the Project will depend on the future land uses. The management and disposal of this waste as well as the screening and sludge arising from the sewage treatment works will be assessed in the EIA study. Waste types such as sludge from waterworks, desalination plant and sewage treatment facilities would be generated.

3.6 Land Contamination

3.6.1 KYCAI is currently open sea, and hence there is no land contamination potential.

3.7 Ecology

3.7.1 The Project would not encroach into any existing islands and thus direct impacts to the terrestrial ecological resources at the outlying islands, including KYC, Siu KYC, Peng Chau, Sunshine Island and Hei Ling Chau, are not anticipated during construction and operation. However, indirect impact to the terrestrial ecological resources would be anticipated.

3.7.2 The potential impacts arising from the Project on the terrestrial and marine ecological resources in the vicinity of the proposed development are expected to be associated with:

Construction Impacts

- Temporary habitat loss and habitat fragmentation for marine works of submarine utilities and the rail links; and
- Disturbance to wildlife and vegetation due to possible air pollution, water pollution, noise and glare, construction activities/related vessel traffic.

Operational Impacts

- Disturbance to wildlife and the Conservation Area at KYC and Sunshine Island SSSI due to increased human activities;
- Disturbance to wildlife due to intake of water containing planktonic larvae and discharge of high salinity and trace amount of residual chemicals into the surrounding waters during operation of the desalination plant; and
- Disturbance to wildlife and vegetation due to possible air pollution, water pollution, noise and glare.

3.8 Fisheries

Construction Impacts

3.8.1 Marine works of submarine utilities and rail links may lead to potential temporary loss and/ or disturbance of fishing ground, important spawning grounds and nursery areas of commercial fisheries resources, and nearby fish culture zone(s). These marine works may cause impacts to water quality and hence impact to fisheries due to potential increase in suspended solids concentration and deterioration of water quality is expected. In the vicinity of the Project site, the increase in marine traffic of working vessels during construction may affect the fishes in nearby waters as well as the fishing operations. There may also be potential risk of accidental chemical spillage to the surrounding water during marine construction, which may affect fisheries resources and aquaculture sites nearby the Project site. Potential impact on fisheries due to the Project and the related changes in water quality on fisheries resources nearby the proposed Project site will be assessed in the EIA study.

Operational Impacts

3.8.2 During operational phase, disturbance to fisheries resources associated with increased human activities and possible water pollution from the KYCAI development may arise.

3.8.3 Impingement and entrainment of fisheries resources may occur at seawater intake points for the Project (e.g. desalination plants). In addition, effluent with high salinity and trace amount of residual chemicals and other operational discharges from auxiliary systems of the desalination plant will be discharged into the surrounding waters during its operation. The fisheries resources as well as the important spawning or nursery grounds and aquaculture sites nearby the Project site may also be affected and the associated impact will be assessed in the EIA study.

3.9 Landscape and Visual

3.9.1 The key visual elements/ setting is characterized by the ridgelines of Tuen Mun to the north, the urban landscape at Kennedy Town at the east, the open seascape at the south and the natural hillside woodland of Lantau Island at the west. The detail of visual envelope and visual receptors will be identified and further elaborated during the EIA study.

3.9.2 The expected sources of landscape and visual impacts arising from the Project would include, but not limited to, the following:

Construction Impacts

- Loss of visual amenity due to the changes of the existing visual setting (e.g changed from open seascape to urbanised setting);
- Visual appearance of any temporary uses prior to the new residential development and its associated infrastructure on the KYCAI;
- Obstruction of or intrusion into views by the new residential development and its associated infrastructure on the KYCAI; and
- Construction works and associated activities at the KYCAI.

Operational Impacts

- Visual intrusion and obstruction created by the new residential development and its associated infrastructure on the KYCAI;
- Visual quality of the new development on the KYCAI;
- Landscape impact arising from the construction works of the new residential development and its associated infrastructure on the KYCAI; and
- Permanent loss of visual amenity of the open sea view due to the new development on the KYCAI.

3.10 Cultural Heritage

Terrestrial Archaeology & Built Heritage

3.10.1 The KYCAI would be located at open sea and hence would not have any impacts on terrestrial archaeology and built heritage.

Marine Archaeology

3.10.2 Although the topside developments on KYCAI are on the reclaimed land, the associated infrastructures such as submarine utilities and rail link may disturb the seabed and hence may have any impacts on marine archaeology.

