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Figures

3 ALTERNATIVE OPTIONS

3.1 General

3.1.1 A number of site options were long-listed at the initial stage of the Site Selection for HKBCF in Mid 2007. These are summarised on **Figure 3.1**.

3.1.2 It should be noted that at that stage, no significant assessments had yet been carried out (neither from engineering nor from traffic and nor from environmental points of view). Hence, options were allowed to enter the long-list even if they were merely plausible. This generous approach would also serve to ensure that the long-list will be encompassing enough to include a feasible site option for HKBCF.

3.1.3 As the Site Selection Study and then the Investigation Consultancy proceed, relevant factors or assessment results were revealed which rendered most of the site options not feasible. Eventually, only one site option (Option NECLK as shown on **Figure 3.1**) locating the HKBCF in the water adjacent to the north-eastern side of the Airport Island was confirmed as viable. Explanations on the above are given in **Section 3.4** below.

3.1.4 With NECLK determined as the site option for HKBCF, three alignment options were considered for HKLR, as shown on **Figure 3.2**.

3.1.5 Amongst the three HKLR alignment options, two of them were evaluated as not feasible. The only feasible option is an alignment in the form of a viaduct routed through the Airport Channel, referred to as Alignment Option (A) on **Figure 3.2**. Explanations on the above are given in **Section 3.5** below.

3.1.6 It should also be noted that two local alternatives are shown on **Figure 3.3** for that portion of Option (A) nearer to Tung Chung. This is because, at the earlier stages, this portion of HKLR was proposed as an elevated viaduct through the waters off the south-eastern side of the Airport Island, but has been revised to a tunnel cum at-grade road in response to public concerns on the elevated viaduct.

3.1.7 **Figure 3.4** shows the overall layout of HKBCF-cum-HKLR, based on the only feasible site option for HKBCF and the only feasible alignment for HKLR.

3.1.8 **Figures 3.5 to 3.6** summarise the key issues/constraints considered when determining the site options for HKBCF and the alignment options for HKLR. *(Note: **Figures 3.5 to 3.6** provide an overall perspective on the key issues/constraints, whereas **Figures 3.7 to 3.9** show them in a larger-scale/close up-perspective.)* Highlights of these key issues/constraints are epitomised in **Sections 3.2 and 3.3** below.

3.2 Key Issues & Constraints – Engineering/Planning Aspects

3.2.1 HZMB Main Bridge Section

3.2.1.1 The alignment of the HZMB Main Bridge Section 港珠澳大橋主橋段 (i.e. the section outside HKSAR Boundary) has already been determined under the HZMB Feasibility Study jointly commissioned by the three Governments of Guangdong Province, HKSAR and Macao SAR. The HZMB Bridge Section will intersect with HKSAR boundary at a point in the waters west of Airport Island/Lantau. HKLR shall take the aforesaid intersection point as the starting point of its alignment at the HKSAR Boundary.

3.2.1.2 Another vital key issue related to the HZMB Main Bridge Section and in fact to the entire Pearl River Delta (PRD), is that, PRD's tidal-flow and hence the flood-discharge capacity of its upstream cities are sensitive to the presence of marine-substructures and artificial-islands that HZMB will introduce across the Pearl

River Estuary. Efforts are being taken to increase the bridge-spans and/or to shorten the artificial-islands in the HZMB Main Bridge Section. Similarly, bridge-spans in the HKSAR portion of Pearl River Estuary (i.e. the waters west of Airport Island/Lantau) should be increased, and the presence of artificial-islands/reclamation thereat should be avoided as far as practicable.

3.2.2 Airport Height Restrictions (AHR) & Navigation Channels

3.2.2.1 To ensure aviation safety, no object is allowed to have a height protruding beyond the AHR levels as shown on **Figure 3.7**. This constraint is of course particularly acute around the Hong Kong International Airport (HKIA): The closer it is to the HKIA, especially its runways, the lower the AHR contours are. The HKBCF site and the HKLR alignment need to be located in areas where the AHR contours are high enough to accommodate the height of HKBCF-related buildings and the depth/height of HKLR structures/facilities (e.g. the streetlights).

3.2.2.2 The waters around the Airport Island and the North-west Lantau area are navigated by various vessel-routings, in the form of navigation channels as shown on **Figure 3.7**, including:

(a) A north-south navigation channel through the western waters (i.e. the waters west of the Airport Island/Lantau);

(b) A navigation channel in the eastern waters (i.e. east of Airport-Island) for marine access to/from Tung Chung waterfront;

(c) Navigation between the eastern and western waters through the Airport Channel – This serves as marine access between Tung Chung waterfront and various destinations in the western waters (notably Tai O).

Whilst there is some flexibility to adjust the exact alignments of the navigation channels, such adjustment must avoid shifting the navigation onto waters of inadequate depth or onto areas of inadequate headroom (e.g. AHR-clearance) for the vessels.

3.2.2.3 The two foregoing items of key issues/constraints will obviously need to be considered together. For instance, by taking account of both, the HKLR alignment in the western waters will need to skirt southward through the area with AHR higher than +65mPD, in order to provide adequate headroom (41m as agreed with relevant government depts.) for navigation channel (a) above to underpass HKLR.

3.2.3 Airport Operation & Facilities

3.2.3.1 Besides the AHR, the operation and facilities of HKIA are also vital to be safeguarded, in determining the HKBCF site and the HKLR alignment. Key aspects in this regard are highlighted on **Figure 3.6.**

3.2.3.2 In addition, close liaison has been made with the Airport Authority on interfacing matters between the HKLR/HKBCF and the future developments of the HKIA.

3.2.4 Revised Concept Plan for Lantau

3.2.4.1 Due cognisance is also taken of the Revised Concept Plan for Lantau publicised in 2007. For instance, in accordance with the Revised Concept Plan for Lantau, the following future developments are planned to be implemented:

- Lantau Logistics Park;
- Possible Lantau Logistics Park Extension or other compatible uses;
- Future Tung Chung East Development;
- Future Tung Chung West Development.

3.2.4.2 These are outlined in **Figure 3.5**. They are taken into account in determining the HKBCF site and the HKLR alignment.

3.2.5 Existing Facilities

3.2.5.1 Various existing facilities shall be safeguarded too, in determining the HKBCF site and the HKLR alignment, including:

- Existing premises and roads in this area;
- The Ngong Ping 360 Cable Car and associated facilities;
- Hong Kong Observatory's metereological instruments which serve to provide vital information for airport operation;
- Submarine utilities between Tuen Mun and the Airport Island.

3.2.5.2 In case reprovisioning/diversion is needed (e.g. reprovisioning of HK Observatory's instruments; e.g. diversion of submarine utilities), due care and thorough consultation with the relevant parties must be taken to ensure that the reprovisioning/diversion will indeed be practicable and that a feasible scheme can be worked out to maintain the services/functions of these facilities.

3.2.6 Designated Area of Northshore Lantau

3.2.6.1 The area at seaward side of Tung Chung is classified as a Designated Area of Northshore Lantau (see **Figure 3.6**), where complex geological conditions (including marble rock with cavities and fault zone with anomalously deep rockhead) are anticipated.

3.2.6.2 In fact, the site investigation work carried out hitherto in this area already reveal that cavities are present outside Tung Chung Seafront, which further confirms the geotechnical complexity of the subsurface conditions of this area.

3.3 Key Issues & Constraints – Environmental Aspects

3.3.1 Residential Premises

3.3.1.1 In selecting the HKBCF site and formulating the HKLR alignment, utmost care will be taken to ensure that the overall layout of HKBCF-cum-HKLR will not result in adverse environmental impacts under the EIAO with regard to the residential premises in Northwest Lantau. These include notably the premises in the private residential developments and public housing estates in Tung Chung, as well as the village houses at various rural communities in North West Lantau (including Sham Wat, San Shek Wan, Sha Lo Wan, Ma Wan Chung, Pak Mong etc) – see **Figure 3.8**.

3.3.1.2 The HKBCF site and HKLR alignment are therefore kept away from these residential premises with adequate buffer distance to ensure compliance with the various requirements under the EIAO.

3.3.2 Valuable Ecological Features

3.3.2.1 The HKBCF site and the HKLR alignment should also minimise impact on the valuable ecological features in this area as far as practicable. Prominent examples are:

- The habitats of Chinese White dolphins in the waters from HKSAR boundary to Tai Ho;
- Valuable ecological features in the Airport Channel, including the rare seagrass species at San Tau, the Site of Special Scientific Interest (also at San Tau), fung shui woods at various locations alongside the Airport Channel, and the horseshoe crabs;

- Tai Ho Wan, which is well known for its high ecological value and the valuable flora/fauna thereat.

3.3.2.2 In particular, it should be noted that the western waters (i.e. the waters west of Airport Island/Lantau) constitute a most vital habitat for the Chinese White Dolphins (see **Figure 3.9**). Due care must be taken not only of the areas with high records of sightings of the dolphins (notably the Sha Chau and Lung Kwu Chau (沙洲/龍鼓洲) Marine Park and the waters west of Lantau), but also of the waters between the two aforesaid areas which serve as a vital movement corridor for the dolphins.

3.3.3 North Lantau Landscape & Shoreline

3.3.3.1 Impact on the scenic landscape of Lantau and its natural shoreline shall be minimised as far as practicable in determining the HKBCF site and the HKLR alignment.

3.3.4 Lantau North Country Park (including Lantau North (Extension) Country Park)

3.3.4.1 The HKBCF site and the HKLR alignment shall avoid encroaching upon the Lantau North Country Park.

3.3.4.2 In particular, it should be noted that the Lantau North (Extension) Country Park was enacted in 2008. The Country Park extent shown on **Figure 3.5** is already the updated one.

3.4 HKBCF Site Options Considered

3.4.1 Option WCLK (see Figure 3.10)

3.4.1.1 This option locates HKBCF on a piece of reclamation/artificial-island of approx. 130 ha to the west of the Airport Island. The exact location of this option may vary between the HKSAR boundary and the Airport Island.

3.4.1.2 This option is considered not feasible mainly because of the following:

(a) Main tidal flow of PRD Region – The HZMB is located within a major tidal flowpath of the PRD. As such, extreme caution must be exercised in the planning of HZMB so as to avoid an unacceptable degree of impedance to the tidal flow, otherwise the flood discharge capacity of the Pearl River Estuary area may be jeopardized. Assessments were carried out during the HZMB feasibility study; the Ministry of Water Resources and other related experts unanimously considered that the water resistance ratio (阻水比) due to the HZMB marine substructures and reclamation/artificial-islands should be controlled within 10%, in order to alleviate the impacts on the flood discharging function of the Pearl River Estuary to an acceptable level. Should the HKBCF be located in the waters west of the Airport Island, the flow blockage area will be increased and the 10% target for 阻水比 cannot be met, thus affecting the tidal flow and flood discharge ability of the Pearl River Estuary. *[Note: The water resistance ratio is the ratio of the area of water-flow blocked by the HZMB marine-substructures and reclamation/artificial-islands, to the water-flow cross-sectional area.]*

(b) Conservation of Marine Ecology – The waters in the western side of the Airport is an important dolphin movement corridor in-between Sha Chau/ Lung Kwu Chau and the west of Lantau Island, which are the mostly densely populated waters for Chinese White Dolphins. It is also an important nursing ground for the dolphins. An artificial island constructed in this location will seriously affect the marine ecology.

(c) This option and other options except Option NECLK will preclude the opportunity of combining reclamation of the TMCLKL with the HKBCF. This option will require reclamation not only on the western side (or the HKBCF location for other options), but also on the eastern side to provide a landfall for the TMCLKL, which is not conducive to the sustainability development objective that reclamation should be minimized.

(d) In comparison with Option NECLK, this option will cause a 2km detouring, resulting in an additional social cost (including time and fuel consumption) and traffic emission.

(e) Should the HKBCF artificial island be located near the HKSAR boundary, the navigation channel thereat will have to be distorted so as to bypass the artificial island. That may have impact to the marine navigation safety.

3.4.2 Option SSW (see Figure 3.11)

3.4.2.1 This option involves partial-reclamation (of approx. 90 ha) cum partial-cutting of slope at the headland at San Shek Wan (SSW).

3.4.2.2 There are several reasons for adopting a partial-reclamation cum partial-excavation form for this option:

(a) Locating the HKBCF on an artificial island or fully on reclamation will cause blockage to the water flow of the Airport Channel.

(b) Resumption of village houses and private lots should be avoided as far as possible. As such, a full excavation option is not acceptable.

(c) There are 3 terrestrial archaeological sites in the vicinity, namely Sha Lo Wan Archaeological Site, Sha Lo Wan (West) Archaeological Site and San Shek Wan Archaeological Site. A full excavation option will encroach upon one or more of these archaeological sites, which however should be avoided as far as practicable. Otherwise a very large-scale of rescue excavation is required, which will result in serious delay to the project.

3.4.2.3 This partial-reclamation cum partial-cutting option at SSW is considered not feasible either, mainly because of the following:

(a) The HKBCF will be extremely close to the nearby villages, with the shortest distance being 20m. It is envisaged that it would result in non-compliance with air-quality and noise requirements as stipulated under the Environmental Impact Assessment Ordinance (EIAO).

(b) Option SSW involves large-scale of hillside cutting (about 15Mm^3), as well as substantial excavation to natural woodland (about 35 hectares) and damage to about 2km of natural shoreline, resulting in significant damage to the natural environment in San Shek Wan.

(c) This option will involve reclamation not only at San Shek Wan for the HKBCF, but also on the eastern side of the Airport Island to serve as the landfall for the TMCLKL, which is not conducive to the sustainability development objective that reclamation should be minimized.

3.4.3 Option SWCLK (see Figure 3.12)

3.4.3.1 This option involves locating HKBCF on the existing land on the Airport Island.

3.4.3.2 This option is considered not feasible mainly because of the following:

(a) The vast majority of the areas on Airport Island are already occupied by airport-related facilities. Locating HKBCF on the existing Airport Island will critically conflict with the operation of the Airport.

(b) Other remaining areas have already been planned for further airport developments. Locating HKBCF on the existing Airport Island will detrimentally affect and hinder the development of the Airport.

3.4.4 Option TCB (see Figure 3.13)

3.4.4.1 This option involves reclamation (approx. 50 ha) at the Tung Chung Bay for the HKBCF.

3.4.4.2 This option is considered not feasible mainly because of the following:

(a) Serious environmental impacts will be resulted to residents in Ma Wan Chung village and Yat Tung Estate in view of their close proximity.

(b) It will conflict with the Future Tung Chung West Development.

(c) The space here is not sufficient for the entire HKBCF, hence it would be necessary to split the HKBCF into parts, resulting in the need to identify other site(s) to locate the remaining part(s) of HKBCF.

3.4.5 Option TH (see Figure 3.14)

3.4.5.1 This option involves reclamation (approx. 130 ha) at Tai Ho for the HKBCF, at the west of the proposed LLP development site.

3.4.5.2 This option is considered not feasible mainly because of the following:

(a) This option will lead to significant detour for those HZMB travellers heading to the Chek Lap Kok Airport or to Northwest New Territories via Tuen Mun Chek Lap Kok Link.

(b) High-potential risk will be posed to the valuable ecology within the Tai Ho Wan which is well-known as ecologically valuable, as the reclamation of Option TH is only about 100m away from the Tai Ho Bay sole outlet.

3.4.6 Option NECLK (see Figure 3.15)

3.4.6.1 This option involves reclamation (approx. 130 ha) at the northeast waters off the Airport Island, about 2km away from the Tung Chung New Town.

3.4.6.2 Together with the HZMB Main Bridge and HKLR as well as the Tuen Mun Western Bypass (TMWB) and TMCLKL, this proposed HKBCF site enables the formation of a strategic road network linking Hong Kong, Zhuhai, Macao and Shenzhen, thereby further enhancing the transportation and aviation hub status of Hong Kong. The synergy effect will be considerable. With its proximity to the Hong Kong International Airport, the HKBCF will serve as a strategic multi-modal transportation hub. It is currently planned that the HZMB related projects, including the HKBCF and the HKLR, should be completed at the same time as that of TMWB and the TMCLKL.

3.4.6.3 The preferred site would have comparatively less impacts on hydraulics and environment, in particular on marine ecology and water quality. For instance, the preferred site location will cause less overall water resistance to the main flow path and less impact on flood discharge capacity of the Pearl River; less disturbance to the movement corridor of Chinese White Dolphins between Sha Chau and west of Lantau Island; less effect on navigation safety; and less damage to the natural hillside, etc.

