



土木工程拓展署
Civil Engineering and
Development Department

ARUP



Executive Summary

Agreement No. CE 8/2017 (CE)

Study on Traffic, Transport and Capacity to Receive Visitors for Lantau

– Feasibility Study

June 2022

Civil Engineering and Development
Department

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Capacity to Receive Visitors for
Lantau - Feasibility Study**

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

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

Job number 256997

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1 Introduction

1.1 Background

- 1.1.1 With a number of proposed major economic and housing developments at north Lantau including the topside development at Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Port, Tung Chung New Town Extension, Siu Ho Wan development, Three-Runway System Project of Hong Kong International Airport in addition to the HZMB and the Tuen Mun-Chek Lap Kok Link, Lantau will become an essential hub for both regional and international journeys to and from Hong Kong. The above developments will also bring fundamental change to Lantau's functions and development potential. On the other hand, Lantau also possesses a lot of natural and cultural assets which deserve conservation and enhancement in a holistic manner for enjoyment by Hong Kong people and visitors. To fully capitalize on the opportunities, the Government established the Lantau Development Advisory Committee (LanDAC) in January 2014 to provide advice to the Government on the social and economic development opportunities as well as policies, measures and specific proposals conducive to the sustainable development and conservation of Lantau.
- 1.1.2 Since then, the Government has formulated the vision, strategic positioning and planning principles for the development of Lantau, with initial proposals covering spatial planning and land use, conservation, strategic traffic and transport infrastructure, recreation and tourism, and social development, as well as short-term improvement measures. A public engagement (PE) exercise was conducted from January to April 2016 to gauge the public views on Lantau development proposals with a view to developing Lantau into a smart and low-carbon community for living, work, business, leisure and study while balancing and enhancing development and conservation.
- 1.1.3 During the PE exercise, numerous views from the public and Lantau residents concerning the traffic and transport impacts brought about by Lantau development, as well as the capacity to receive visitors in Lantau, were received. Some public members requested for improvement of the internal connections in Lantau, such as between Tung Chung and Tai O; and between Mui Wo and North Lantau; enhancement and improvement in the traffic and transport facilities including water transport services; and exploration of cycle track/mountain bike trail networks in Lantau.
- 1.1.4 With this background, the Civil Engineering and Development Department (CEDD) appointed Ove Arup and Partners Hong Kong Limited in July 2017 to commence the subject study, namely “Study on Traffic, Transport and Capacity to Receive Visitors for Lantau - Feasibility Study” (Agreement No. CE 8/2017 (CE)). This Executive Summary (ES) summarizes the findings and assessments of the strategic and local transport infrastructure and services, and visitors’ receiving capacity in Lantau, and the corresponding recommendations.

1.2 Main Scope of the Study

1.2.1 The main scope of the Study includes the following :

- Carry out a desktop study for Lantau’s strategic traffic and transport infrastructure to meet the long-term development needs of Lantau;
- Assess the needs and conduct preliminary feasibility study for providing internal road connections in Lantau (i) between Tung Chung and Tai O; and (ii) between North Lantau and Mui Wo;
- Study the feasibility of improving the internal traffic and transport connections in Lantau, including water transport;
- Assess the needs and carry out preliminary feasibility study on providing pier facilities/landing steps for water transport with a view to complementing land-based transport;
- Assess the receiving capacity of visitors for Lantau and recommend measures and supporting infrastructures necessary for promoting sustainable development of the potential recreation and tourism development proposals in Lantau;
- Carry out preliminary feasibility study on expanding the cycle tracks/mountain bike trail networks, with associated supporting facilities, to form a comprehensive cycle track/mountain bike trail networks for Lantau; and
- Explore and recommend other practicable traffic and transport improvement initiatives including measures to promote green transport, etc.

1.3 Abbreviations

AEL	Airport Express Line
APM	Automatic People Mover
BCR	Benefit-Cost Ratio
CA	Conservation Area
CBD	Core Business District
CE	Civil Engineering
CEDD	Civil Engineering and Development Department
CMPA	Country and Marine Parks Authority
CPA	Coastal Protection Area
CT	Cycle Track
DIA	Drainage Impact Assessment
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
EIS	Ecologically Important Stream
EPD	Environmental Protection Department
FS	Feasibility Study
HH	Hop-On / Hop-Off
HKIA	Hong Kong International Airport
HKLR	Hong Kong Link Road
HKSAR	Hong Kong Special Administrative Region

HLC	Hei Ling Chau
HZMB	Hong Kong-Zhuhai-Macao Bridge
KYC	Kau Yi Chau
LanDAC	Lantau Development Advisory Committee
LCRP	Lantau Closed Road Permit
LTV	Lantau Tomorrow Vision
MBT	Mountain Bike Trail
MTR	Mass Transit Railway
MTRCL	Mass Transit Railway Corporation Limited
MW	Mui Wo
NLB	New Lantao Bus Company
NLH	North Lantau Highway
NP360	Ngong Ping 360 cable car
NWNT	Northwest New Territories
POI	Pier of Interest
pphpd	Passengers per hour per direction
PT	Public Transport
PTI	Public Transport Interchange
R&T	Recreation & Tourism
SAI	Site of Archaeological Interest
SIA	Sewerage Impact Assessment
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
TCL	Tung Chung Line
TCNTE	Tung Chung New Town Extension
TD	Transport Department
TIA	Traffic Impact Assessment
TM-CLKL	Tuen Mun – Chek Lap Kok Link
TPDM	Transport Planning and Design Manual
TY-LL	Tsing Yi – Lantau Link
UNWTO	World Tourism Organisation of the United Nations
WSD	Water Supplies Department