3.11 Potential Hazard

3.11.1 It is expected that PHI or DG store may be included in the development on KYCAI. The potential hazard would be assessed to fulfil the legislative requirements in the Technical Memorandum of the Environmental Impact Assessment Ordinance (TM-EIAO).

4 Major Elements of the Surrounding Environment

4.1 General

4.1.1 The major existing and planned sensitive receivers and sensitive parts of the natural environment relating to respective environmental aspects that may be affected by the proposed project are shown below. The existing and planned sensitive receivers would be further studied and updated during the EIA study with due considerations of the planned infrastructures on the KYCAI.

Air Sensitive Receivers

- Planned developments at KYCAI
- Existing and planned developments at Peng Chau, Hei Ling Chau, NEL, Hong Kong Disneyland Resort and western HKI

Noise Sensitive Receivers

- Planned developments at KYCAI
- Existing and planned developments at Peng Chau and Hei Ling Chau

Water Sensitive Receivers

- Planned development at KYCAI
- KYC Conservation Area
- Hei Ling Chau Typhoon Shelter
- Gazetted and non-gazetted beaches in Ma Wan, NEL, Cheung Chau, Lamma Island
- Water abstraction for cooling, flushing and other industrial purposes at western HKI and NEL
- Existing submarine pipelines for utilities
- Existing and planned Marine Parks (e.g. Sha Chau & Lung Kwu Chau Marine Park, the Brothers Marine Park, North Lantau Marine Park)
- Coral communities in northern Hei Ling Chau, southern Peng Chau, Green Island and other parts of the central waters including KYC and Siu KYC
- Ma Wan, Cheung Sha Wan, Lo Tik Wan and Sok Kwu Wan Fish Culture Zones and the important fisheries spawning ground, and nursery areas of commercial fisheries resources and fishing grounds in the central waters
- Existing coastal protection areas at Peng Chau and Discovery Bay
- Sunshine Island Site of Special Scientific Interest

Waste-related Environment

- Disused spoil ground at the waters near KYC

Ecological Sensitive Receivers

- KYC Conservation Area
- Existing natural shorelines
- Sunshine Island Site of Special Scientific Interest
- Egretry and ardeids at some locations in the central waters
- Nesting sites of the White-bellied Sea Eagle in the central waters, such as Pa Tau Kwu in Lantau, Sunshine Island and Green Island
- Egretry on little Green Island
- Coral communities in northern Hei Ling Chau, southern Peng Chau, Green Island and other parts of the central waters including KYC and Siu KYC
- Seapen at the seabed in the vicinity of reclamation site
- Horseshoe crab in the eastern of Peng Chau
- Marine mammal in the central waters

Fisheries Sensitive Receivers

- Ma Wan, Cheung Sha Wan, Lo Tik Wan and Sok Kwu Wan Fish Culture Zones and the important fisheries spawning ground, and nursery areas of commercial fisheries resources and fishing grounds in the central waters

Terrestrial Cultural Heritage Elements

- Built heritage and SAI at Peng Chau

Landscape and Visual Sensitive Receivers

- Planned developments at KYCAI
- Existing and planned developments at Peng Chau, Hei Ling Chau, NEL, Hong Kong Disneyland Resort and western HKI, Tsing Yi, Lamma Island, Cheung Chau
- KYC Conservation Area
- Sunshine Island Site of Special Scientific Interest
- Existing natural shorelines

5 Environmental Protection Measures to be Incorporated in the Design and Further Environmental Implications

5.1 General

5.1.1 The EIA study will determine the significance of environmental impacts (both cumulative impacts and those arising from the Project) and any avoidance or mitigation measures to ensure that all development and infrastructure proposals recommended by the Project would be environmentally acceptable. Reference would be made to the relevant legislation and other requirements including but not limited to the EIAO, Hong Kong Planning Standards and Guidelines (HKPSG) etc. The residual impacts, if any, would be confined within the allowable limits. Environmental monitoring and auditing of potential impacts that may arise from implementation of the works proposed by the Project will be provided for the construction and operational phases. Subject to the findings of the EIA study, the following mitigation measures would be incorporated in the design and construction of the Project.