3.4.6.4 More elaboration on the merits of this Option NECLK will be discussed in **Section 3.6**.

3.4.7 Taking account of the foregoing points, Option NECLK is recognised as the only feasible site option for HKBCF.

3.4.8 As explained above, Option NECLK (locating the HKBCF in the waters adjacent to the north-eastern side of the Airport Island) is the only feasible site option. For ease of reference, a comparison of the key environmental benefits/disbenefits of the various site options is tabulated below.

HKBCF Site Option	Environmental Benefits	Environmental Dis-benefits
Option WCLK	• Well away from the main residential developments (environmental SRs) in Tung Chung. • Away from the natural hillside and landscape at/around San Shek Wan & Sha Lo Wan.	• The waters west of Airport is a vital habitat and nursing area for the Chinese White Dolphins, including also a dolphin movement corridor between Sha Chau/Lung Kwu Chau and West of Lantau Island; reclamation/ artificial island at this location will be detrimental to the dolphins. • Will disturb the natural setting of the western waters. • Precluding opportunity of combining TMCLKL and HKBCF reclamations hence no associated saving of seawalls / dredging volume / amount of mud disposal; also involving reclamations on both western and eastern sides of Airport (for HKBCF and TMCLKL respectively). • Traffic route detouring about 2km hence more vehicle fuel consumption and more traffic emission. • Larger dredging volume and amount of mud disposal due to thicker marine deposit at western waters. • Visual impact to villagers at Sha Lo Wan and San Shek Wan; whilst visual sensitive receivers at Tung Chung and Airport still subject to visual impact due to TMCLKL landfall and southern connection viaducts.
Option SSW	• Well away from the main residential developments (environmental SRs) in Tung Chung. • Away from the main areas of highest sightings of Chinese White Dolphins (but this option will still require reclamation which will have potential impacts on the dolphins, in view of juvenile/calf sightings in the West Lantau coastal waters).	• Extremely close to nearby villages, only approx. 20m from some village houses; serious air quality & noise impacts expected. • Will involve large scale hillside cutting (about 15Mm^3), and substantial damage to natural woodland (about 35ha), resulting in serious damage to environment and loss of terrestrial habitat at San Shek Wan. • Loss of about 2km long of natural coastline at San Shek Wan due to reclamation. • Precluding opportunity of combining TMCLKL and HKBCF reclamations hence no associated saving of seawalls / dredging volume / amount of mud disposal; also involving reclamations on both western and eastern sides of Airport (for HKBCF and TMCLKL respectively). • Large visual impact to nearby villagers due to the close distance.
Option SWCLK	• No reclamation for HKBCF required. • Away from dolphin habitats.	• Will require substantial resumption of existing facilities on Airport Island (which renders this option not feasible anyway; in addition, extensive demolition work will be required which is unfavourable from waste management point of view). • The affected facilities will require reprovisioning – Forming of substantial land for reprovisioning will entail environmental impacts.

HKBCF Site Option	Environmental Benefits	Environmental Dis-benefits
Option TCB	• Away from dolphin habitats	• Immediately adjacent to Ma Wan Village and only approx. 100m from Yat Tung Estate; serious air quality & noise impacts expected. • Precluding opportunity of combining TMCLKL and HKBCF reclamations hence no associated saving of seawalls / dredging volume / amount of mud disposal; also involving reclamations on both western and eastern sides of Airport (for HKBCF and TMCLKL respectively). • Large visual impact to nearby villagers / residents. • Area not large enough for HKBCF; still requiring land formation for remaining area at other sites as only about 50ha available under Option TCB. This will cause environmental impacts at another site.
Option TH	• Away from the main areas of highest sightings of Chinese White Dolphins and dolphin movement corridor.	• Significant detour for HZMB travellers heading to Airport or to Northwest New Territories via TMCLKL, hence more vehicle fuel consumption and more traffic emission. • High-potential risk to valuable ecology within Tai Ho Wan, which is well-known as ecologically valuable, due to the short distance of 100m between reclamation of Option TH and Tai Ho Bay sole outlet. • Precluding opportunity of combining TMCLKL and HKBCF reclamations hence no associated saving of seawalls / dredging volume / amount of mud disposal; also involving two separate reclamations in waters near Tai Ho and northeast waters of Airport (for HKBCF and TMCLKL respectively). • Visual impact to villagers at Pak Mong, at distance of about 500m.
Option NECLK	• Away from the main areas of highest sightings of Chinese White Dolphins and dolphin movement corridor. • Integration of HKBCF reclamation with TMCLKL southern landfall reducing total seawall length thus reducing dredging volume and amount of mud disposal. • Only reclamation at eastern side of Airport and no reclamation at western side.	• Existing artificial reefs at northeast waters of Airport Island affected.

[Note: Option NECLK is closer to the main residential developments (environmental SRs) in Tung Chung than Options WCLK & TH, but there will still be a substantial buffer distance from these SRs. It is not anticipated that this factor will cause any significant adverse environmental impacts.]

3.5 HKLR Alignment Options Considered

3.5.1 Alignment Option (A) – See Figure 3.16

3.5.1.1 Under this option, the alignment of the HKLR from HKSAR boundary to Scenic Hill is in the form of a marine viaduct running through the Airport Channel. In view of residents' concerns over the marine viaduct from Scenic Hill to the HKBCF, the viaduct option has been changed to a scheme of tunnel-cum-at grade road over the reclaimed shoreline along the existing shoreline at the eastern side of the Airport Island as described in **Section 3.1.6** above.

3.5.1.2 The key merits of this alignment are:

(a) Major facilities in the HKIA will not be affected; and

(b) The Lantau hillside and associated ecological features (including the Lantau Country Park and the Tung O Ancient Trail) are kept intact.

3.5.1.3 In view of the visual concern by Sha Lo Wan residents on this alignment, larger span lengths will be adopted for the portion of viaduct near Sha Lo Wan.

3.5.2 Alignment Option (B) – See Figure 3.17

3.5.2.1 This alignment option features a tunnel on a strip of reclamation along the northern side of the Airport Island, together with viaducts connecting the western portal of the tunnel to HKSAR boundary across the western waters of the Airport as well as connecting the eastern portal of the tunnel to HKBCF. The tunnel will be about 7km long, whereas the viaducts will have a length of 8km totally.

3.5.2.2 This option is considered not feasible mainly because of the following:

(a) The tunnel will pose an undesirable constraint to the future developments of the HKIA; the area at the north of the Airport Island is planned for Airport expansion. Constructing a tunnel underneath the expansion will result in substantial risk in the event of fire or explosion inside the tunnel, thus affecting the operation and safety of the airport.

(b) The tunnel of this alignment option along the northern side of Airport Island will be close to the existing contaminated mud pits and hence there is potential of release of contaminated mud during dredging operation for the reclamation and the tunnel construction.

(c) When compared to the Alignment Option (A) through Airport Channel, this option [Option (B)] will cause about 3km detour, hence increasing social cost (e.g. time and fuel consumption) and exhausted gas emission (additional of about 90 tonnes of NOx emission per annum).

(d) It is much more costly than the Airport-Channel alignment described above (estimated net increase in construction cost of the order of HK$13 billion).

(e) Lighting and ventilation facilities will need to be operated 24-hours daily inside the proposed 7km long tunnel. A substantial increase in energy consumption annually is envisaged.

3.5.3 Alignment Option (C) – See Figure 3.18

3.5.3.1 This alignment option is mostly similar to Alignment Option (A), except that it involves a tunnel through the Lantau hillside in lieu of a viaduct near San Shek Wan headland.

3.5.3.2 This option is considered not feasible mainly because of the following:

(a) The eastern tunnel portal will encroach upon the Country Park.

(b) The western tunnel portal will destroy the natural shoreline and hillside of the Lantau Island.

(c) The tunnel will also need ventilation shafts in-between the eastern and western portals. These ventilation shafts will inevitably encroach upon the Country Park too.

(d) The eastern portal and the approach viaduct will affect the Tung O trail which has significant heritage value.

3.5.4 Taking account of the foregoing points, Alignment Option (A) is recongised as the only feasible alignment option for HKLR.

3.5.5 At a finer level of details, the following further points should be noted for this recommended alignment for HKLR:

(i) The portion of HKLR between HKSAR boundary and the Airport Channel will involve a southward bend. This is to enable HKLR to overpass the navigation channel in the western waters with adequate headroom for vessels, and at the same time satisfying the Airport Height Restrictions (AHR). [By introducing this southward bend, HKLR will overpass the navigation channel under less onerous AHR condition, and also with enough climbing length for HKLR between HKSAR boundary and the high point for overpassing navigation channel.]

(ii) For aviation safety, HKLR must be kept away from the touchdown zone at the western end of the southern runway. Similarly, it needs to keep away from the Government Flying Service (GFS) compound to avoid affecting the helicopter operations thereat. Hence, a local portion of HKLR is aligned on the southern side of the Airport Channel as shown on **Figure 3.16**. Once HKLR reaches a chainage cleared of the GFS compound, it will cross the Airport Channel to run along the northern side of the channel (i.e. along the edge of the Airport Island).

(iii) Accordingly, the aforesaid local portion of HKLR will overpass the headland at the western tip of the Airport Channel (i.e. the headland between San Shek Wan and Sha Lo Wan). At this overpassing point, there will be no physical contact between HKLR and the headland. The HKLR viaduct structure will straddle over the headland, spanning between columns kept away from the headland.

(iv) The foregoing arrangement is shown on **Figure 3.16**. **Figure 3.19** also shows that HKLR's pilecaps outside the Airport Channel will be emerged type (i.e. located within tidal levels), whilst pilecaps inside the Airport Channel will be embedded type (i.e. located below the channel-bed). Of exception are the pilecaps at the navigation span within the Airport Channel near Sha Lo Wan pier. These pilecaps need to be of emerged type so as to cater for vessels impact forces.

3.5.6 For a viaduct structure (i.e. elevated trestle bridge form) as HKLR, the optimal span-length (i.e. spacings between columns) is often in the range of 50m to 60m from structural points of view. This is also the reason for assuming such a column spacing in **Section 9** (Water Quality) and in **Section 10** (Ecology). Nevertheless, a larger span-length (i.e. wider column spacings) up to approximately 75m is structurally feasible, so as to enhance performance as regards ecology and water quality. For this reason, it is recommended that 75m should be adopted as the typical span-length for the portion of HKLR in the waters west of the Airport Island (where larger column spacings will be particularly beneficial not only to ecology and water quality, but also from the point of view of PRD water flow). Hence, as described in **Figure 3.20**, the typical

spans for the portion of HKLR in the western waters will indeed be 75m, even though for conservatism, the assessment on ecology and water quality will show that it will be acceptable even if the spans are 50m. At a finer level, the following further points should be noted:

(i) Structurally, the local spans adjacent to a movement joint (MJ) will need to be shorter than typical. Hence, though the typical spans are 75m, the spans adjacent to each MJ will only be 60m;

(ii) At individual special locations, the spans will need to deviate from typical due to special reasons. For instance, where HKLR overpasses a navigation channel, its span will need to be even larger than 75m in order to meet marine traffic requirement (exact length of each such navigation span is assessed under the Marine Traffic Impact Assessment, depending on traffic-volume and sizes of vessels involved). And for instance, a local large span is required over the San Shek Wan/Sha Lo Wan headland to avoid toughing the headland physically.

[Note: For spans significantly longer than 75m, the deck will need to be haunched i.e. with deepening of the deck at/near the columns. Such a deck structure is relatively less construction-friendly (and is of course more costly and more time-consuming to build) than a deck structure of constant depth (as in the case of spans approx. 75m or less). In any case, the need for large spans at individual locations is driven by special reasons, such as navigation need or the aim to overpass a special feature (e.g. San Shek Wan/Sha Lo Wan headland), hence large spans are adopted notwithstanding that they are structurally more costly and more time-consuming, for individual local portions.]

3.5.7 As explained above, Option (A) [under which HKLR is aligned along the Airport Channel, then through Scenic Hill, and then along the east coast of Airport Island] is the only feasible alignment option. For ease of reference, a comparison of the key environmental benefits/disbenefits of the various alignment options is tabulated below.

HKLR Alignment Option	Environmental Benefits	Environmental Dis-benefits
Alignment Option (A)	In comparison with (B): • Much less reclamation (Reclamation areas approx. 23 ha & 70 ha for (A) & (B) respectively), hence better from water quality and marine ecology points of view. • Option (A)'s traffic route is approx. 3 km shorter than Option (B)'s, hence less traffic emission. • Much less tunnel [Option (A) involves approx. 1.1 km tunnel but Option (B) involves approx. 7 km tunnel], hence less environmental impacts due to energy consumption for ventilation & lighting. In comparison with (C): • Option (A) will not involve excavation of the natural landscape/hillside of North Lantau, or impingement upon the Country Park and Tung O Ancient Trail; • Less tunnel [Option (A) involves approx. 1.1 km tunnel but Option (C) involves approx. 4.6 km tunnel], hence less environmental impacts due to energy consumption for	In comparison with (B) & (C): • Relatively closer to Sha Lo Wan village houses (environmental SRs). In comparison with (B): • Will affect part of the coastal protection area of the Airport Island, viz. that part of the CPA on its eastern side. [Nevertheless, this portion of the Airport Island shoreline is found to be of low ecological value, and the new armoured seawall of HKLR can provide a similar habitat.]

HKLR Alignment Option	Environmental Benefits	Environmental Dis-benefits
	ventilation & lighting.	
Alignment Option (B)	In comparison with (A) & (C): • Alignment running north thus farther away from environmental sensitive receivers at Tung Chung and Sha Lo Wan • Neither touching North Lantau hillside/shoreline nor natural shoreline on east side of Airport Island.	In comparison with (A) & (C): • Much larger reclamation size (in the order of 70ha) compared to other 2 options (both about 23ha); unfavourable from water quality and marine ecology viewpoints. • Alignment and reclamation work close to existing contaminated mud pits (hence potential of release of pollutants during construction). • About 3km longer than the other 2 options; more traffic emission. • Longest total length of tunnels (about 7km, significantly longer than the other 2 options); more environmental impacts due to higher energy consumption for operation (e.g. 24-hour ventilation and lighting).
Alignment Option (C)	In comparison with (A): • Option (C) will have less visual impact on Sha Lo Wan Village. In comparison with (B): • Much less reclamation (Reclamation areas approx. 70 ha & 23 ha for (B) & (C) respectively), hence better from water quality and marine ecology points of view. • Option (C)'s traffic route is approx. 3 km shorter than Option (B)'s, hence less traffic emission. • Relatively less tunnel [Options (B) & (C) involve approx. 7 km & 4.6 km tunnel respectively], hence relatively less environmental impacts than Option (B) due to energy consumption for ventilation & lighting.	In comparison with (A) & (B): • Involves excavation of the natural landscape/hillside of North Lantau, as well as impingement upon the Country Park and Tung O Ancient Trail. In comparison with (A): • Longer tunnel [Options (A) & (C) involves approx. 1.1 km & 4.6 km tunnel respectively], hence Option (C) will involve more environmental impacts due to energy consumption for ventilation & lighting. In comparison with (B): • Will affect part of the coastal protection area of the Airport Island, viz. that part of the CPA on its eastern side. [Nevertheless, this portion of the Airport Island shoreline is found to be of low ecological value, and the new armoured seawall of HKLR can provide a similar habitat.]

[Note: Options (A) & (C) are closer to the main residential developments (environmental SRs) in Tung Chung than Option (B). However, by revising that portion of HKLR nearer Tung Chung from the original viaduct scheme to a tunnel cum at-grade road scheme, the concern in this regard should be eased.]

3.6 Option NECLK-cum-Alignment Option (A) – Merits

3.6.1 Apart from being the only feasible option, Option NECLK-cum-Alignment Option (A) will bring forth significant benefits in various aspects.

3.6.2 In terms of transport and economic functions:

(a) At a regional level, locating the HKBCF at the north-east waters off the Airport Island will facilitate integration with the TMCLKL and TMWB, forming a more convenient and comprehensive strategic road network that links up Hong Kong, Shenzhen, Zhuhai and Macao. Also, with a variety of transport modes availability in proximity, HKBCF will become a multi-modal transportation-hub (including the Airport, the SkyPier, the Airport Express Line and Tung Chung Line) in the area.

(b) Locally, with the HKBCF located at the north-east waters off the Airport Island and connected to the TMCLKL, a passage linking the HKIA, NWNT and Lantau area is formed. The connectivity of Tung Chung and the Lantau area to the urban area of HK is enhanced, and transport network between the above areas are improved. With close proximity and ties to the Tung Chung Town, there is potential for further economic development of the local area. For example, a localized economic zone comprising the HKBCF, HKIA and Tung Chung can be formed, bringing economic benefits as well as creating business and job opportunities to the local area.