2 Strategic Traffic and Transport Infrastructure in Lantau

2.1.1 In the 2018 Policy Address, the Chief Executive announced the Lantau Tomorrow Vision to meet the long-term development needs of Hong Kong. One of the key initiatives is the formation of artificial islands in the Central Waters which will provide multiple strategic benefits. The artificial islands will be supported by a comprehensive network of strategic roads and rails that connects the Hong Kong Island, Lantau and the coastal areas of Tuen Mun, benefiting not only the artificial islands but also the Northwest New Territories (NWNT) as well as the territory. The first phase of the development will focus on the artificial islands around Kau Yi Chau, with a total reclaimed area of about 1 000 hectares. The conceptual development and strategic transportation plan is shown in **Figure 2.1**. A detailed planning and engineering study for the said development around Kau Yi Chau, and a feasibility study on the priority road link and the priority rail link connecting the artificial islands commenced in June 2021 for completion within 42 months.

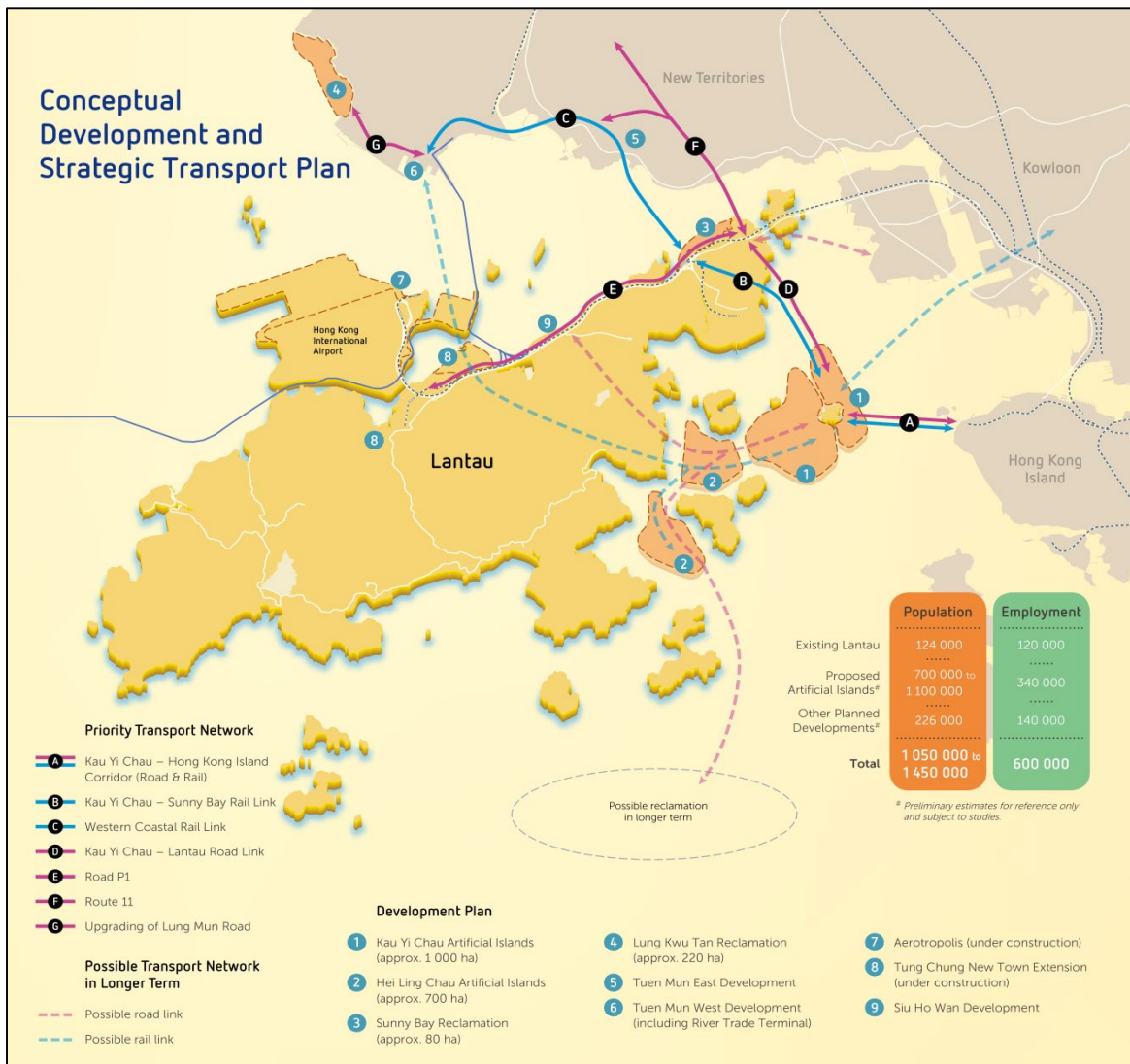


Figure 2.1 Conceptual Development and Strategic Transport Plan of Lantau Tomorrow Vision

2.1.2 Apart from North Lantau Highway and Lantau Link that have been serving Lantau since 1990s, there are also a number of recently completed/on-going/planned transport infrastructures in North Lantau to meet the current and future social, economic and development needs. The following table summarises various these strategic road and rail networks.