5.1.2 Any mitigation measures that may be required for the construction of operation of the Project to facilitate the implementation of the planned land uses on the artificial islands would be addressed in this EIA study.

5.2 Air Quality

Construction Impacts

General Construction Works

5.2.1 In order to prevent adverse impacts on air quality, the control measures stipulated in the Air Pollution Control (Construction Dust) Regulations should be implemented, wherever applicable, to limit the dust emissions from the site. Subject to EIA findings, the following mitigation measures, which are not exhaustive, will be considered during construction period to minimize impacts on air quality on nearby ASRs.

- Any vehicles/marine vessels with an open load compartment used for transferring dusty materials off-site will be properly fitted with side and tail boards and cover;
- Stockpiles of sand and aggregate will be enclosed on three sides and water sprays will be used to dampen stored materials and when receiving raw material;
- The site will be frequently cleaned and watered to minimise fugitive dust emissions;
- In the process of material handling, any material which has the potential to create dust will be treated with water or sprayed with a wetting agent where practicable;

- Implementation of wheel washing facilities at access roads into and out of construction sites;
- Speed control of vehicles on-site; and
- Optimize slope cutting and extent of cut-and-cover tunnelling section.
- Sufficient dust suppression measures for batching facilities, concrete batching facilities, etc.

5.2.2 To minimize the exhaust emissions from Non-road Mobile Machinery (NRMM), the following mitigation measures, which are not exhaustive, will be considered during construction period to minimize impacts on air quality on nearby ASRs.

- Connect construction plant and equipment to main electric supply and avoid use of diesel generators and diesel-powered equipment as far as practicable;
- Consider to restrict the use of exempted NRMMs; and
- Deploy electrified NRMMs as far as practicable.

Operational Impacts

5.2.3 Subject to EIA findings, the proposed mitigation measures, which are not exhaustive, to improve the air quality within the possible developments and infrastructure are to be considered as follows:

- Well planning of building layout such as adequate buffer distance is recommended to separate the ASRs and roads as well as the proposed air-polluting infrastructures such as waste-to-energy facility, sewage treatment plant, waste disposal facility, effluent reuse facility and sludge treatment facility;
- Suitable design for underground road networks, loading/unloading area and location of ventilation building and tunnel portals to be away from the ASRs;
- Optimization of anchorage areas and fairways;
- Environmental friendly or zero emission vehicles as well as pollution control technology measures if necessary; and
- Odour control measures such as covering the odour sources, installing odour scrubber and locating ASRs away from odour sources, such as sewage pumping stations or sewage treatment works are to be proposed.

5.3 Noise

Construction Impacts

General Construction Works

5.3.1 Subject to EIA findings, the following measures will be considered during construction period to minimize construction noise impacts on nearby NSRs.

- Use of quieter powered mechanical equipment and plant, and/or fitted with muffler/ silencers/ sound reduction devices;
- Provision of temporary noise barriers and enclosures, where practicable;
- Noise screening structures or purpose-built noise barriers will be provided along the site boundary to provide additional protection to NSRs nearby;
- Good site practices will be implemented as effective noise mitigation measures. These will include, but not limited to, locating noisy equipment and activities as far from NSRs as practical, scheduling noisy activities to minimise exposure of nearby NSRs to high levels of construction noise, limiting the use and number of equipment operating close to the NSRs, proper maintenance of construction plant and devising methods of working to minimise noise impacts on the surrounding environment; and
- Travelling route of the construction vehicles on public roads should be planned as far as practicable in a way to minimize the noise impacts to NSRs.

Operational Impacts

5.3.2 In order to minimize the impacts arising from the Project on the nearby existing / planned NSRs, the following mitigation measures are to be considered:

- For the NSRs, proper arrangement of landuses and the use of direct noise mitigation measures such as noise barriers along roads as appropriate, and the use of special building design including noise insulation as appropriate;
- The possibility of implementing noise barriers/ enclosures on planned highway infrastructures, and railway lines;
- For fixed noise sources, careful sitting of noisy machinery within the site; by enclosing the noisy machinery within building structures; by use of acoustic louvers, silencer for ventilating fan, acoustic door and absorptive wall lining; and any opening of the building to be located facing away from any NSRs; and
- Suitable design for underground road networks and location of ventilation building and tunnel portals for away from the NSRs;
- Optimization of anchorage areas and fairways; and
- Relevant measures (proper arrangement of landuses etc.) for helicopter noise.