(c) With the proximity of the HKBCF site to the Airport, and after reprovisioning of some affected Airport facilities, air/land transit of passengers can be facilitated by extending the existing Automated People Mover to connect the Airport Terminal with the HKBCF. With such transit-transport arrangement, HZMB-air transit passengers can get to Airport without requiring full immigration & customs clearance at HKBCF. Therefore, the travel time for airport-bound passengers of HZMB is much shortened.

(d) With AsiaWorld-Expo, hotels, shopping mall and outlets etc. in the proximity, there is a greater potential for economic activities and employment opportunities in the local area.

3.6.3 In terms of environmental aspects:

(a) As the proposed reclamation can be combined with that for the proposed TMCLKL southern landfall, about 1km long of seawall can be saved and hence the dredging and filling volumes can be significantly reduced.

(b) Reclamation will be required on the eastern side of the Airport Island only (unlike the other HKBCF options, which will involve reclamation not only on western side of the Airport Island or at the respective HKBCF location, but also on the eastern side of the Airport Island in order to provide the TMCLKL landfall).

3.6.4 As regards concerns by some of the Tung Chung residents on the visual impact of the recommended scheme, it should be noted that all the buildings on the HKBCF are limited in terms of height. Also, the largest building in the HKBCF is the Passengers Clearance Building, which will be similar in height as (and concordant in appearance with) the existing Airport Terminal buildings. Furthermore, the distance from the HKBCF to the closest private residential development at Tung Chung waterfront is as much as 2km.

3.6.5 There are also some concerns in the local community on visual impact arising from that part of the marine viaduct of the HKLR closer to Tung Chung waterfront.

These concerns are addressed by adopting a hybrid tunnel-cum-at-grade scheme as mentioned in **Section 3.1.6**.

3.6.6 The visual impact of the recommended scheme, together with other environmental aspects including air quality and noise impacts, will be assessed in detail in this EIA Report.

3.7 Finer-level Alternatives on HKLR and HKBCF

3.7.1 Further to the preceding sections, there is room to give further consideration on the following finer aspects of the scheme for HKLR and HKBCF:

- Whether another alternative could be considered for the section of HKLR from Scenic Hill to HKBCF that can obviate the need for reclamation along Airport Island east coast, and on the other hand still be able to ease public concerns as that noted in **Section 3.1.6** above;
- Whether the connection between HKBCF and the Airport Island could adopt a bridge structure so as to reduce the reclamation area.

3.7.2 Finer-level alternatives in relation to the above have thus been considered, and are discussed in the paragraphs below.

Finer-level alternative on the section of HKLR from Scenic Hill to HKBCF

3.7.3 Instead of the Tunnel cum At-grade Road scheme as noted in **Section 3.5.1.1** above, consideration has been given to adopt a shorter tunnel (through Scenic Hill only) and use a viaduct i.e. elevated bridgeform for crossing Airport Road and Airport Railway, followed by a low-level bridge along Airport Island east coast. The advantage of this alternative is that it could obviate the reclamation along Airport Island east coast (required under the Tunnel cum At-grade Road scheme noted in **Section 3.5.1.1** above).

3.7.4 For ease of reference, the foregoing alternative i.e. Viaduct cum Low-level Bridge is shown together with the Tunnel cum At-grade Road scheme as well as the previously considered all-Viaduct scheme (objected by Tung Chung waterfront residents and hence not adopted) on **Figure 3.21**.

3.7.5 After due consideration, the alternative scheme of Viaduct cum Low-level Bridge is not selected in view of the following:

(i) At various public engagement meetings held at Tung Chung, residents of the waterfront premises expressed strong objection against seeing any significant structure for the portion of HKLR closest to Tung Chung waterfront. Though the Viaduct cum Low-level Bridge alternative is more distant from Tung Chung than the original all-Viaduct scheme, it is conceivable that the alternative scheme will still be objected by the residents as it still involves a significant scale of elevated structures in the portion of HKLR in issue. By comparison, the Tunnel cum At-grade Road scheme is superior in the sense that it can eliminate elevated structures altogether in this special portion of HKLR.

(Adhering to a tunnel form, HKLR will underpass Airport Road and Airport Railway, and then rise-up for daylighting. The portion of HKLR tunnel immediately east of the Airport Island will therefore be at a level within the waters presently thereat. It is therefore necessary to provide a piece of reclamation around this portion of tunnel structure for construction and for protection against vessels.)

(This reclamation needs to continue further north around the Dragonair Headquarters, not only because the open road emerging from the portal (i.e. the daylight point) is shallow in level but also because of the need to accommodate another tunnel serving as a roadlink for the

HKBCF/TMCLKL traffic to the Airport (see attached **Figure 3.21**). For the same reason as (i) above, a tunnel form is adopted to enable this roadlink to cross the Airport Railway and Airport Road.)

(ii) Further north i.e. the point where HKLR crosses the Aeronautical Lights, the AHR where is more stringent. Therefore, if adopting bridge form for that portion of alignment, it must be in the form of low-level bridge. The total width of the bridge deck would be about 60m, including the dual-3 lanes for the HKLR and dual-2 lanes for the roadlink between HKBCF/TMCLKL and Airport. Allowing for streetlight above the bridge and the future maintenance headroom below the bridge soffit (at least 2m above surged high-tide in accordance with good design practice), the structural depth of the bridge deck will be limited which will render a shorter span length for the bridge as compared to a typical bridge span of 50-60m and in turn increase the number of supporting columns. The numerous columns will obstruct the water flow and result in stagnant waters around that area. Besides, refuse in waters will be trapped around the columns but cannot be removed easily as vessels cannot get through the low-level bridges.

(iii) In any case, the deck of the bridge cannot be too shallow, as the area is well known to be underlain by marble cavities (as verified by site investigation). Large spans are inevitable in order to avoid the cavities, which in turn require much larger structural depth.

(iv) If adopting a low-level bridge close to the Airport Island, the existing shoreline will be hidden by the bridge. The species on the existing shoreline, though found to be low ecology-value according to the ecological surveys result, will be affected by the resulted stagnant waters around the columns area. However, if adopting at-grade road on reclamation, the seawall of the reclamation will be formed by using armour rocks in the form of natural rock materials and hence providing a suitable habitat for the species to re-establish.

(v) Besides the foregoing specific points, a general point is that, if a low bridge is built adjacent to the existing shoreline, it will cause accessibility problem for maintenance of the existing shoreline surface. A reclamation form will not have such a problem. Also, the low-level bridge will be hostile for future bridge maintenance.

(vi) In addition, visual impact of bridge option with numerous columns will be higher as compared with at-grade road option on reclamation in general.

(vii) Noting that the existing shoreline along the southeastern coast of Airport Island contains low landscape value (refer to **Section 14**) in terms of landscape resources and character, the reclamation scheme can afford an advantage for tree planting along the roadside more favourably which can enhance the shoreline visually.

3.7.6 In view of the various points considered, it is proposed that the portion of HKLR from Scenic Hill to HKBCF should adhere to the Tunnel cum At-Grade Road scheme as noted in **Section 3.5.1.1** and shown on **Figure 3.16**.

3.7.7 As regards the reclamation along Airport Island east coast, which is an inherent part of the Tunnel cum At-Grade Road scheme, an armoured-type seawall will be adopted (as opposed to block-type seawall) so as to reduce artificiality in appearance. Moreover, planting will be provided along the reclamation edge. These elements will be further described in **Sections 4 and 14** below respectively.

Finer-level Alternative for Connection between HKBCF and Airport Island

3.7.8 Consideration has been given on whether this connection should take the form of a Low-level Bridge structure or a Reclamation-bund.

3.7.9 The advantage of a Low-level Bridge is that it can reduce the reclamation extent for HKBCF from approximately 130 ha to approximately 120 ha.

3.7.10 The advantages of adopting a Reclamation-bund are:

(a) It should be noted that the reclamation-bund will accommodate the dual-3 lanes HKLR, the roadlinks between HKBCF and Airport Island including two 2-lanes linkroads connecting to/from Airport and two single-lane sliproads connecting to/from SkyCity Interchange, and a 2-lanes bonded road for transit passengers to/from Airport. If adopting low-level bridge form (due to AHR constraint) for all the roads aforementioned (total deck width about 90m), there will be numerous supporting columns within that water area. Therefore, refuse in waters will be trapped around the columns but cannot be removed easily as vessels cannot get through the low-level bridges. On the other hand, due to the AHR constraint, the structural depth of the bridge deck need to be minimised as far as possible which in turn require to reduce the bridge span length and hence increase the number of columns. This will let the foregoing problem become more worse.

(b) Reclamation has an advantage is that it is more favourable for tree planting along the roadside for visual enhancement. Besides, the visual impact of bridge option with numerous columns will be higher than that of at-grade road option on reclamation in general.

(c) The seawall of the reclamation-bund will be formed by using armour rocks in the form of natural rock materials and hence providing a suitable habitat for ecological species to establish.

(d) Addition of utilities between HKBCF and the Airport Island will also be facilitated. (Note: At the preliminary design and detailed design stages of the HKBCF project, the routing of known utilities will be planned, including power-supply, telecom services etc. However, in the very long term, the need for adding such utilities/services may arise. In that case, addition of utilities/services is much more facilitated along a Reclamation-bund than along a Bridge structure, because in the latter case there may be a need to modify the structure to accommodate the new utilities/services.)

3.7.11 Taking consideration of the above, it is proposed that a Reclamation-bund should be adopted for the connection between HKBCF and Airport Island, in view of the vital significance of the advantages noted in **Section 3.7.10** above. Moreover, the additional reclamation area due to the bund is relatively small compared with the overall reclamation area.

3.7.12 Culverts will be provided across this Reclamation-bund to maintain tidal-flow across it. This is shown further in **Section 9** below.

Finer-level options for HKBCF layout to minimize reclamation size

3.7.13 The HKBCF needs to provide the necessary facilities for the clearance of vehicles and passengers using HZMB, together with other supporting facilities. The major facilities include the following:

- Passenger clearance building and associated transportation facilities;
- Vehicle clearance kiosks, queuing areas and associated secondary examination facilities;

- Supporting facilities such as various government offices and infrastructure utility buildings.

3.7.14 In developing the HKBCF layout, various factors have to be considered. The major ones are listed as below:

- The design volumes of vehicles and passengers using HKBCF;
- The processing arrangement/time;
- The flow of vehicles and passengers;
- The operational requirements for supporting facilities.

3.7.15 In addition to accounting for the above, consideration has been made to minimize the reclamation size while not jeopardizing the operation of HKBCF. In this regard, 3 finer-level options related to the HKBCF layout have been considered:

(a) Co-locating clearance plazas of cars and goods vehicles;

(b) Adopting 2-level design for clearance plaza;

(c) Adopting 2-row arrangement for clearance kiosks.

3.7.16 Further discussions on (a) to (c) are given below. Among these 3 finer-level options, (a) and (c) are considered to be feasible and have been adopted in the current HKBCF layout design; while (b) is found to be impracticable due to various reasons explained below. Having considered all factors as aforementioned, the HKBCF layout as shown in **Figure 4.9** is adopted, encompassing an area of approximately 130ha.

Finer-level Option (a): Co-locating clearance plazas of cars and goods vehicles

3.7.17 In the initial proposal on HKBCF layout put forward under the Feasibility Study for the (entire) HZMB [commissioned by the governments of Guangdong Province, HKSAR, Macao SAR], cars and goods vehicles (GVs) are processed separately. As a finer-level option, an alternative to the above is to co-locate the clearance facilities of cars and goods vehicles, instead of locating them separately.

3.7.18 Co-location of the cars and GVs facilities will save space, as the peak number of kiosks required for cars and that for GVs do not occur under the same scenario. Putting them together will therefore reduce the total number of kiosks required.

3.7.19 With the number of kiosks reduced, the vehicle-manoeuvring areas upstream/downstream the kiosks are reduced too. This serves to reduce the area required for accommodating the Cars/GVs clearance plaza, which in turn reduces the size of the reclamation.

3.7.20 This idea of co-locating the cars and GVs facilities was accepted by the relevant Government Departments, notably Immigration Dept, Customs & Excise, and Police. Hence, it is adopted and taken into account in the finalization of the layout for HKBCF.

Finer-level Option (b) : Adopting 2-level design for clearance plaza

3.7.21 Another alternative layout option considered is to adopt a 2-level design by the stacking of the Cars/GVs clearance plazas. It may be in the way of stacking the outbound Cars/GVs clearance plaza on upper level, over the inbound one on ground level. It may also be in an alternative way of stacking part of the clearance facilities for Cars over that for GVs, or vice versa. The area involved will be in the order of tens of hectares, depending on the arrangement.

3.7.22 Though this alternative layout of adopting a 2-level design can contribute to land-saving, substantial problems are envisaged (not to mention the substantial increase in capital and operational costs involved):

(a) Hazard – Owing to a covered area of tens of ha involved, there would be substantial hazard risks for the ground floor (i.e. the covered area) in the event of accidental leakage of chemical, smoke, fire, or other hazardous incidents.

(b) Air quality/ventilation – It is envisaged that there will be major air quality/ventilation design problems. Making reference to a typical large covered public transport interchange of about 1ha, the stacked area considered here is in the order of at least tens times larger. As vehicles on the ground floor are either travelling or queuing with their engines on, the air quality of the ground floor will be conceivably poor, which will lead to substantial problem in the ventilation design.

(c) Traffic operation – Road users of the ground floor need to manoeuvre in the midst of columns supporting the upper level. This is particularly problematic to larger vehicles such as goods vehicles or container trucks.

3.7.23 In fact, the possibility of stacking the pickup / dropoff areas for coaches (大客車上落客區) has also been considered, but the same problems of (a) to (c) mentioned above also apply.

3.7.24 In view of these problems, it is considered that this layout option of adopting a 2-level design for clearance plazas is impractical and is thus not adopted.

Finer-level Layout Option (c) : Adopting 2-row arrangement for clearance kiosks

3.7.25 At the early stage of development of the HKBCF layout, the relevant operation departments notably Police expressed preference for a straight-row arrangement for the Cars/GVs clearance kiosks. This is advantageous from operation point of view, as traffic-flow through the Cars/GVs clearance plaza is smoother under such an arrangement.

3.7.26 However, the foregoing arrangement will require a larger space. As a finer-level option, an alternative to the foregoing is to stagger the kiosks on plan, i.e. splitting the kiosks into 2 rows and arranging them in stagger. As shown on **Figure 3.22**, which depicts a comparison between the straight-row option and the staggered option, it is obvious that the latter will save space, hence reducing the size of reclamation.

3.7.27 Note: It is considered that such staggering arrangement should be applied to private car kiosks only, as they are more flexible to manoeuvre in the slightly S-shaped clearance plazas. Kiosks for goods vehicles and coaches will be arranged in single row in straight arrangement to obviate the need for S-manoeuvring.

3.7.28 This finer-level option (c), i.e. the alternative of staggering the kiosks, was discussed with the relevant departments (including Immigration Dept, Customs & Excise, Police), and was eventually accepted by them as it was considered that the increase in traffic-manoeuvring due to the staggered arrangement is still acceptable and should not be regarded as a particular disadvantage.

3.7.29 Considering its benefit of land saving and no particular disadvantages envisaged, this layout option of adopting 2-row arrangement for clearance kiosks is adopted.