Strategic Transport Infrastructure	Type of Project	Description
Hong Kong Link Road (HKLR)	Road	<ul style="list-style-type: none"> It connects the Hong Kong-Zhuhai-Macao Bridge (HZMB) and HZMB Hong Kong Port, serving cross-boundary traffic between Hong Kong and Zhuhai/Macao. It was opened on 24 October 2018 in tandem with the HZMB commissioning.
Tuen Mun – Chek Lap Kok Link (TM-CLKL)	Road	<ul style="list-style-type: none"> It provides the most direct route between the NWNT, HZMB, Airport and North Lantau; it also serves as an alternative route to the Airport from North Lantau Highway (NLH). <p><i>Southern Connection</i></p> <ul style="list-style-type: none"> Mainline (the section between the Hong Kong Port and the NLH (urban bound)) - was opened on 24 October 2018 in tandem with the commissioning of the HZMB. The section between the Hong Kong Port and the NLH (Tung Chung bound) - was opened on 30 November 2018. <p><i>Northern Connection</i></p> <ul style="list-style-type: none"> The Northern Connection of TM-CLKL – was opened on 27 December 2020.
Road P1	Road	<ul style="list-style-type: none"> It comprises two sections, which are about 2.5 km for Tung Chung to Tai Ho Section and about 9.5 km for Tai Ho to Sunny Bay Section. Road P1 (Tung Chung - Tai Ho Section) is being implemented under TCNTE project that will form a major external highway connection for future Tung Chung East. The relevant construction works have commenced in phases since June 2021. The Engineering Study on Road P1 (Tai Ho - Sunny Bay Section) commenced on 24 June 2021 and is in progress.
MTR Tung Chung Line Extension	Rail	<ul style="list-style-type: none"> It is one of the recommended schemes under the Rail Development Strategy (RDS) 2014. The TCL Extension project has been gazetted and is at the detailed design stage. The construction works are expected to commence in 2023 for completion in 2029. <p><i>Tung Chung West Section</i></p> <ul style="list-style-type: none"> The 1.3 km extension of existing Tung Chung Line (TCL) from Tung Chung Station to a new station in Tung Chung West to cope with future TCNTE (West) and existing housing development in the district. <p><i>Tung Chung East Section</i></p> <ul style="list-style-type: none"> The new intermediate station on TCL east of Tung Chung Station will serve future TCNTE (East).

Strategic Transport Infrastructure	Type of Project	Description
Route 11 (including Tsing Lung Bridge)	Road	<ul style="list-style-type: none"> Route 11 which will link up North Lantau and Yuen Long, provides a third strategic access to Lantau on top of Tsing Ma Bridge and TM-CLKL, thus enhancing the robustness of the road network connecting to the Airport. It provides a new strategic connection between NWNT and the urban areas, including the proposed Hung Shui Kiu New Development Area and Yuen Long South Development to cope with future increase in traffic demand. The investigation study on Route 11 (section between Yuen Long and North Lantau) commenced on 27 September 2021.
Tsing Yi – Lantau Link (TY-LL)	Road	<ul style="list-style-type: none"> TY-LL is a proposed dual 3-lane carriageway, connecting Northeast Lantau and Tsing Yi (to tie into Route 8). Strategically, it would serve as a parallel route to reach Lantau bypassing the Lantau Link (Tsing Ma Bridge). The TY-LL has been packaged along with Road P1 to provide a continuous and parallel alternative route from the Airport and North Lantau to Tsing Yi and the urban areas.
MTR Siu Ho Wan Station	Rail	<ul style="list-style-type: none"> In the 2020 Policy Address, the Chief Executive announced the development of the Siu Ho Wan Depot Site of the MTR Corporation Limited (MTRCL) which is expected to provide some 20 000 public and private residential units in the medium and long term. To cater for the development and meet the transport needs of the residents, the MTRCL recommended the addition of a railway station at Siu Ho Wan on the Tung Chung Line. The addition of a railway station at Siu Ho Wan was gazetted on 11 June 2021.
Airport City Link	Road	<ul style="list-style-type: none"> In the 2020 Policy Address, the Government accepted the proposal of the Airport Authority Hong Kong (AAHK) to take forward the Airport City Link project connecting the SKYCITY and the HZMB Hong Kong Port by constructing a bridge system and by applying autonomous transportation system to strengthen the overall transportation network and capacity, thereby connecting the SKYCITY, the HZMB Hong Kong Port and the HKIA. According to the AAHK plan, the autonomous transportation system of the Airport City Link would be extended to Tung Chung Town Centre and the roads along the eastern coast of the Airport Island would be optimised so as to provide a comprehensive and environmentally-friendly transport link connecting Tung Chung Town Centre, the Airport Island and the HZMB Hong Kong Port.

2.1.3 After detailed traffic assessment based on the best available planning assumptions in this Study, it is considered that the existing and above ongoing/planned strategic traffic and transport infrastructure can generally meet the long-term external transport needs of Lantau.

3 Road Connection Options between Tung Chung and Tai O and between North Lantau and Mui Wo

3.1 Overview and Key Considerations

3.1.1 At present, as illustrated in **Figure 3.1**, Tung Chung Road is the only vehicular road for South Lantau to connect with the northern part of Lantau and external roads. For preservation of the tranquil environment of Lantau and given its road capacity, all the main roads in South Lantau (including Tung Chung Road (TCR), South Lantau Road (SLR), Keung Shan Road (KSR) and Tai O Road (TOR)) are designated as closed roads and members of the public must first obtain the Lantau Closed Road Permit before they could drive to South Lantau. Besides, there are currently several licensed ferry routes serving South Lantau, including the "Central - Mui Wo" route, the "inter-islands" route plying between different outlying islands including Peng Chau, Mui Wo, Chi Ma Wan and Cheung Chau, the route between Tuen Mun, Tung Chung, Sha Lo Wan and Tai O, and the "Discovery Bay - Mui Wo" route etc.