5.4 Water Quality

Construction Impacts

5.4.1 In order to prevent adverse impacts on water quality, the following general mitigation measures would be put in place where appropriate.

General Construction Works

- Provision of adequate construction site drainage according to the established good practices;

- Open stockpiles of materials on site will be avoided or where unavoidable covered with tarpaulin or similar fabric during rainstorms;
- Where possible, works entailing soil excavation will be minimised during the rainy season;
- All runoffs arising from the construction site should be properly collected and treated to ensure the effluent comply with Water Pollution Control Ordinance. Silt trap and oil interceptor will be provided to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before being pumped to the public stormwater drainage system. The silt traps and oil interceptors will be cleaned and maintained regularly;
- Minimisation of the impacts of concrete washings, use of infiltration/ sedimentation pits to settle out the washings before treatment/ re-use/ discharge, and adoption of treatment units with pH adjustment if necessary;
- Oil interceptors will be provided and properly maintained for collecting spillage or leakages from site workshops. The waste oil removed will be collected by licensed collectors;
- Mobile toilets or other appropriate means will be provided to store sewage before disposal through licensed collection agent or discharging to main sewerage system;
- For bore piling operations, the resulting suspension will be settled in sedimentation/ infiltration pit until supernatant is clear and the bentonite solids will be disposed appropriately;

Marine-based Works

- Non-dredged method would be considered as far as practicable. In case limited dredging is required, installation of silt curtain would be considered to control the dispersion of suspended solids; and
- Reduction of the dredging rate, use of tightly closed grabs, and control of grab descending speed to minimize disturbance to the seabed and sediment loss during dredging.

Operational Impacts

5.4.2 The following mitigation measures are to be considered:

- Adopt the practices outlined in ProPECC PN 5/93 for handling, treatment and disposal of operational stage effluent;
- Provision of sand/ silt and oil/ grease traps and Sustainable Drainage System (SuDS) such as bioswales, porous pavements, attenuation and treatment ponds at suitable locations to prevent ingress of pollutants to the stormwater system/ natural streams;
- Adopting proper sewerage system to treat sewage flows from the possible developments;

- Proper location of the outfall for sewage treatment works and desalination plant to allow efficient dilution upon discharge and with due consideration of WSRs nearby;
- Develop contingency plan for accidental chemical spillage;
- Careful design of the piers and berthing facilities (e.g. adopt pipe-desk design) to minimize the water flow pattern impact; and
- Considering diffuser for the sewage treatment works and desalination plant to minimize the environmental impacts of concentrate discharge.

5.5 Waste Management

Construction Impacts

5.5.1 The following mitigation measures will be considered during the construction phase to minimize waste generation and provide good control on waste management.

- Good site practice and implementation of Waste Management Plan will be adopted to minimize any potential waste impacts;
- Careful design, planning and good site management to encourage on-site sorting of C&D materials and minimize their generation during the course of construction;
- Chemical waste will be properly stored and transported off-site for treatment by a licensed collector;
- Refuse will need to be stored in enclosed bins and reputable waste collector should be employed to remove the generated refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts;
- A recording system for the amount of wastes generated, recycled and disposed;
- A Waste Management Plan (WMP) shall be prepared and this WMP shall be submitted to the Engineer for approval;
- Use of reusable non-timber formwork to reduce the amount of C&D material; and
- Proper storage and site practices to minimise the potential for damage or contamination of construction materials.

Operational Impacts

5.5.2 Proper source separation, collection, recycling, recovery, transfer, treatment and disposal system will be considered and provided to deal with the municipal solid wastes, including the sewerage screening and sludge generated during the operational phase of the Project.

5.6 Land Contamination

5.6.1 As mentioned in **Section 3.6**, no land contamination potential is anticipated. Hence, no mitigation measures are considered necessary.

5.7 Ecology

Construction Impacts

5.7.1 The mitigation measures that are to be implemented to minimize the impacts on air quality, noise and water quality will also help to minimize any impacts on ecological resources.

5.7.2 As regards ecological impact, the best mitigation is avoidance and will be used wherever possible. For impact which is considered unavoidable, mitigation measures will be adopted to minimize such impact.