N

HKSAR Boundary

HZMB Main Section

WCLK

HKIA

NECLK

SWCLK

TH

Proposed Lantau Logistics Park

Tai Ho Wan

Tung Chung

Future Tung Chung East and West Developments

SSW

San Shek Wan

TCB

Lantau

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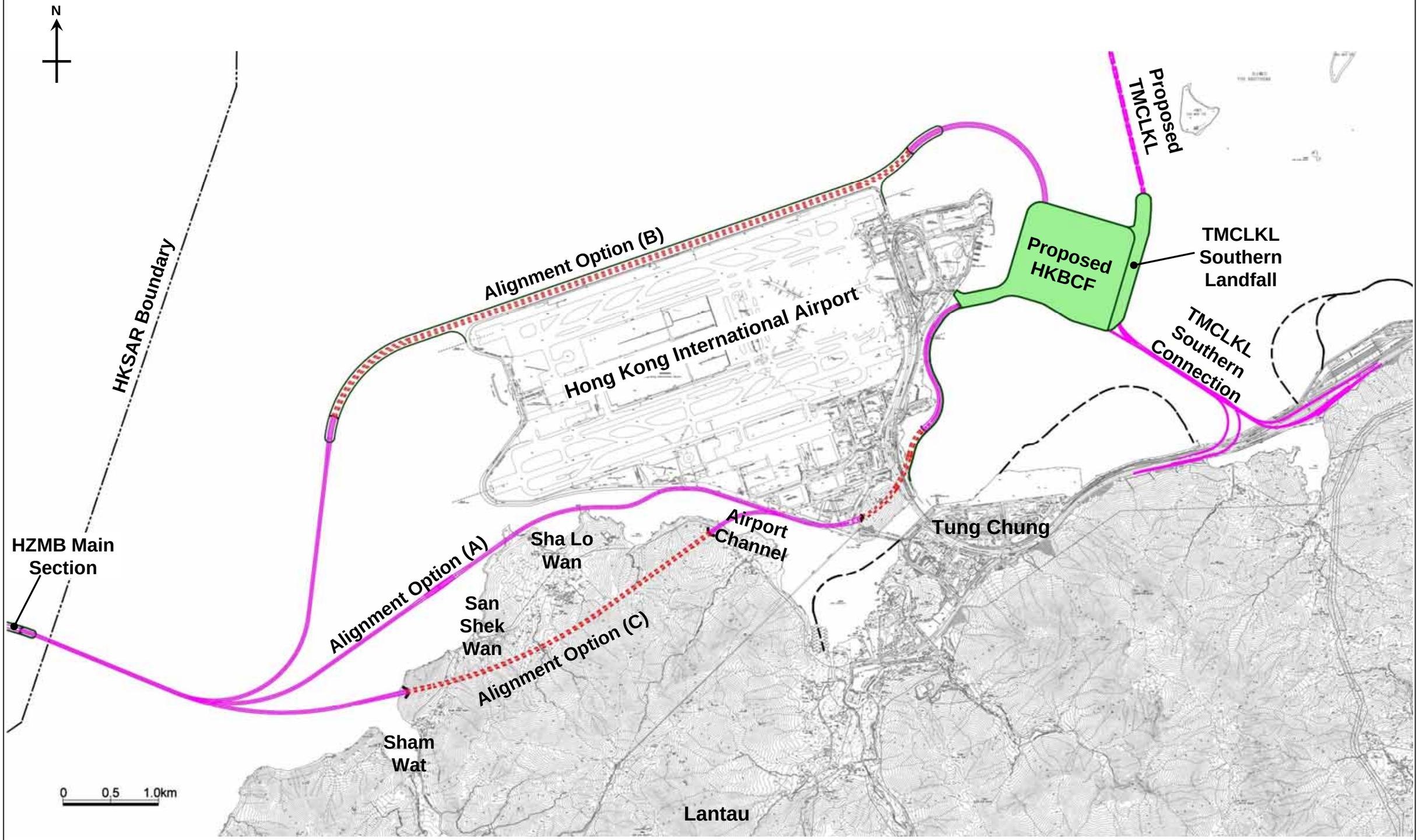

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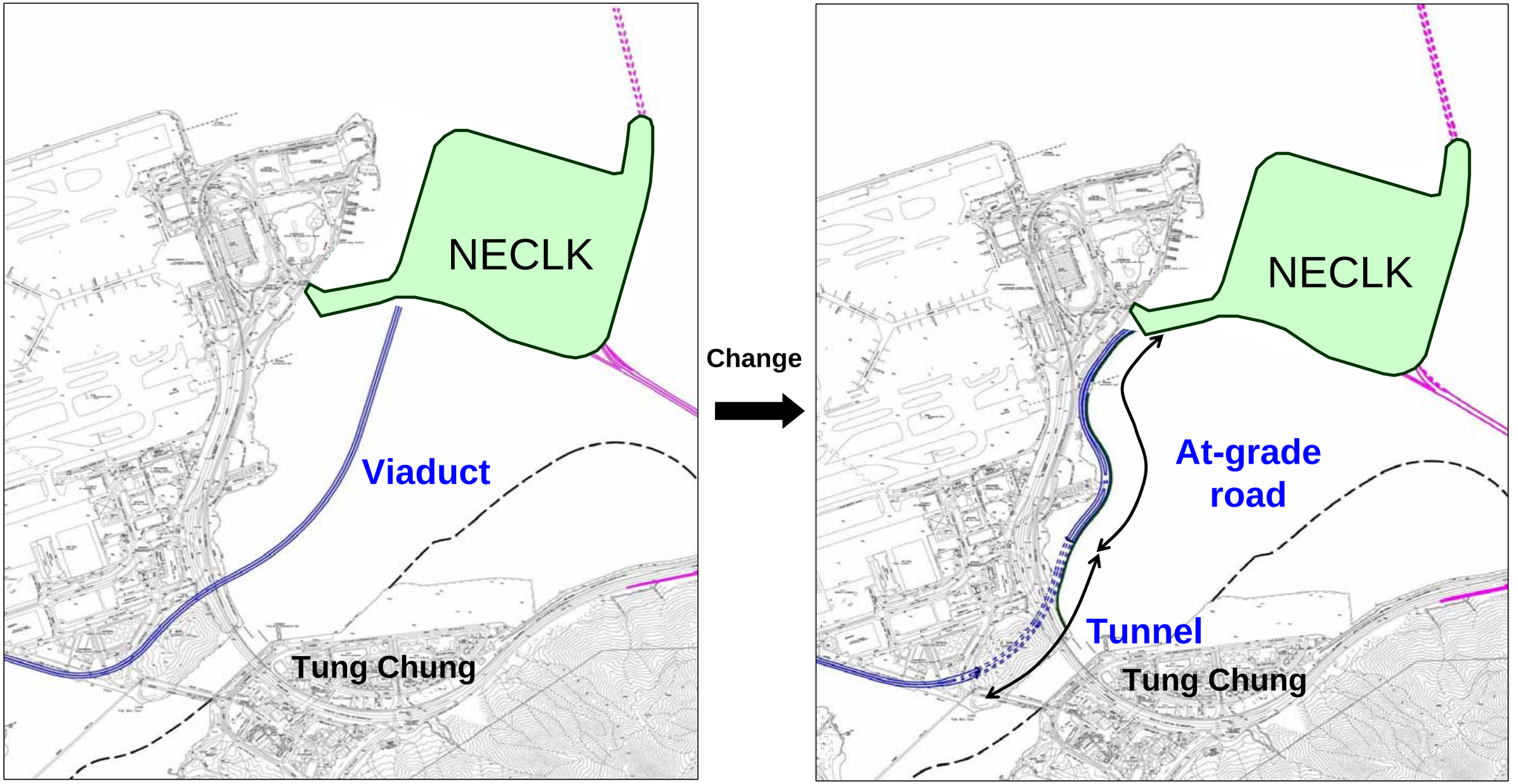
Tunnel cum At-grade Road Scheme for HKLR

- A section of viaduct of the HKLR near Tung Chung has been changed to a combination of tunnel and at-grade road.



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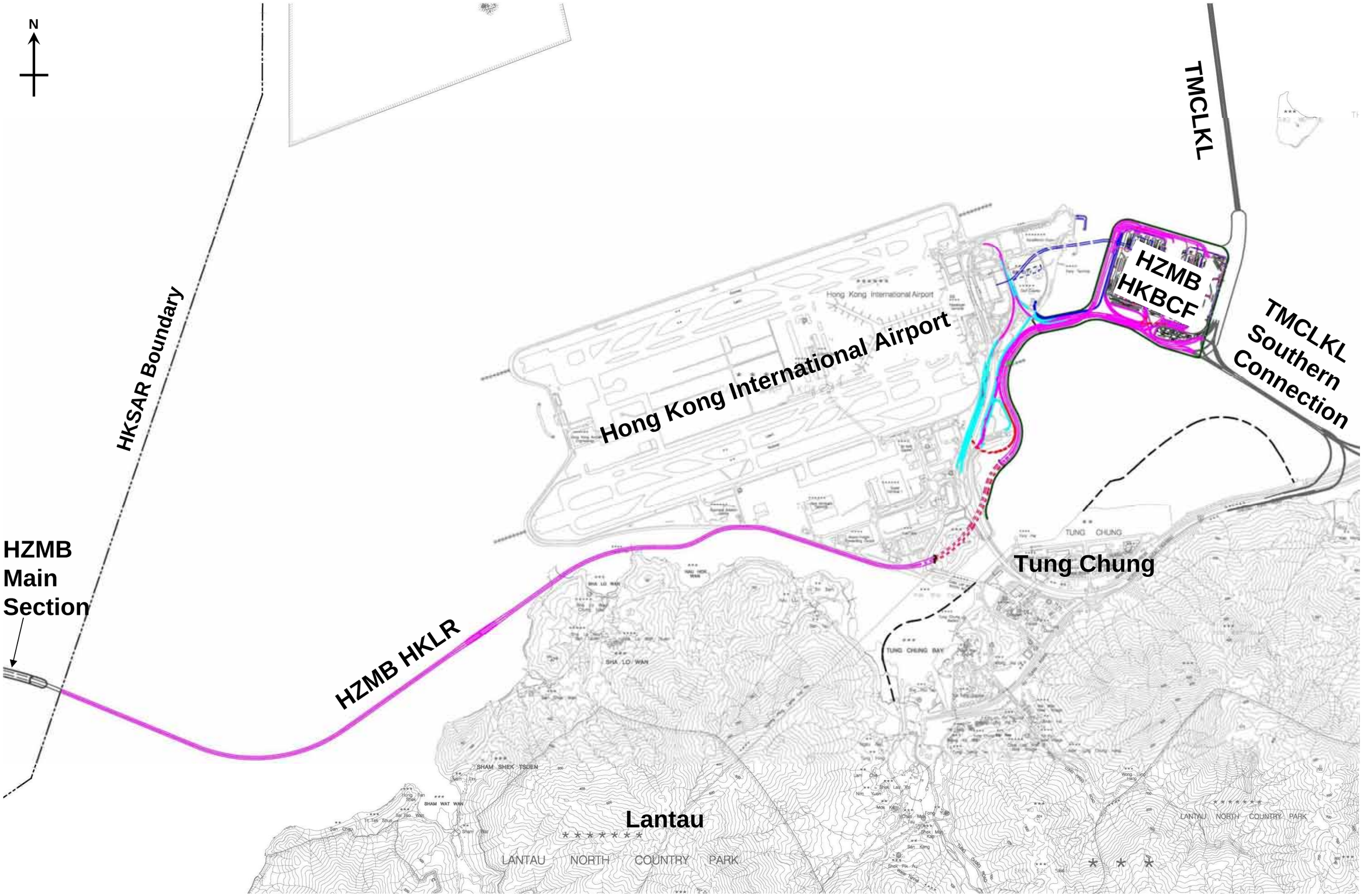

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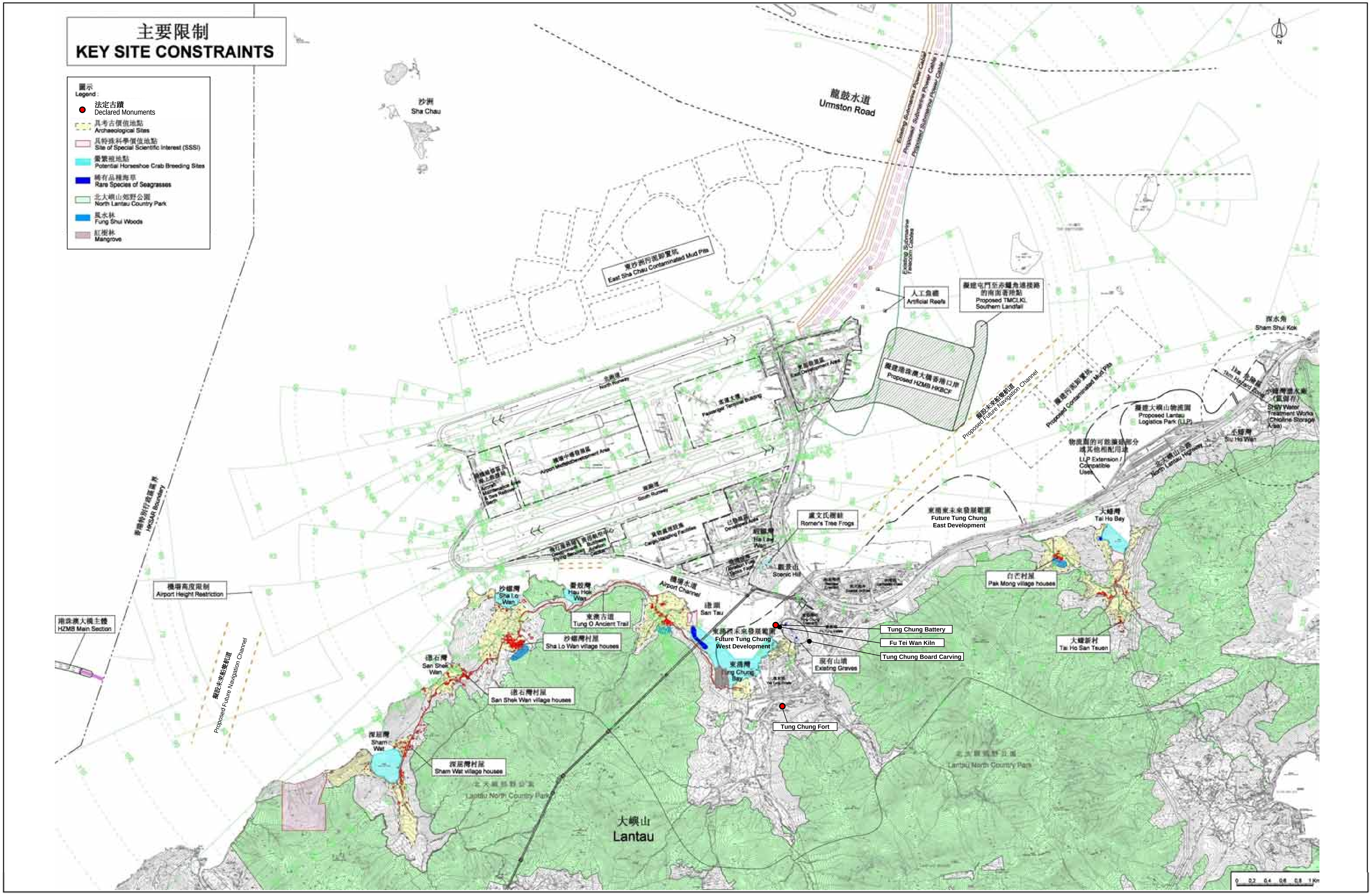

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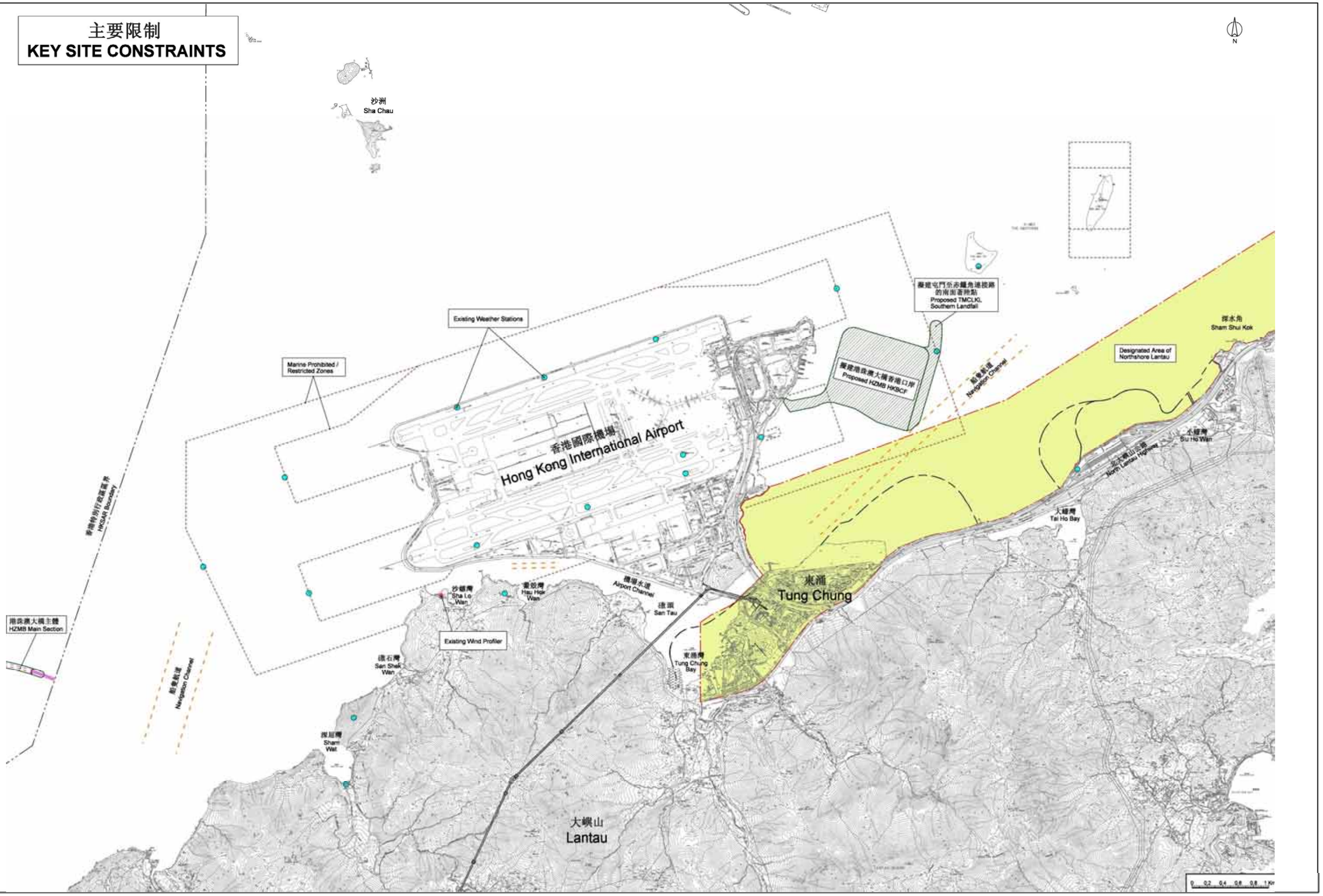
Drawing Title

Key Issues/Constraints – Overall Plan (Sheet 1 of 2)

Drawing No.