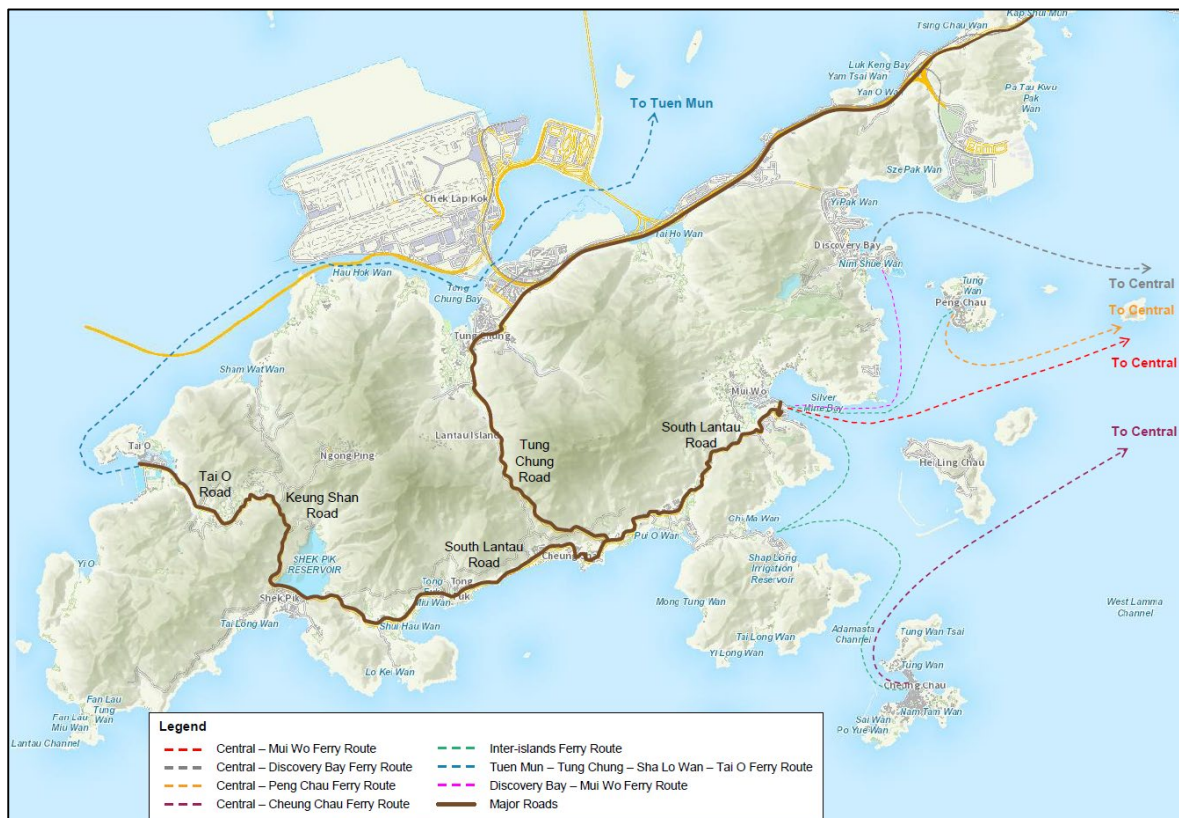


Figure 3.1 Existing Main Roads and Ferry Routes in Lantau

- 3.1.2 Figures from past few years revealed that the annual average daily traffic flow of existing roads (i.e. TCR, SLR, KSR (connecting SLR and Sham Wat Road) and TOR (connecting Sham Wat Road and TOR) in South Lantau are only about half of their design capacities or even less. Details of the existing road conditions are shown in Section 4.1.
- 3.1.3 Given Tai O and Mui Wo are among visitors' popular hotspots in South Lantau and there is only one vehicular access (i.e. via Tung Chung Road) connecting South and North Lantau, the public including the locals have pressed for improvement of the connectivity between Tai O and Tung Chung as well as Mui Wo and North Lantau. This Study has considered a total of six possible road connection options between Tung Chung and Tai O and four possible road connection options between North Lantau and Mui Wo. Preliminary assessments of these ten possible road connection options have been conducted taking account of the following key considerations and constraints:
- (a) Connectivity – Existing TCR is the only vehicular access connecting north and south Lantau. Travel to Mui Wo from TCR would be via SLR while to Tai O would be via SLR, KSR and TOR. Keung Shan Road (KSR) was built against the hillsides with steep gradients and sharp bends at some road sections. Large vehicles like coaches and buses may need to slow down around these turns, and currently the road condition only allows the use of single-decker buses.
 - (b) Planning and Land Use – Taking account of the overarching principle of “Development in the North; Conservation for the South” embraced by the Sustainable Lantau Blueprint promulgated in June 2017, only those developments that are compatible with this principle would be planned or undertaken. New developments including road infrastructures, if in need (such as tunnel portals, ventilation facilities, etc.), should be sited away from conservation related zonings and country parks as far as possible. Infringement upon private land and land with existing / planned developments / facilities / structures like local villages should also be avoided as far as practicable.
 - (c) Environmental Consideration – There are some main environmental constraints which need to be carefully considered in South Lantau. They include water sensitive receivers, high ecological resources and/or sites of conservation importance such as “SSSI” and conservation areas, etc.
 - (d) Engineering Consideration – It includes some main engineering constraints such as Airport Height Restrictions, clearances at existing navigation channel, etc.
 - (e) Implementation – It includes required construction period and implementation duration.
 - (f) Cost – It includes capital costs and recurrent costs, etc.