Operational Impacts

5.7.3 Implementation of water pollution control measures described in **Section 5.4** will minimise the potential ecological impact on marine wildlife during the operational phase of the Project. Proper planning and design on the developments on KYCAI would be required to minimize the disturbance to the potential ecological environment.

5.8 Fisheries

Construction Impacts

5.8.1 Subject to EIA findings, the mitigation measures on water quality impact proposed in **Section 5.4.1** will be considered to minimise the impact on fisheries. Other possible mitigation measures will also be implemented if considered necessary.

Operational Impacts

5.8.2 Relevant water quality and ecology impact mitigation measures proposed in **Sections 5.4** and **5.7** are effective in reducing potential impact on fisheries resources. Other possible mitigation measures, if necessary, for enhancement of fisheries resources will be studied in the EIA.

5.9 Landscape and Visual

5.9.1 Subject to EIA findings, the following measures will be considered to minimize landscape impacts on existing landscape resources and visual impacts on nearby sensitive receivers

Construction Impacts

- Temporary greening treatment on bare soil surface before construction works of structures take place;
- Early formation of the planting area and advance planting of vegetations on the concerned landscape sensitive receivers;

- Screening of works areas with hoardings with appropriate colours compatible with the surrounding area;
- Control of night-time lighting by hooding all lights and through minimisation of night working periods;
- Sensible control of development height;
- Reduction of construction period to minimum and introduction of phasing of the construction stage; and
- Construction traffic (land and sea) should be kept to a minimum;
- Optimising the sizes and spacings of the viaduct columns; and
- Fine-tuning the location of the viaduct columns to avoid visually-sensitive locations.

Operational Impacts

- Sensitive and innovative architectural design, chromatic and facade treatment of new buildings and structures;
- Tree and shrub planting to provide adequate greening, screening, and mitigation, and minimise visual impact of the new residential development and its associated infrastructure on the KYCAI; and
- Incorporation of green roofs and vertical greening where feasible to mitigate visual impacts of buildings and structures;
- Aesthetic design of the form and structural elements of the elevated structures/ viaducts; and
- Roadside planting.

5.10 Cultural Heritage

Terrestrial Archaeology & Built Heritage

5.10.1 As discussed in **Section 3.10**, there would be no impacts on terrestrial archaeology, built heritage. Therefore, no mitigation measures would be required.

Marine Archaeology

5.10.2 Marine Archaeological Investigation (MAI) will be conducted by qualified marine archaeologist to ascertain the archaeological value of the affected seabed. The investigation where necessary will include geophysical survey and diver inspection as necessary.

5.10.3 The potential impact on area of archaeological potential caused by the Project will be assessed during EIA. If unavoidable, appropriate mitigation measures will be designed and implemented

5.11 Potential Hazard

5.11.1 In case any PHI or DG store is required within the proposed development area, the need for mitigation measures would need to be considered.

5.12 Severity, Distribution and Duration of Environmental Effects and Further Implications

5.12.1 Subject to the EIA findings, effective control and mitigation measures will be identified to ensure the impacts are within acceptable levels. The possible severity, distribution and duration of environmental effects such as beneficial and adverse effects; short and long term effects; secondary and induced effects; cumulative effects and transboundary effects will be considered and addressed in the EIA, where applicable. The key results from public consultation should also be documented in the EIA.