Figure 3.5

主要限制
KEY SITE CONSTRAINTS



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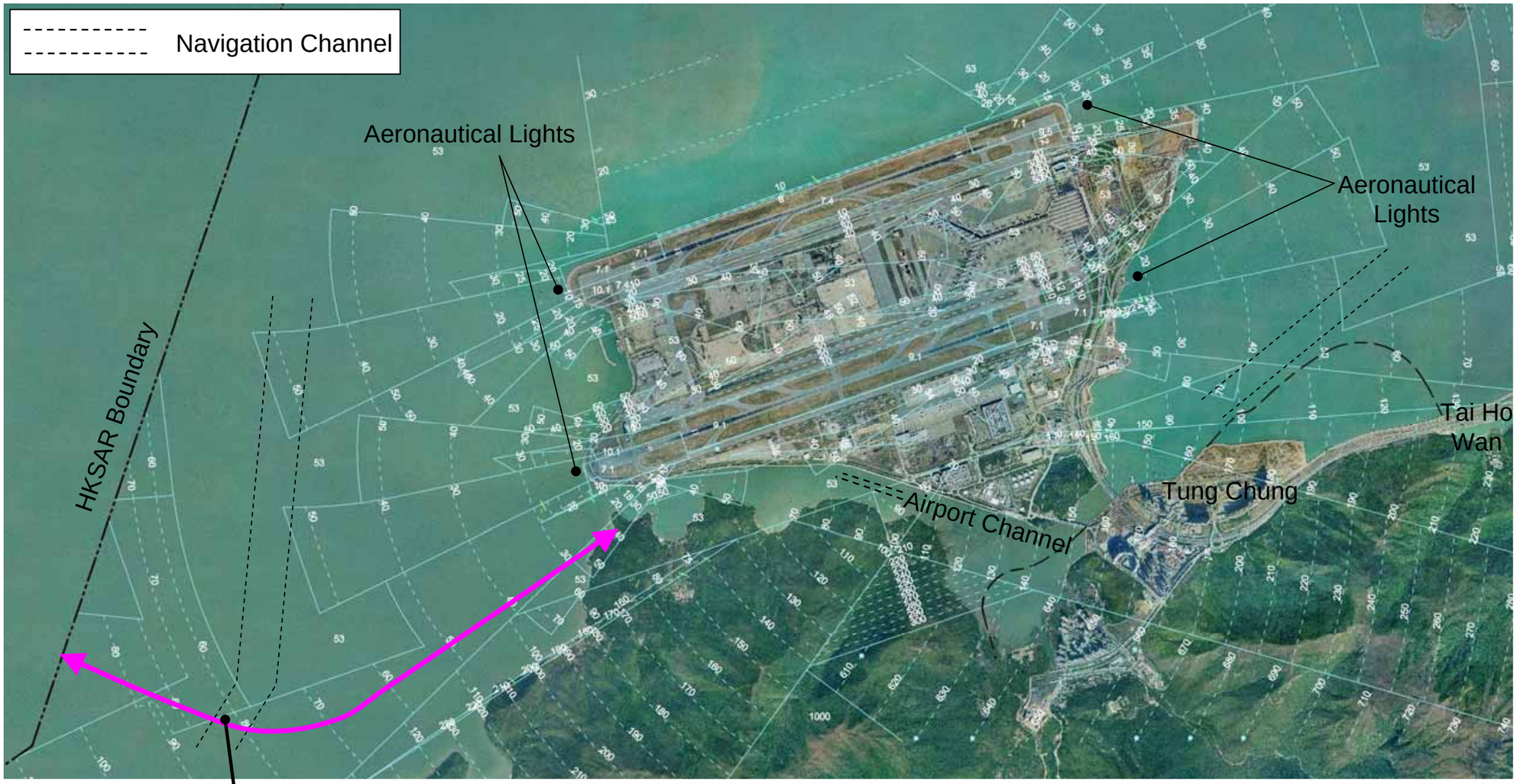

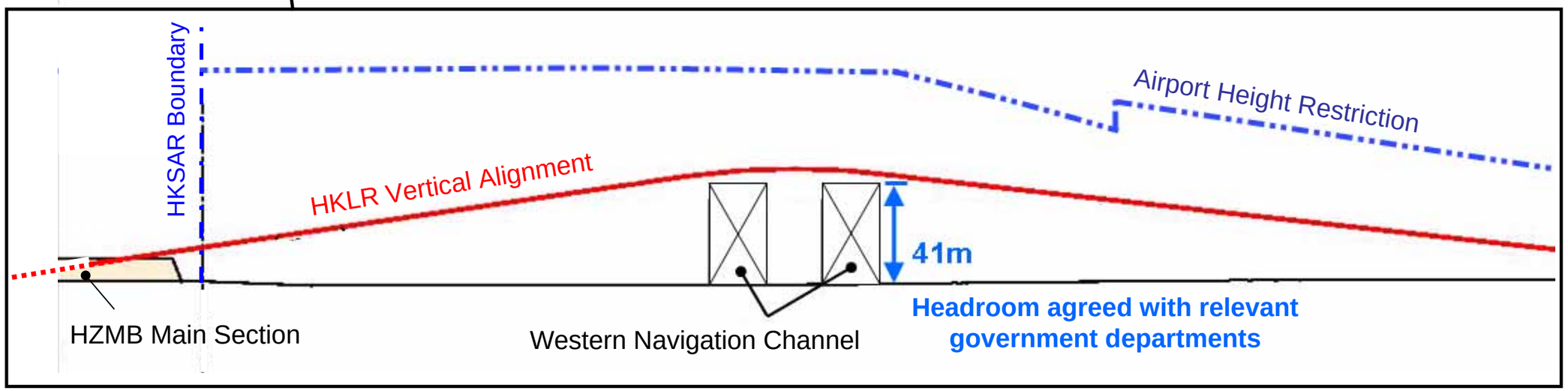

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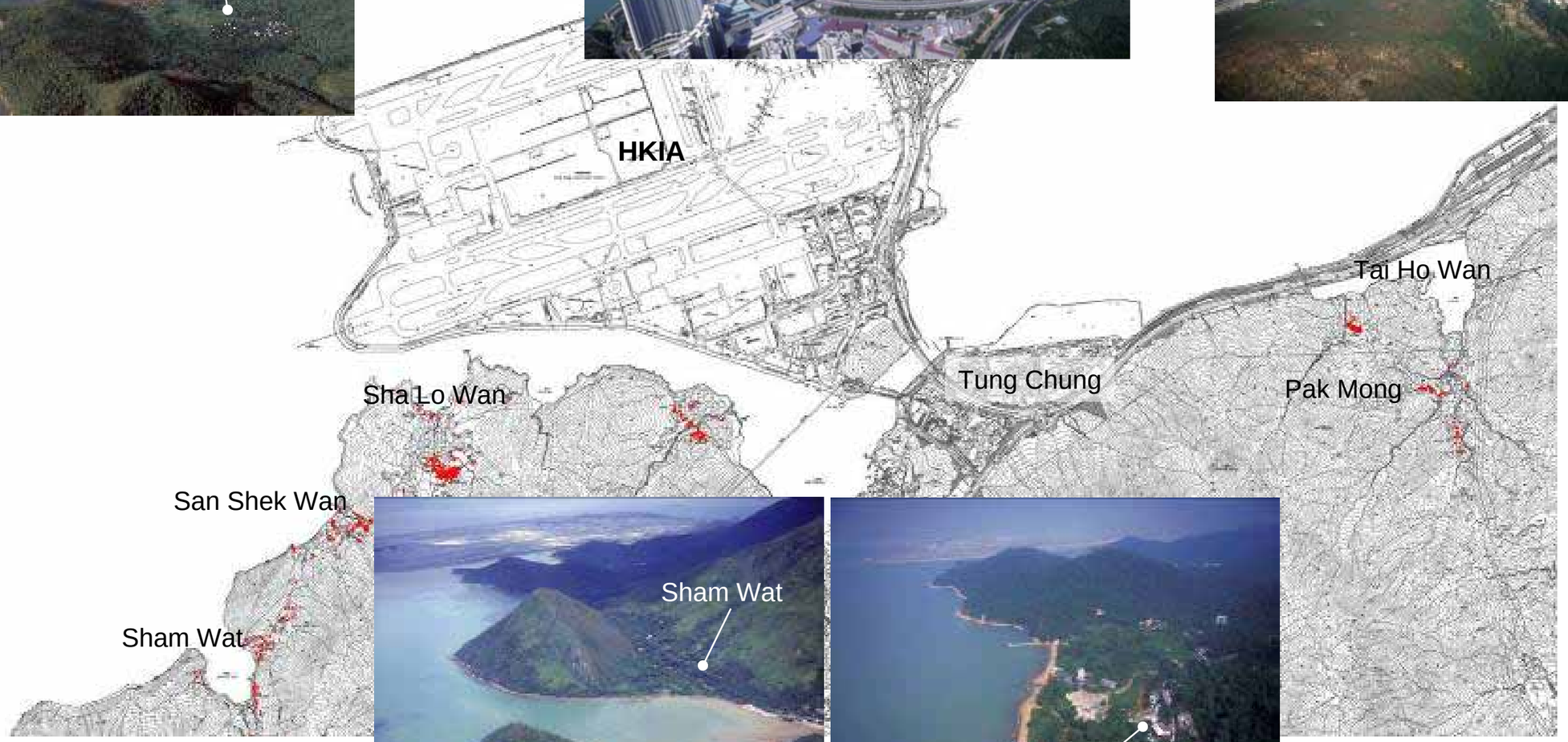

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Key Issues/Constraints – Residential Premises

Drawing No.

Figure 3.8

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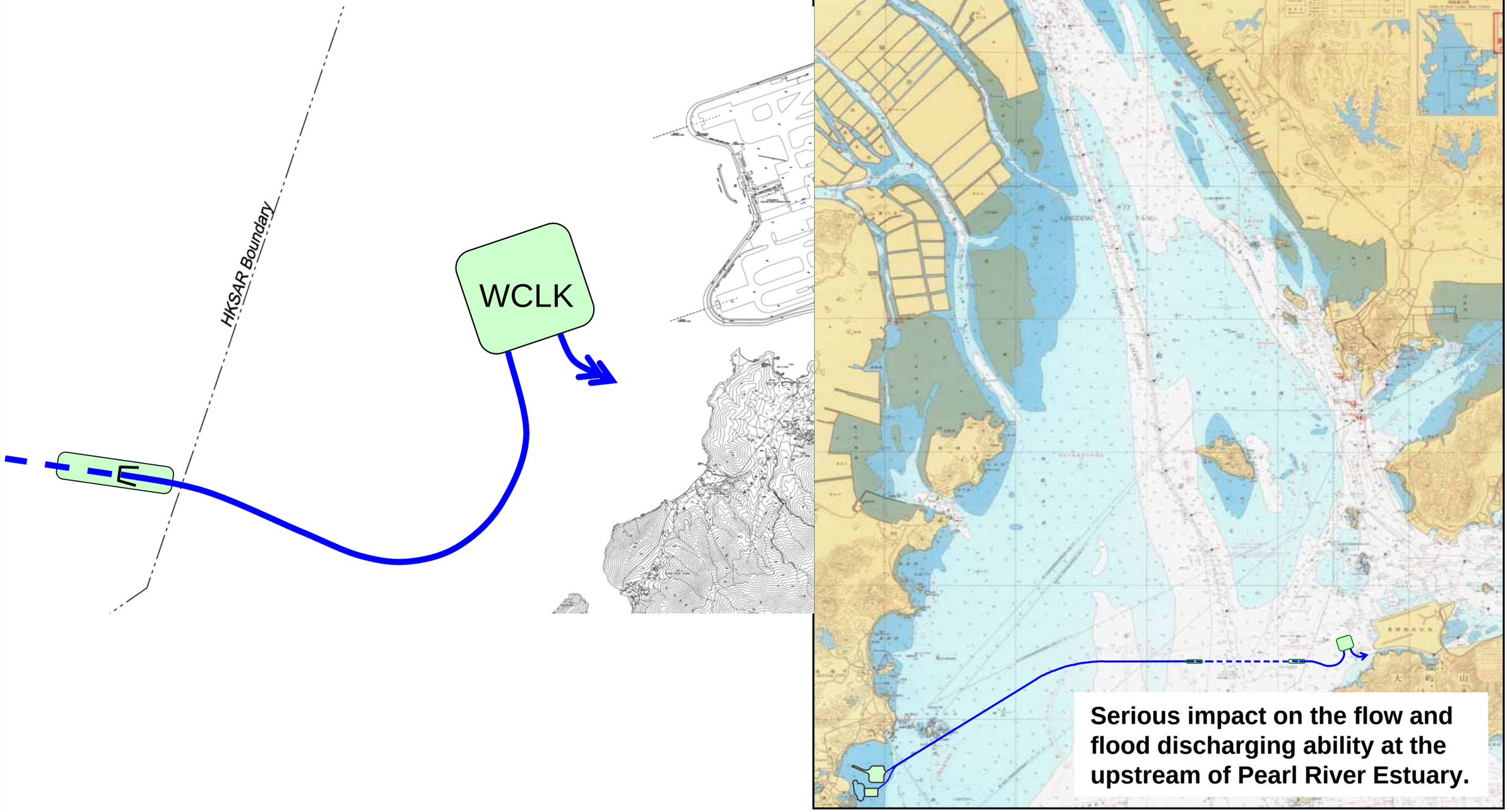

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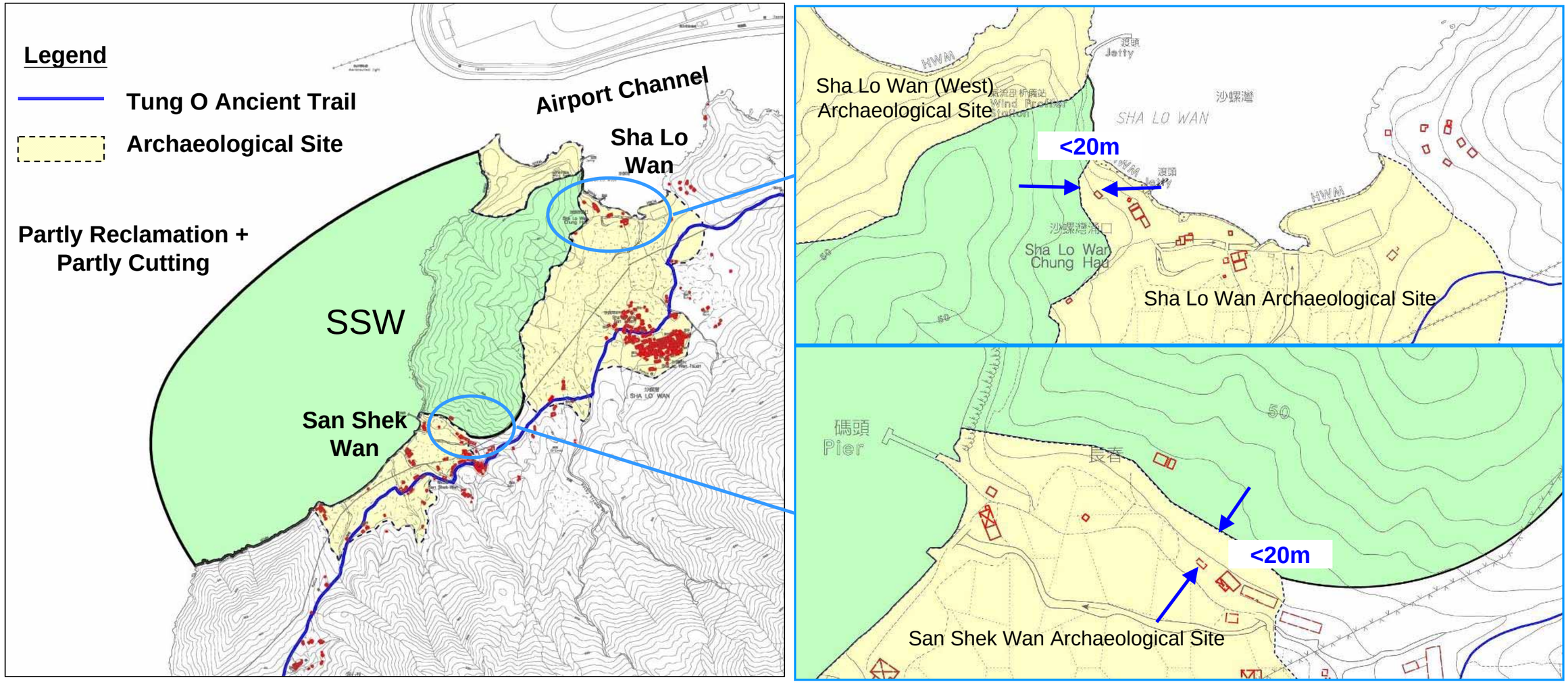