3.2 Possible Road Connection Options between Tung Chung and Tai O

3.2.1 A brief account of the six possible road connection options between Tung Chung and Tai O and the preliminary assessment based on the above key considerations are set out in the ensuing paragraphs. The schematic layout of these possible road connection options is shown in **Figure 3.2**.

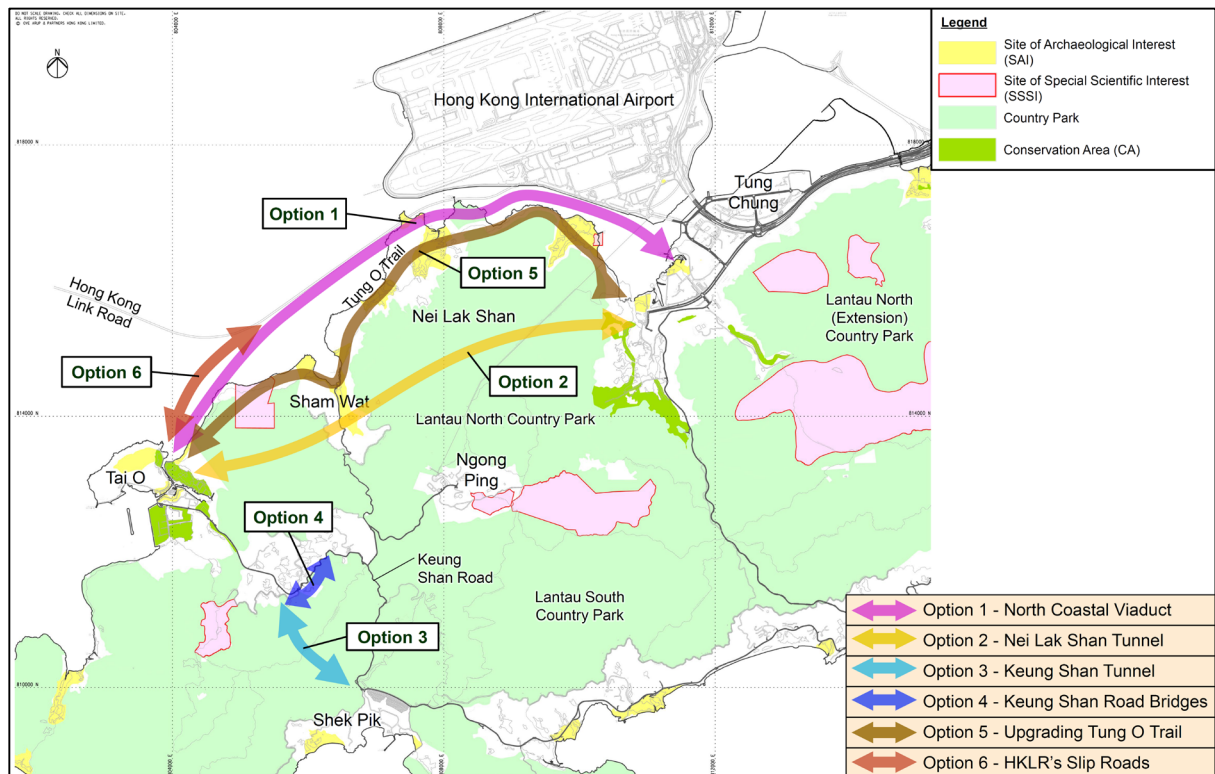


Figure 3.2 Schematic Layout of Possible Road Connection Options between Tung Chung and Tai O

Option 1 (North Coastal Viaduct)

3.2.2 Option 1 mainly comprises a marine viaduct and a land viaduct of dual-one lane carriageway (over 10 km in total length) along the northwest coastline of Lantau and connecting Tung Chung and Tai O.

3.2.3 This option would provide a direct link reducing both the travelling length and time between Tung Chung and Tai O significantly. However, there are various engineering and environmental issues which will be difficult to address. The environmental impact is one of the major concerns, given that land in Tai O is predominantly of conservation areas. The estimated capital cost of this option would also be very high, i.e. the 2nd highest among the six possible options.

Option 2 (Nei Lak Shan Tunnel)

3.2.4 Option 2 mainly comprises a land tunnel (about 7 km in length) underpassing Lantau North (Extension) Country Park and Lantau North Country Park from Tung Chung through Nei Lak Shan to Tai O.

- 3.2.5 This option would provide a direct link reducing both the travelling length and time between Tung Chung and Tai O significantly. However, this option would require extensive site formation works at tunnel portals in Country Park and land resumption. The impact on the environment is another concern given land in Tai O is predominantly of conservation areas especially where this option might affect Romer's Tree Frog habitat in Sham Wat. The long tunnel would also require long implementation period and capital cost is the highest amongst the six possible options.