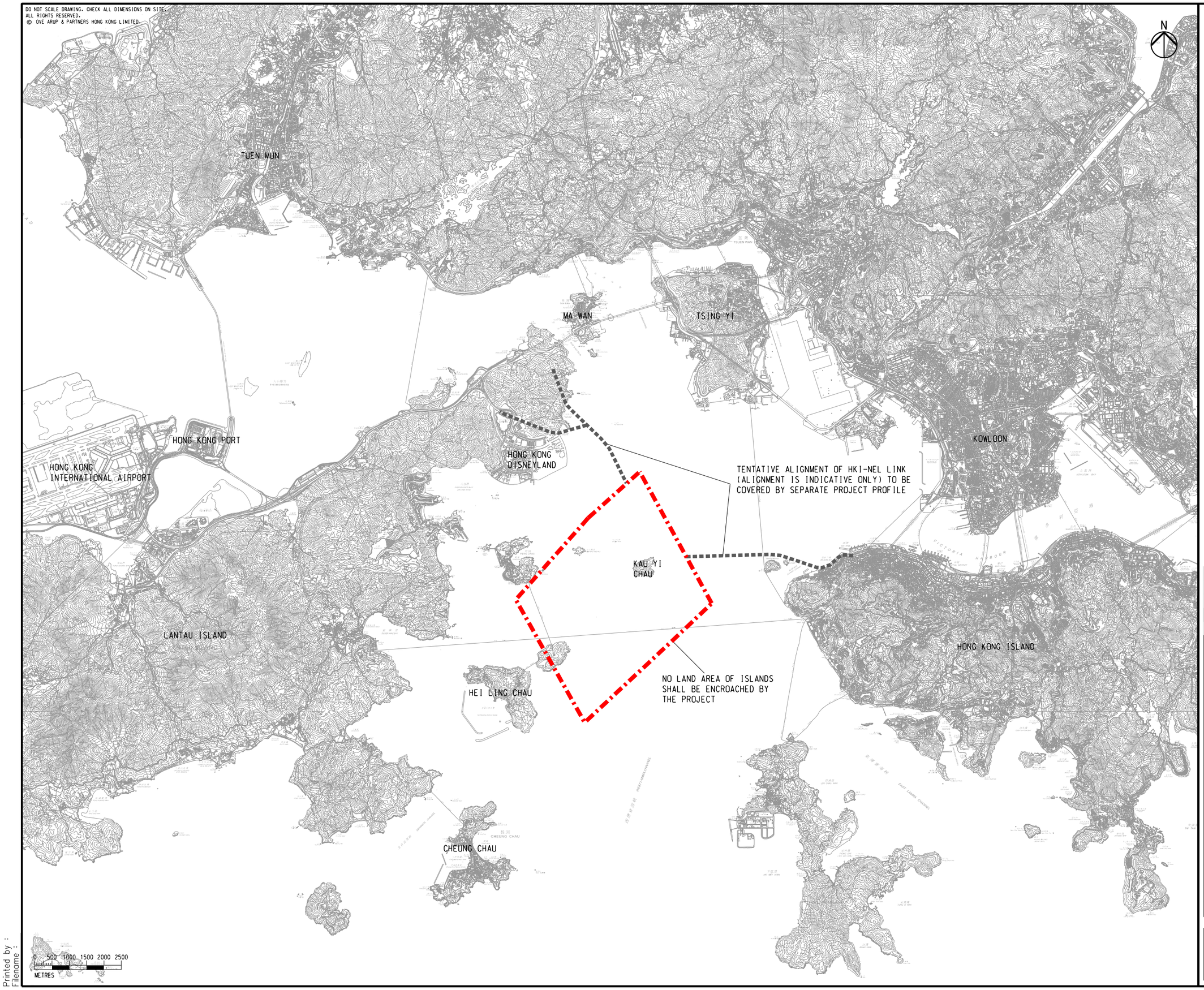
6 Use of Previously Approved EIA Reports

6.1.1 There are no relevant EIA reports already approved under the EIA Ordinance. However, the following studies are relevant and will be referred to in the subsequent EIA study:

Table 6.1 List of previously approved EIA reports for reference

Item	Application No./ Register No.	Title
(i)	AEIAR-090/2005	Approved EIA Study for Road P1 Advance Works at Yan O on Lantau Island
(ii)	AEIAR-196/2016	Tung Chung New Town Extension
(iii)	AEIAR-203/2016	Hung Shui Kiu New Development Area
(iv)	AEIAR-215/2017	Housing Sites in Yuen Long South
(v)	AEIAR-213/2017	Proposed Comprehensive Residential and Commercial Development atop Siu Ho Wan Depot
(vi)	AEIAR-227/2020	Development at San Hing Road and Hong Po Road, Tuen Mun

Figures



LEGEND

TENTATIVE POSSIBLE DEVELOPMENT AREA (BOUNDARY IS INDICATIVE ONLY)

Rev	Description	By	Date
A	FIRST ISSUE	GL	10/21

Consultant

ARUP

Contract No. and Title

Kau Yi Chau Artificial Islands Development

Drawing title

LOCATION OF THE PROJECT

Drawing no.			Rev.
FIGURE 1.1			A
Drawn: GL	Date: 10/21	Checked: RC	Approved: FC
Scale: 1 : 100000 @A3		Status	

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