- Extremely close to village houses at San Shek Wan and Sha Lo Wan ➔ non-compliance with air-quality and noise criteria
- Substantial hillside cutting (~15 Million m^3), and damage to natural woodland (~35 hectares)➔ Serious impact on the natural setting of North Lantau
- Loss of natural shoreline (~2km)

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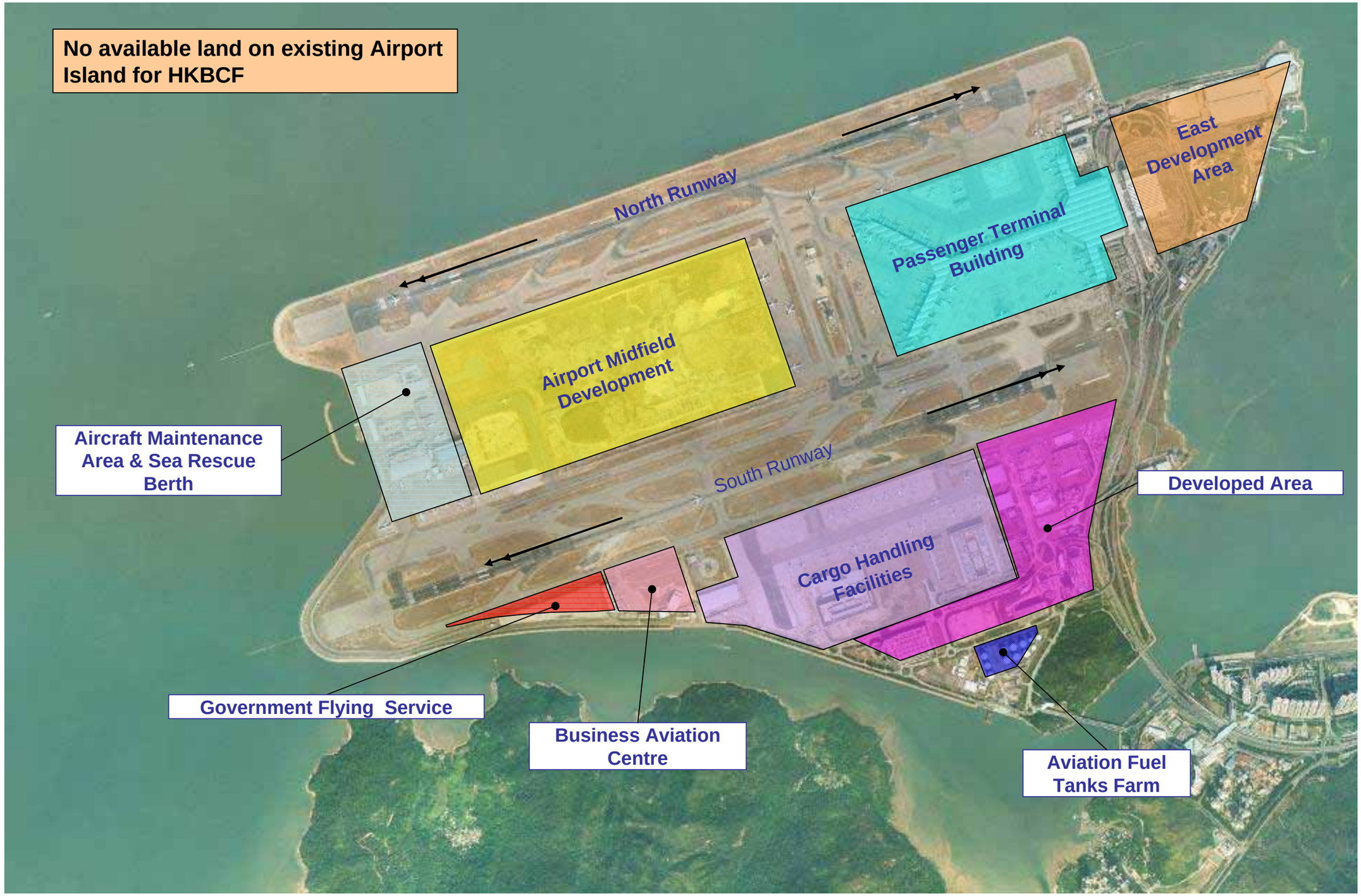

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Drawing Title

HKBCF – Option SWCLK

Drawing No.

Figure 3.12

圖示
Legend :

- 法定古蹟 Declared Monuments
- 具考古價值地點 Archaeological Sites
- 具特殊科學價值地點 Site of Special Scientific Interest (SSSI)
- 北大嶼山郊野公園 North Lantau Country Park

HKIA

Ha Law Wan Archaeological Site

- **Too close to residents**
- **Conflict with future planning**
- **Only ~50ha, not sufficient for entire HKBCF (see Inset P)**

San Tau Archaeological Site

San Tau SSSI

Cable Car

Tung Chung Battery

Tung Chung Crescent

Fu Tei Wan Kiln

Ma Wan Chung Archaeological Site

TCB

Ma Wan Chung village

~100m

Yat Tung Estate

Cable Tower

Tung O Ancient Trail

Country Park

Sha Tsui Tau Archaeological Site

Inset P

TCB Not sufficient for entire HKBCF thus require HKBCF splitting into parts

➔ **Need to identify other site(s) for remaining part(s) of HKBCF**

For example:
BCF for passengers at TCB;
BCF for GVs at Airport NE Reclamation

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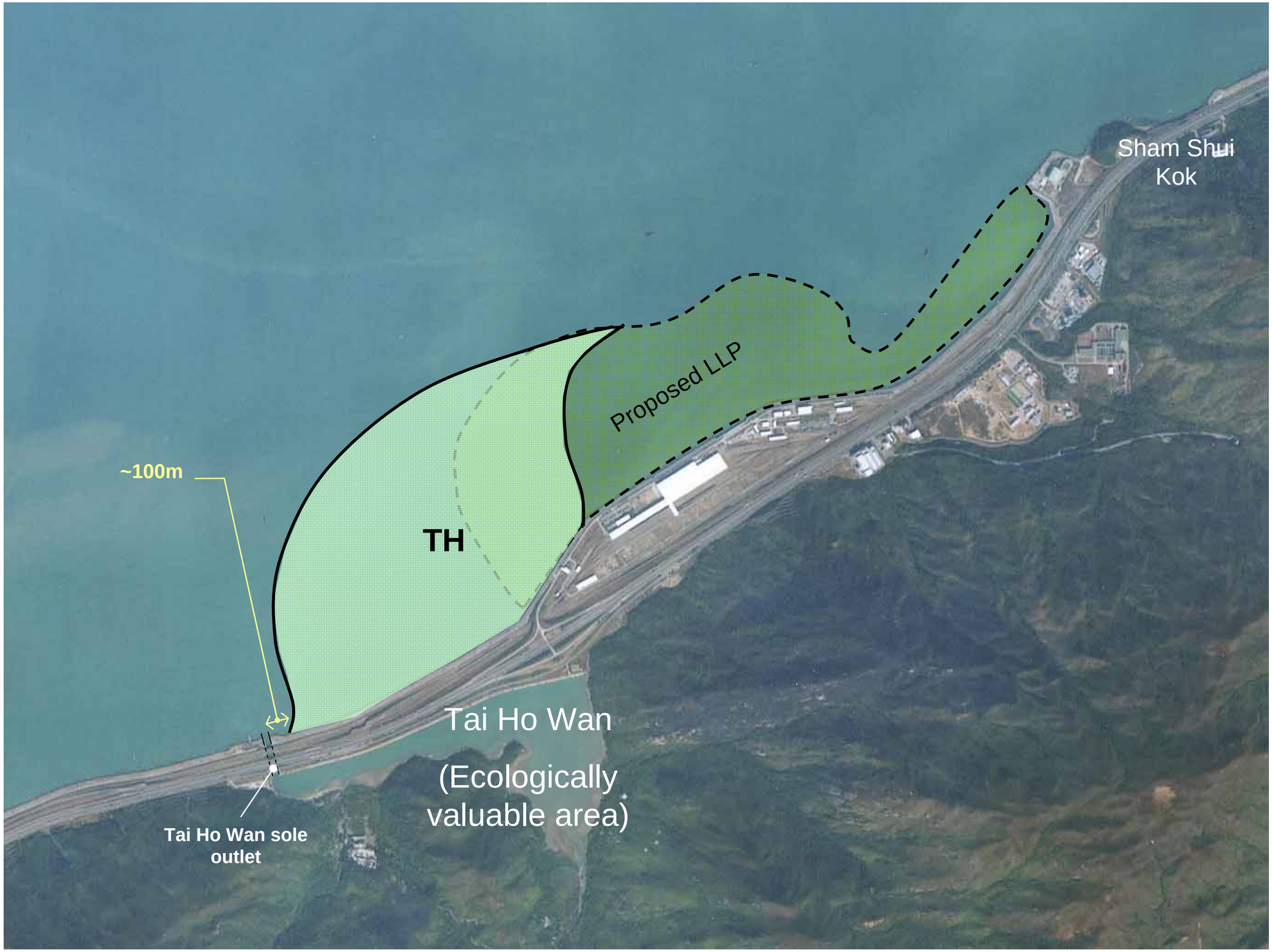
Drawing Title

HKBCF – Option TCB

Drawing No.

Figure 3.13



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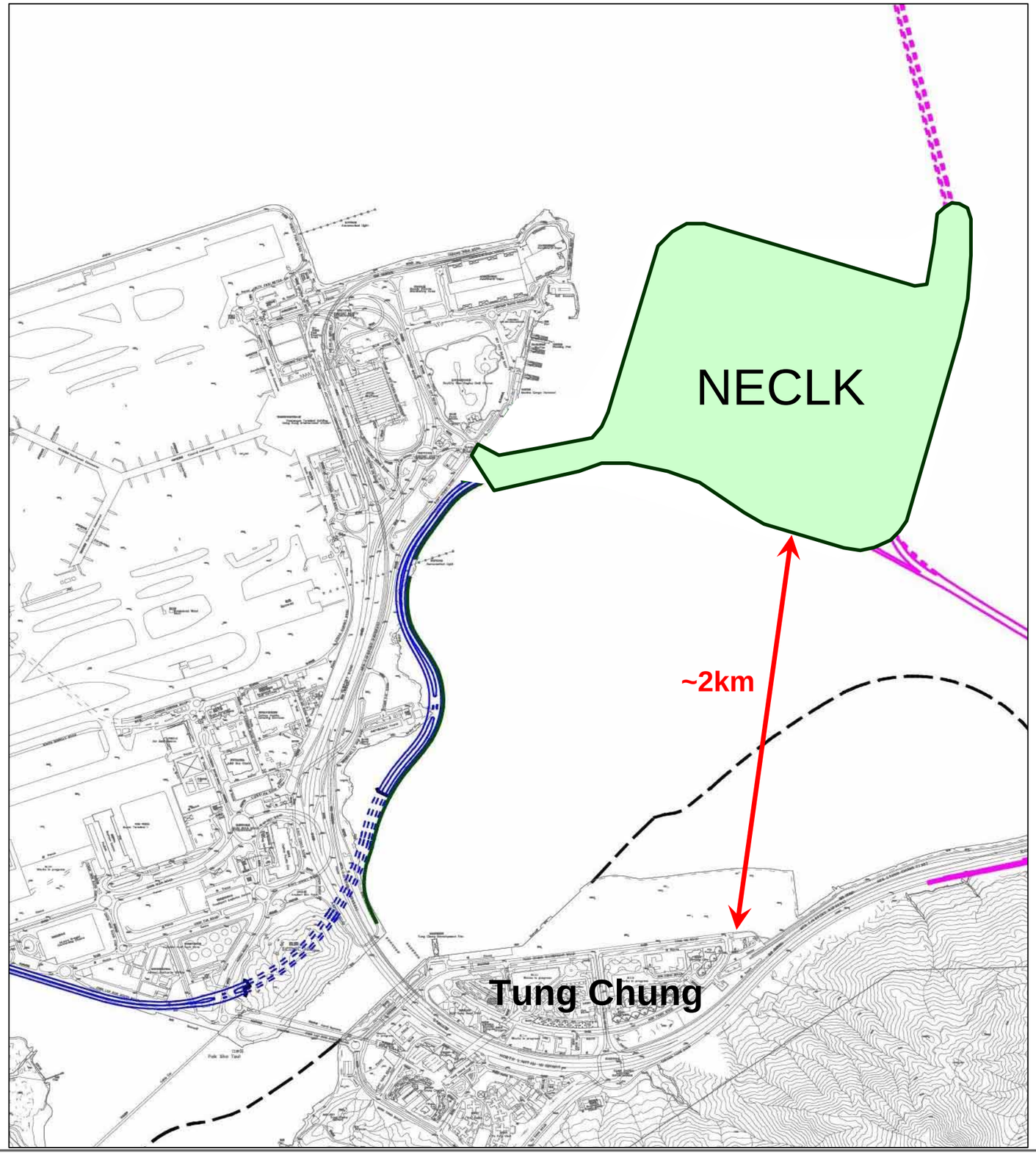

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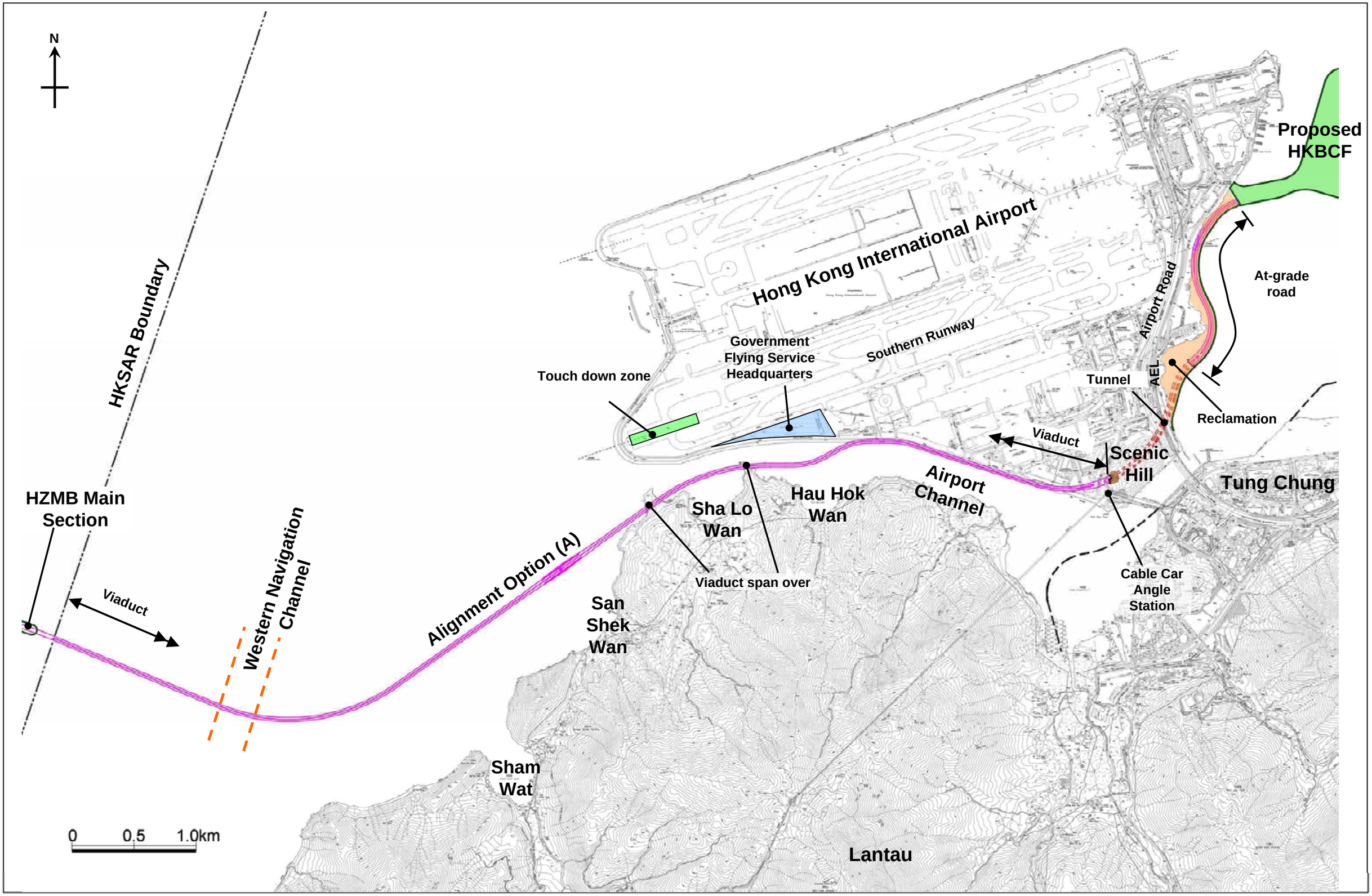