Option 3 (Keung Shan Tunnel)

- 3.2.6 Option 3 mainly comprises about 2 km land tunnel underpassing Lantau South Country Park through Keung Shan connecting from Shek Pik to Tai O Road.
- 3.2.7 This option could enhance the connectivity between Shek Pik to Tai O, travel comfort as well as road safety. Given the relatively short distance, the estimated capital cost is the 2nd lowest among the six possible options and involves shorter implementation period. However, this option would require extensive site formation works at tunnel portals in Country Park and assessment on the impacts to Romer's Tree Frog habitat in Keung Shan will also need to be subject to more in-depth study.

Option 4 (New Bridges at Keung Shan Road)

- 3.2.8 Option 4 mainly comprises two new bridges (about 350 m each) across the sharp bends of existing Keung Shan Road.
- 3.2.9 This option can overcome the critical road section with steep gradient and sharp bends and improve the travel comfort as well as road safety. This option would be of the lowest estimated capital cost with shorter implementation period than other options. However, the reduction in travelling distance and time is not significant. There are some engineering and environmental issues that need to be addressed, e.g. to arrange construction works in hilly terrain, the need to maintain operation during construction and impacts on the country park etc.

Option 5 (Upgrading Tung O Trail)

- 3.2.10 Option 5 mainly comprises upgrading an existing coastal pedestrian walkway of about 12 km long between Tung Chung and Tai O into a vehicular access.
- 3.2.11 This option would reduce the travelling length and time between Tung Chung and Tai O moderately. However, there are various insurmountable problems including significant adverse environmental impacts such as running through San Chau SSSI and close to San Tau Beach SSSI and some ecological sensitive areas such as Ecologically Important Stream (EIS), mangrove, seagrass bed, horseshoe crab nursery sites and butterfly hotspots. It would also encroach onto several SAIs. The impact on the environment is another concern given land in Tai O is predominantly of conservation areas. In addition, this option would run through several existing villages and affect more private land sites than other options. Its implementation period would also be relatively longer than other options.

Option 6 (New Slip Roads from Hong Kong Link Road)

- 3.2.12 Option 6 mainly comprises new slip roads (about 4 km) stemming from marine portion of existing Hong Kong Link Road (HKLR) near Sham Wat Wan. This option would connect Tung Chung and Tai O via existing HZMB Hong Kong Port, HKLR and the new viaducts along northwest coastline of Lantau Island.

3.2.13 Existing HKLR is a closed area, this option may involve modification of Cap. 245L Closed Area (Hong Kong-Zhuhai-Macao Bridge Hong Kong Port and Hong Kong Link Road) Order and implementation of special administrative arrangement on customs, immigration and quarantine, as well as requiring agreements from authorities of mainland China and Macao. Besides, the option would be close to Tai O SAI.

3.2.14 A summary table of the qualitative evaluation of above possible road connection options is at **Table 3.1**.

Table 3.1 Summary of Preliminary Assessment of Six Possible Road Connection Options between Tung Chung and Tai O

	Connectivity Enhancement	Planning and Land Use	Environmental	Engineering	Implementation	Cost
Option 1 – North Coastal Viaduct	✓✓✓	X	X	◆	◆	X
Option 2 – Nei Lak Shan Tunnel	✓✓✓	X	X	✓	X	X X
Option 3 – Keung Shan Tunnel	✓	◆	◆	✓	◆	✓
Option 4 – New Bridges at Keung Shan Road	◆	◆	◆	✓	✓	✓✓
Option 5 – Upgrading Tung O Trail	✓✓	X X	X X X	✓	X	◆
Option 6 – New Slip Roads from Hong Kong Link Road	◆	X X X	◆	✓	◆	◆

The following symbols refer to the qualitative comparison among six possible options

- ✓✓✓ denotes very good
- ✓✓ denotes good
- ✓ denotes slightly good
- ◆ denotes fair / some degree of influence
- X denotes slightly poor
- X X denotes poor
- X X X denotes very poor and non-starter

3.3 Possible Road Connection Options between North Lantau and Mui Wo

3.3.1 On the possible road connection options between North Lantau and Mui Wo, a total of four options have also been preliminarily assessed based on the key considerations in Section 3.1 above. The schematic layout of these possible road connection options is shown in **Figure 3.3**.