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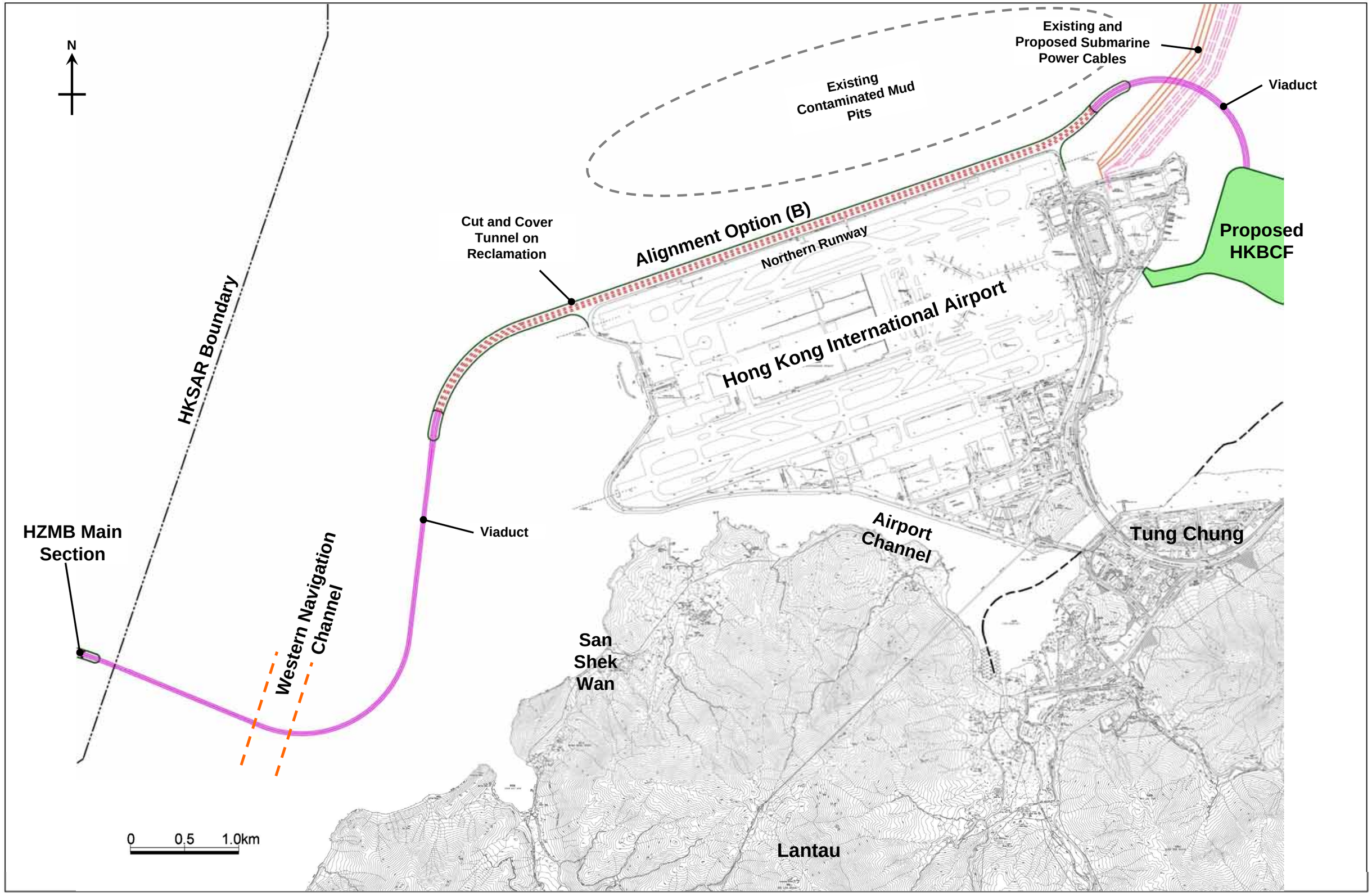

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Drawing Title

HKLR – Alignment Option (B)

Drawing No.

Figure 3.17

N

圖示
Legend :

- 法定古蹟 Declared Monuments
- 具考古價值地點 Archaeological Sites
- 具特殊科學價值地點 Site of Special Scientific Interest (SSSI)
- 稀有品種海草 Rare Species of Seagrasses
- 北大嶼山郊野公園 North Lantau Country Park
- 紅樹林 Mangrove

HKSAR Boundary

HZMB Main Section

Western Navigation Channel

Viaduct

San Shek Wan

Sham Wat

Village houses

Tunnel

Alignment Option (C)

Airport Channel

Hong Kong International Airport

Archaeological Site

San Tau SSSI

Rare Species of Seagrasses

Viaduct

Tunnel

Reclamation

At-grade road

Proposed HKBCF

Scenic Hill

Cable Car Angle Station

Tung Chung

Tung Chung Battery

Fu Tei Wan Kiln

Tung Chung Game Board Carving

Tung Chung Fort

北大嶼郊野公園
Lantau North Country Park
Lantau North Country Park

Lantau

0 0.5 1.0km

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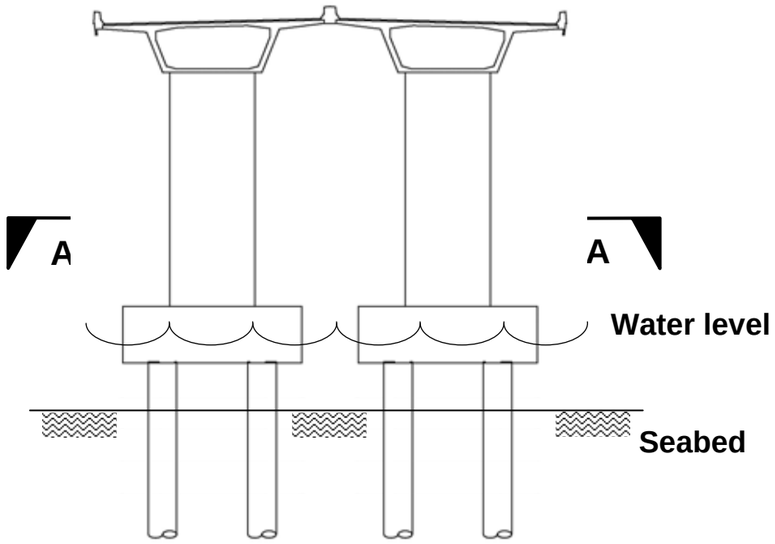
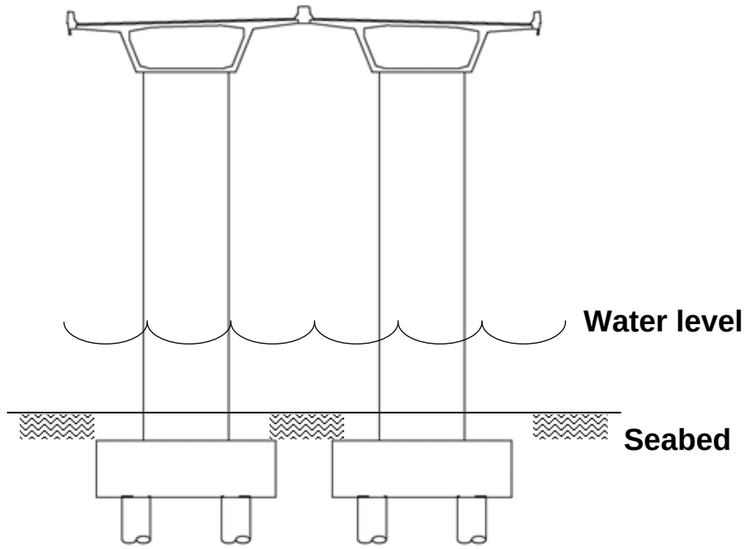
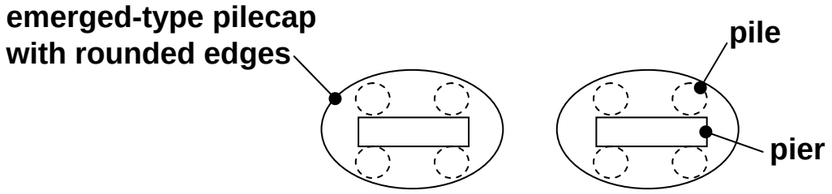


Typical Section for Sea Viaduct outside Airport Channel i.e. in Western Waters (Pilecaps to be emerged i.e. within tidal level)

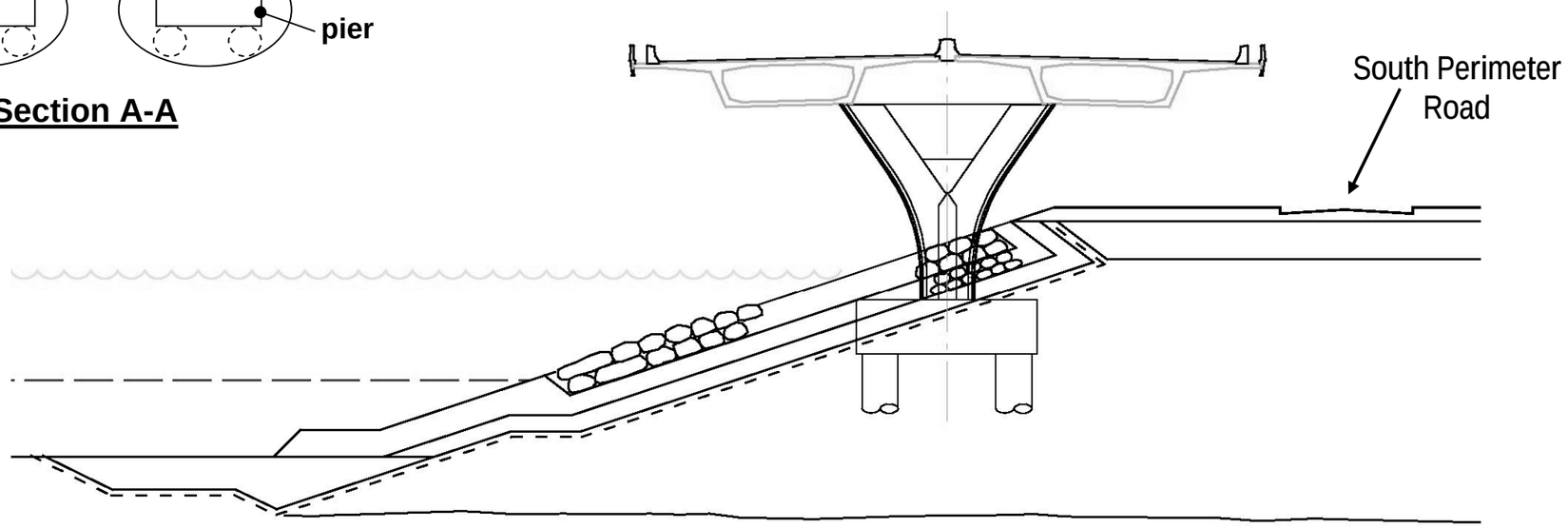


Typical Section for Sea Viaduct within Airport Channel (Pilecaps to be embedded i.e. below channel-bed)

Note: except at navigation span where pilecaps are to be emerged



Section A-A



Typical Section for Viaduct along South Perimeter Road

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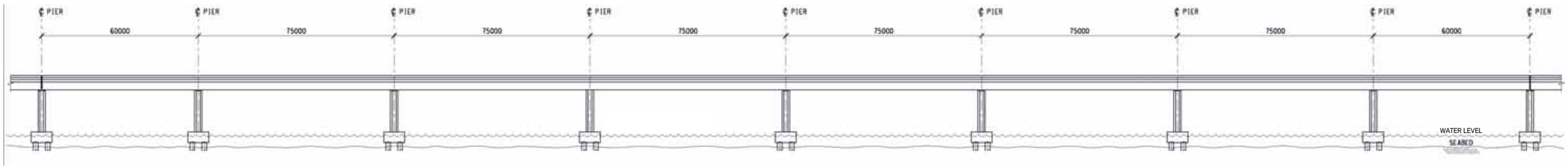
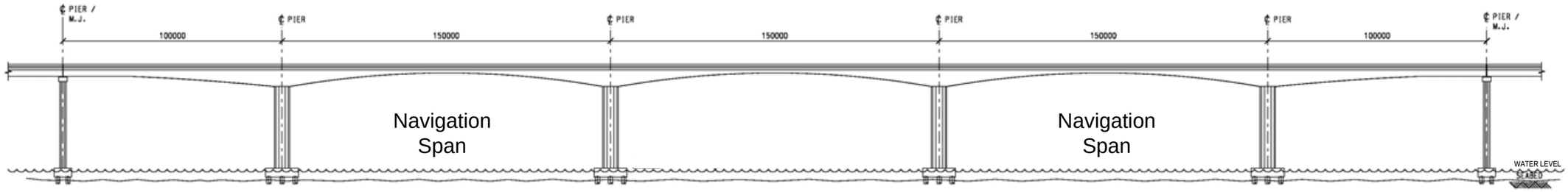
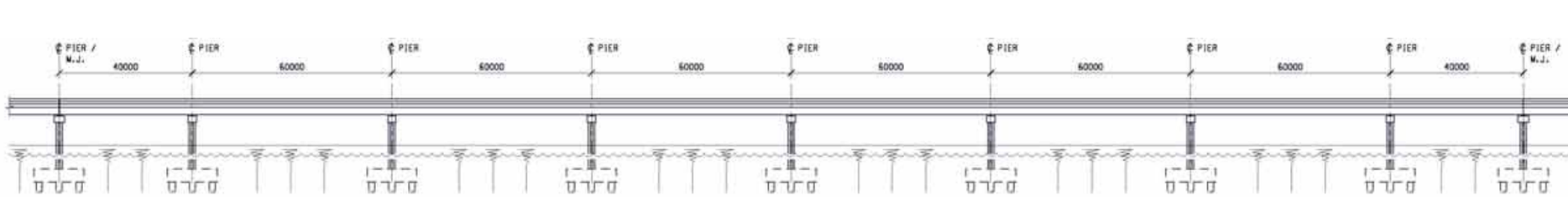


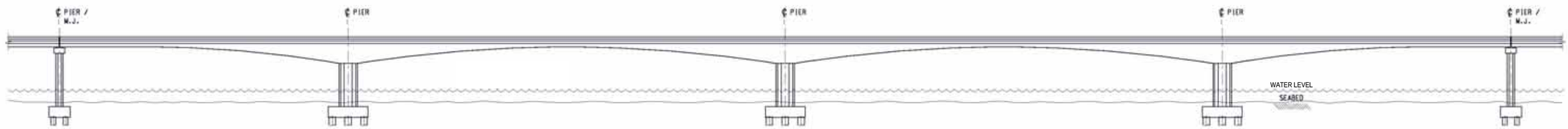
Typical Elevation for 75m-span Viaducts in Western Waters



Typical Elevation for Navigation Spans in Western Waters



Typical Elevation for 60m-span Viaducts along South Perimeter Road



Typical Elevation for Larger-span Viaducts (>75m) within Airport Channel

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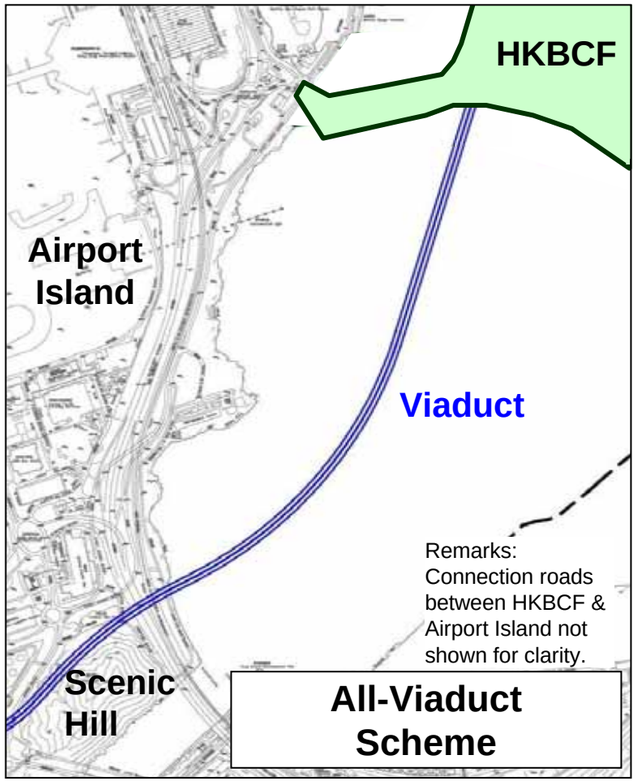
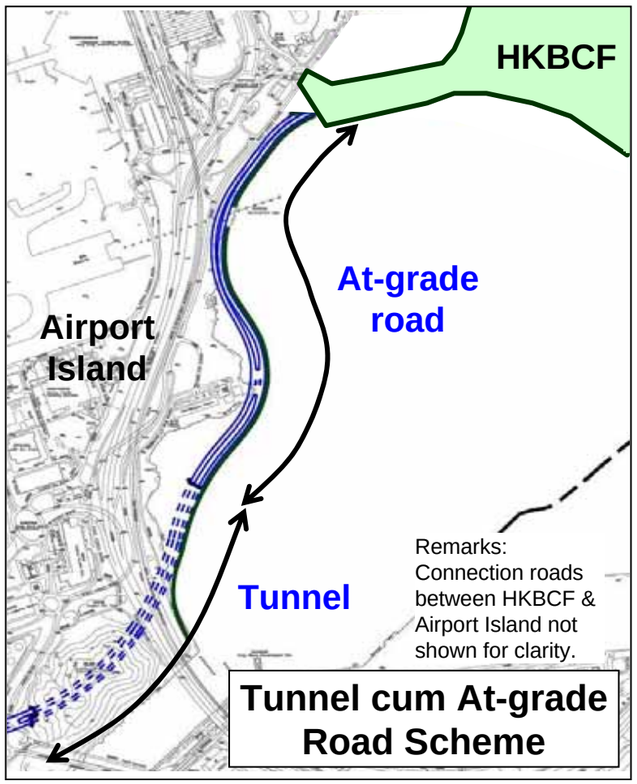
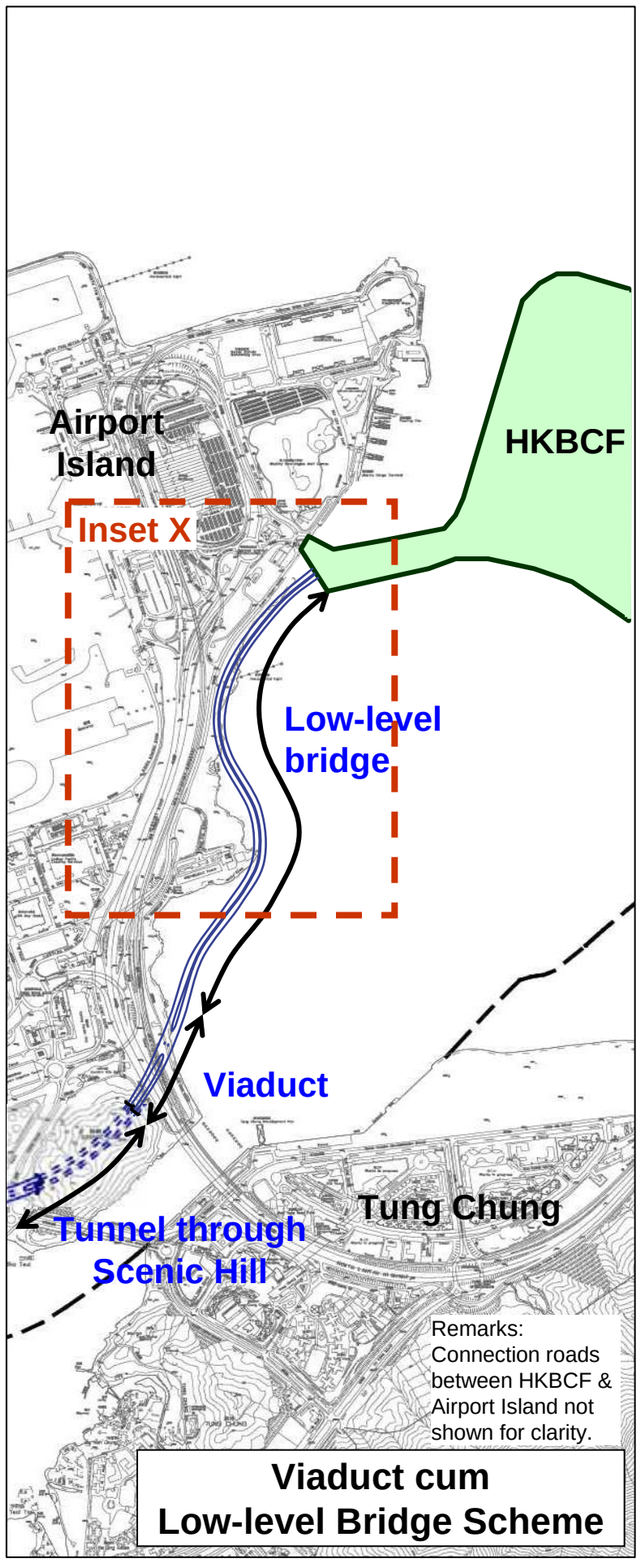


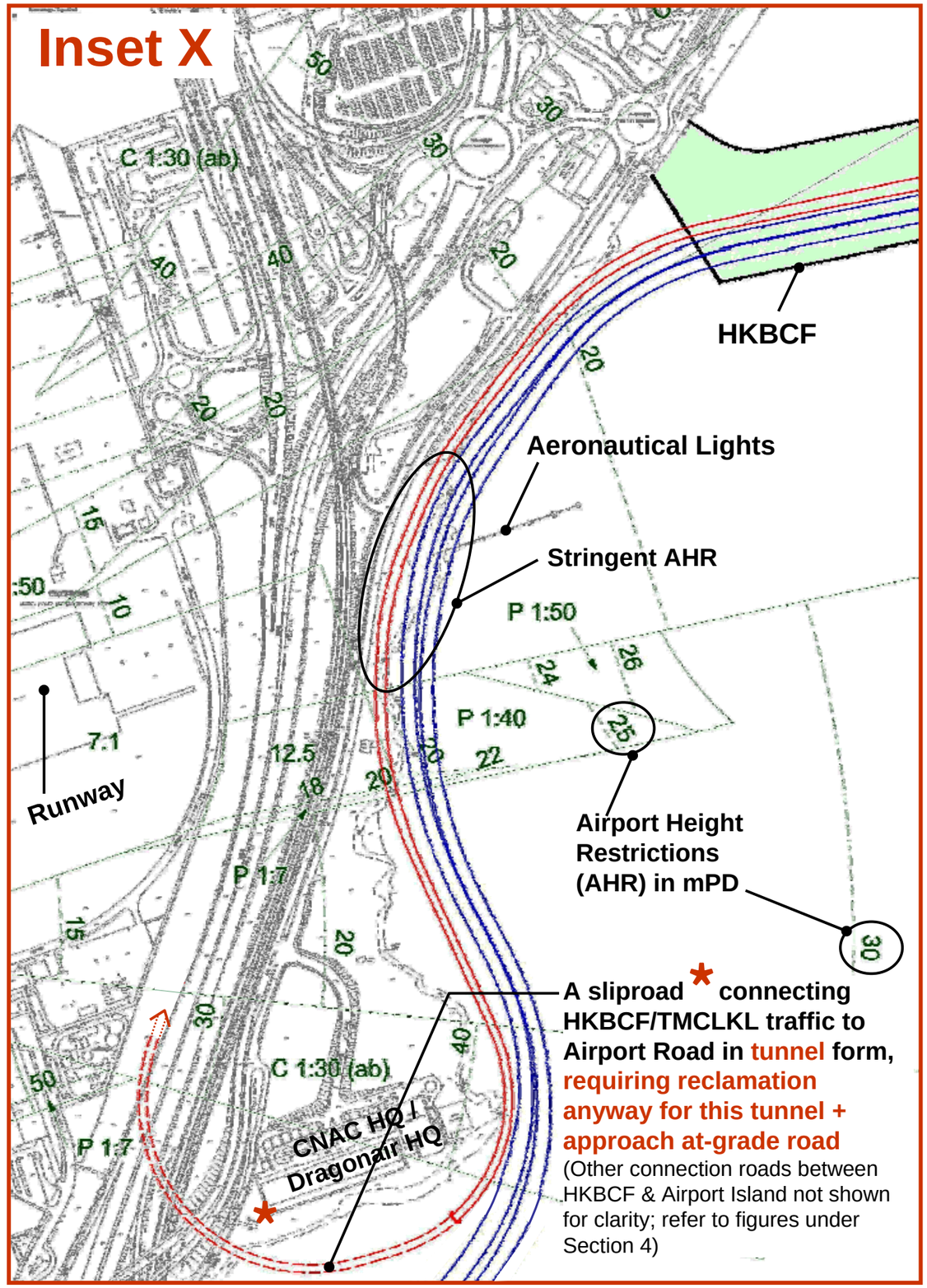
All-Viaduct Scheme



Tunnel cum At-grade Road Scheme



Viaduct cum Low-level Bridge Scheme



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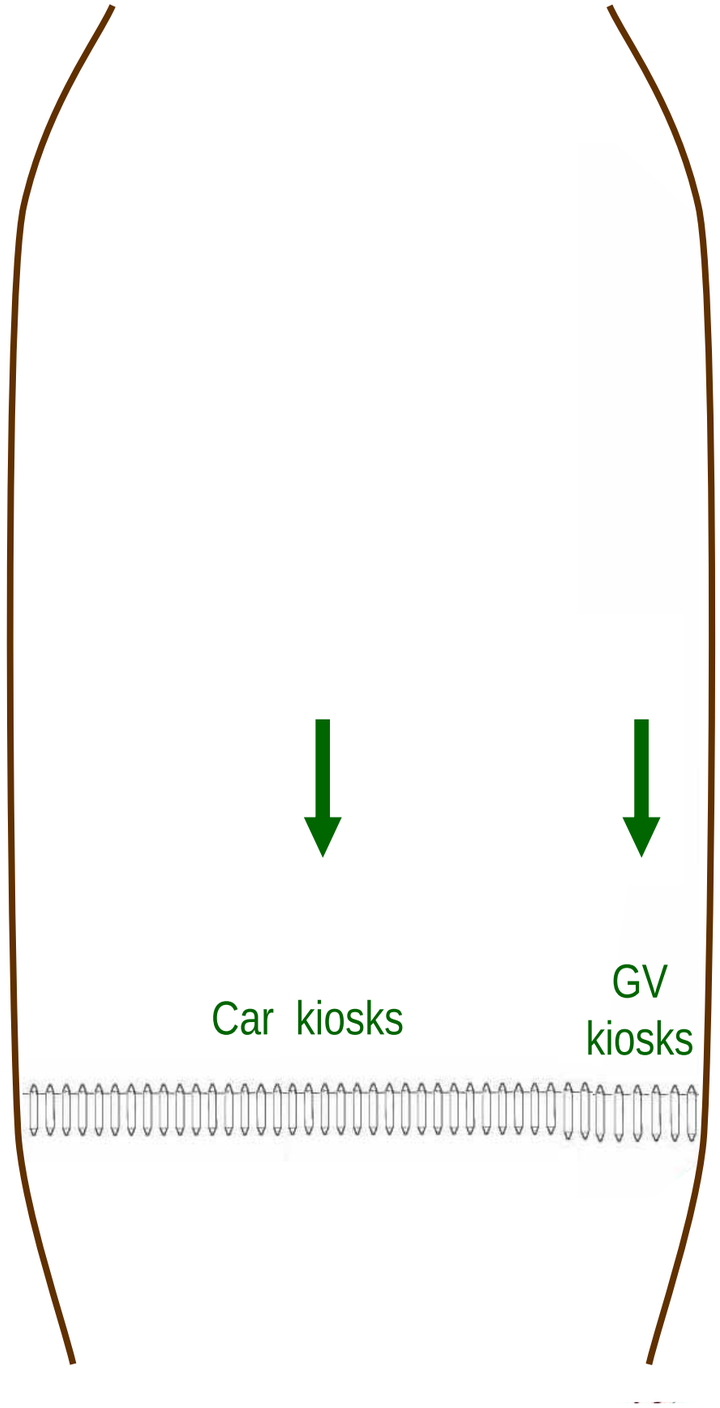
Drawing Title

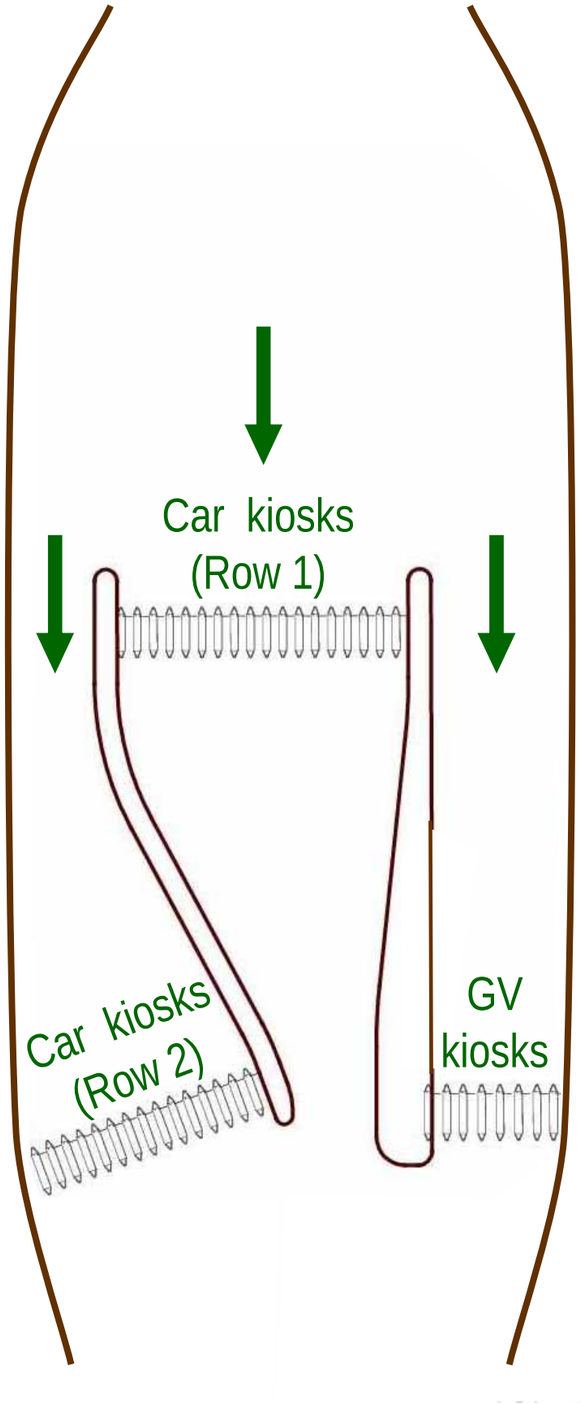
HKLR – Finer-level Alternative on the Section of HKLR from Scenic Hill to HKBCF

Drawing No.

Figure 3.21



Layout without
2-row kiosk arrangement



Layout with 2-row arrangement
adopted for car kiosks

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Ove Arup & Partners
Hong Kong Limited

Drawing Title

HKBCF – Finer-level Layout Option (c) : Adopting 2-row Arrangement for Clearance Kiosks

Drawing No.

Figure 3.22