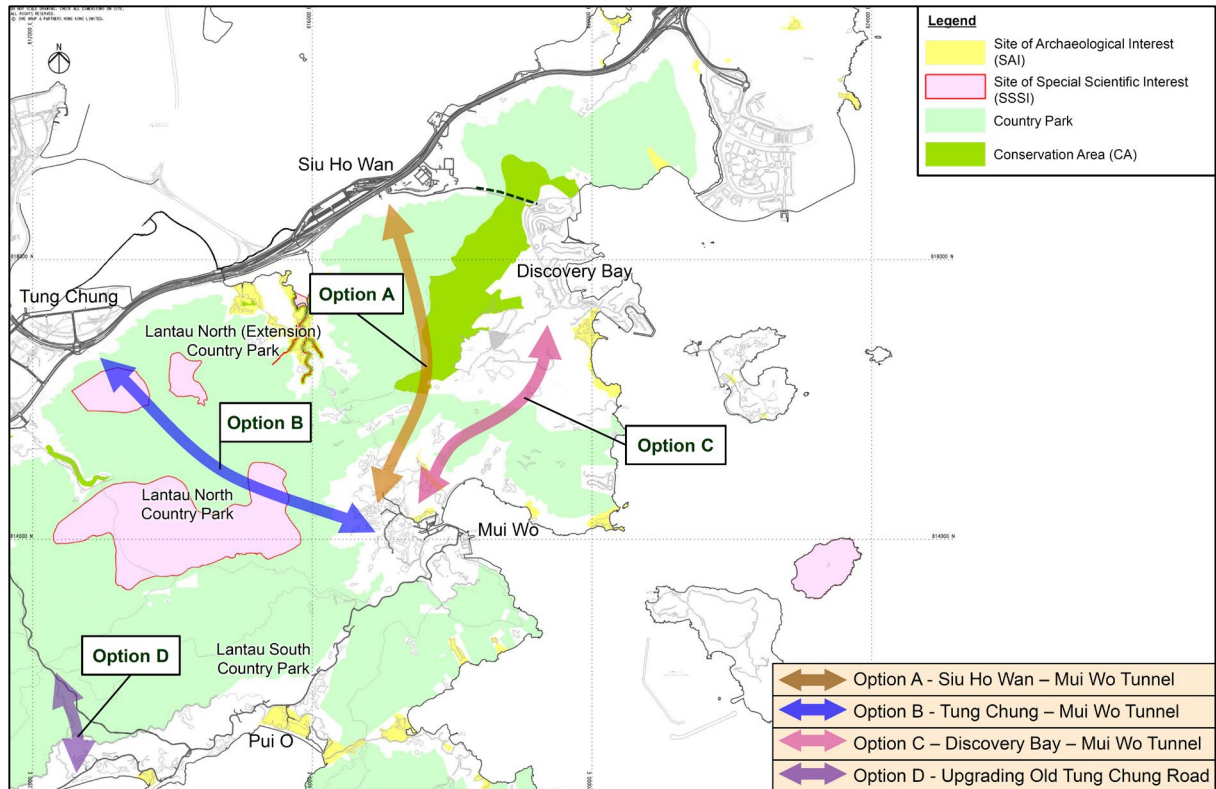


Figure 3.3 Schematic Layout of Possible Road Connection Options between North Lantau and Mui Wo

Option A (Siu Ho Wan - Mui Wo Tunnel)

3.3.2 Option A comprises mainly a land tunnel underpassing existing Lantau North (Extension) Country Park with a connecting road from Mui Wo to Siu Ho Wan (about 5 km in total length).

3.3.3 This option would provide a direct road connection between Mui Wo and Siu Ho Wan and hence other areas of Hong Kong. However, there are some engineering and environmental issues, e.g. extensive site formation works at tunnel portals in Country Park and impacts on Romer's Tree Frog habitat. The estimated capital cost of this option would be the 2nd highest among the four possible options with longer implementation period.

Option B (Tung Chung - Mui Wo Tunnel)

3.3.4 Option B mainly comprises a land tunnel underpassing existing Lantau North Country park and Lantau North (Extension) Country Park with a connecting land viaduct from Mui Wo to Tung Chung (about 5.6 km in total length).

3.3.5 This option would provide a direct link reducing both the travelling length and time between Mui Wo and Tung Chung significantly. However, there are some engineering and environmental issues, e.g. extensive site formation works at tunnel portals in Country Park. Besides, the estimated capital cost of this option is the highest among the four possible options with longer implementation period.

Option C (Discovery Bay - Mui Wo Tunnel)

3.3.6 Option C mainly comprises a land tunnel underpassing existing Lantau North (Extension) Country Park and connecting to existing road/tunnel in Discovery Bay (DB), and a connecting road to Mui Wo (about 3.5 km in total length).

3.3.7 The option would provide a direct link from Mui Wo to Cheung Tung Road via existing road/DB tunnel¹ in DB. It makes good use of the existing transport infrastructure and the estimated capital cost and implementation period of this option would be fair comparing with other options. However, this option would require further discussion with the private developer as well as the local residents in DB, and the operation mode of traffic passing via existing road/tunnel in DB also need to be further studied (e.g. whether to allow public transport uses only). The environmental impacts on Mui Wo and DB areas needed to be subject to further study.

Option D (Upgrading Old Tung Chung Road)

3.3.8 Option D mainly comprises upgrading existing Old Tung Chung Road of about 2.5 km long between Pak Kung Au and Cheung Sha. The section of road is currently closed and served for maintenance access only.

3.3.9 The estimated capital cost of this option would be the lowest among these possible options and its implementation period would be relatively shorter than other options. However, the existing Old Tung Chung Road is a single lane road and with steep sharp bends. Its feasibility depends on the specific requirements on future road alignment such as longitudinal gradient and horizontal radius, etc. In addition, the reduction in travelling time and distance of this option is not significant.

¹ Existing DB tunnel and road in DB are privately owned. The DB tunnel is a 630m long single-tube two-way tunnel privately built, maintained and operated by the Discovery Bay Road Tunnel Company Limited (Tunnel Company), under the Discovery Bay Tunnel Link Ordinance (Cap. 520). The traffic flow is well below its design capacity.

3.3.10 A summary table of the preliminary assessment of the above four possible road connection options between North Lantau and Mui Wo is at **Table 3.2**.

Table 3.2 Summary of Preliminary Assessment of Four Possible Road Connection Options between Mui Wo and North Lantau

	Connectivity Enhancement	Planning and Land Use	Environmental	Engineering	Implementation	Cost
Option A – Siu Ho Wan - Mui Wo Tunnel	✓✓	◆	◆	✓	X	X
Option B – Tung Chung - Mui Wo Tunnel	✓✓✓	◆	◆	✓	X X	X X
Option C – Discovery Bay - Mui Wo Tunnel	✓	X	◆	✓	◆	◆
Option D – Upgrading Old Tung Chung Road	◆	◆	◆	◆	✓	✓

The following symbols refer to the qualitative comparison among four possible options

- ✓✓✓ denotes very good
- ✓✓ denotes good
- ✓ denotes slightly good
- ◆ denotes fair / some degree of influence
- X denotes slightly poor
- X X denotes poor
- X X X denotes very poor and non-starter

3.4 Assessments and Recommendations

- 3.4.1 Taking into account that the main roads in South Lantau, including TCR, SLR and KSR, etc., still have considerable capacity to accommodate potential additional traffic to south Lantau in future, there is insufficient justification to support the construction of major road infrastructure for connecting south and north Lantau due to traffic demand.
- 3.4.2 Nevertheless, there is only one vehicular access connecting north and south Lantau, i.e. via TCR. In case of any incident occurred on the TCR, the road traffic connecting south Lantau and urban areas would be seriously affected and no alternative route will be available except water transport. From the perspective of enhancing the resilience of the South Lantau's transport network to serious incidents on the road traffic, provision of alternative vehicular access connecting South and North Lantau could be further explored.
- 3.4.3 In addition, Tai O is a very popular visitors' place in South Lantau. Due regard may be given to enhance the connectivity of Tai O with other areas as well as to increase the visitors' travel comfort. In particular, KSR was built along hillsides with steep gradients and sharp bends at some road sections. Improvements to sections of KSR or provision of a direct link from Tai O to Shek Pik could be considered.
- 3.4.4 Preliminary assessment on the various different road connection options between Tung Chung and Tai O, and between North Lantau and Mui Wo, has revealed that the following five possible road connection options are more preferable. However, as the above possible road connection options are based on desktop qualitative evaluation only, further detailed feasibility study on these options is required to examine and identify the feasible and most suitable arrangement:
- For improving Keung Shan Road / enhancing the connectivity of Tai O to other areas
- (a) Option 3 – Keung Shan Tunnel; and
 - (b) Option 4 – New Bridges at Keung Shan Road.
- For enhancing the resilience of the transport network between South and North Lantau
- (a) Option A – Siu Ho Wan - Mui Wo Tunnel;
 - (b) Option C – DB - Mui Wo Tunnel; and
 - (c) Option D – Upgrading Old Tung Chung Road.
- 3.4.5 The detailed feasibility study, if proceeded, would require reviewing various aspects, including technical feasibility, environmental implications and possible mitigation measures, implementation implication, cost effectiveness, stakeholders' views, as well as suitable operating modes, i.e. whether limiting access to public transport only for some options, etc., in line with the overarching principle of "Development in the North, Conservation for the South" for Lantau.

4 Local Road Improvement Proposals in South Lantau

4.1 Existing Roads in South Lantau

- 4.1.1 The existing road conditions of some main roads in South Lantau have been assessed and set out as follows:
- 4.1.2 Tung Chung Road (TCR) – it is a single-2 lane rural road and is the only vehicular access connecting north and south Lantau. The improvement works to TCR were completed in 2009. The road conditions are in general satisfactory.
- 4.1.3 South Lantau Road (SLR) – it is a single-2 lane rural road and is the main carriageway for traffic between east and west of South Lantau. In general, the road section between Cheung Sha and Mui Wo is less satisfactory in terms of road width, horizontal and vertical alignments, etc. In addition, some bends do not allow two 12m long buses to simultaneously pass each another at these locations.
- 4.1.4 Keung Shan Road (KSR) – It is a single-2 lane rural road. The road width in general and the longitudinal gradient at some locations are less satisfactory. There are frequent road bends, with some bends very sharp and do not allow two 12m long buses to simultaneously pass each other. In addition, if low-floor buses are to be used, the vertical clearance between road surface and the bottom of the buses at some locations are insufficient, which may result in vehicle bumping. Due to the limited road width and sharp bend in some sections of the road, it is not suitable for use by double-decker bus.
- 4.1.5 Tai O Road (TOR) – It is a single-2 lane rural road. In general, the horizontal and vertical alignments are generally in compliance with the current standard, except the road width at some localised sections of the road. In addition, if low-floor buses are to be used, the vertical clearance between road surface and the bottom of the buses at one or two discrete locations are insufficient, which may result in vehicle bumping.

4.2 Preliminary Local Road Improvement Proposals

- 4.2.1 In order to improve the traffic conditions of the roads on South Lantau, the Transport Department and the Highways Department completed 22 road widening and bend improvement projects along South Lantau Road and Keung Shan Road between 2007 and 2021. The Transport Department is preparing to carry out other improvement works on South Lantau, including road widening and bend improvement.
- 4.2.2 Since many sections of the main roads in South Lantau are located within country parks, the environmental and ecological impacts arising from the local road improvement works have been duly considered under the Study. In formulating the preliminary local road improvement proposals, two main principles have been adopted, i.e. (a) avoid extensive hillside cutting / filling, burial grounds, and SAIs, etc.; (b) minimise impacts on sensitive environment such as CPA, country park, private land lots, and existing and planned structures, utilities and facilities, etc.
- 4.2.3 After assessment, a set of preliminary local road improvement proposals are recommended on SLR, KSR and TOR, which comprises bend improvements and local road widening. The tentative locations are shown in **Figure 4.1**. These preliminary local road improvement proposals are subject to further investigation, detailed design and liaison / agreement with relevant authorities.

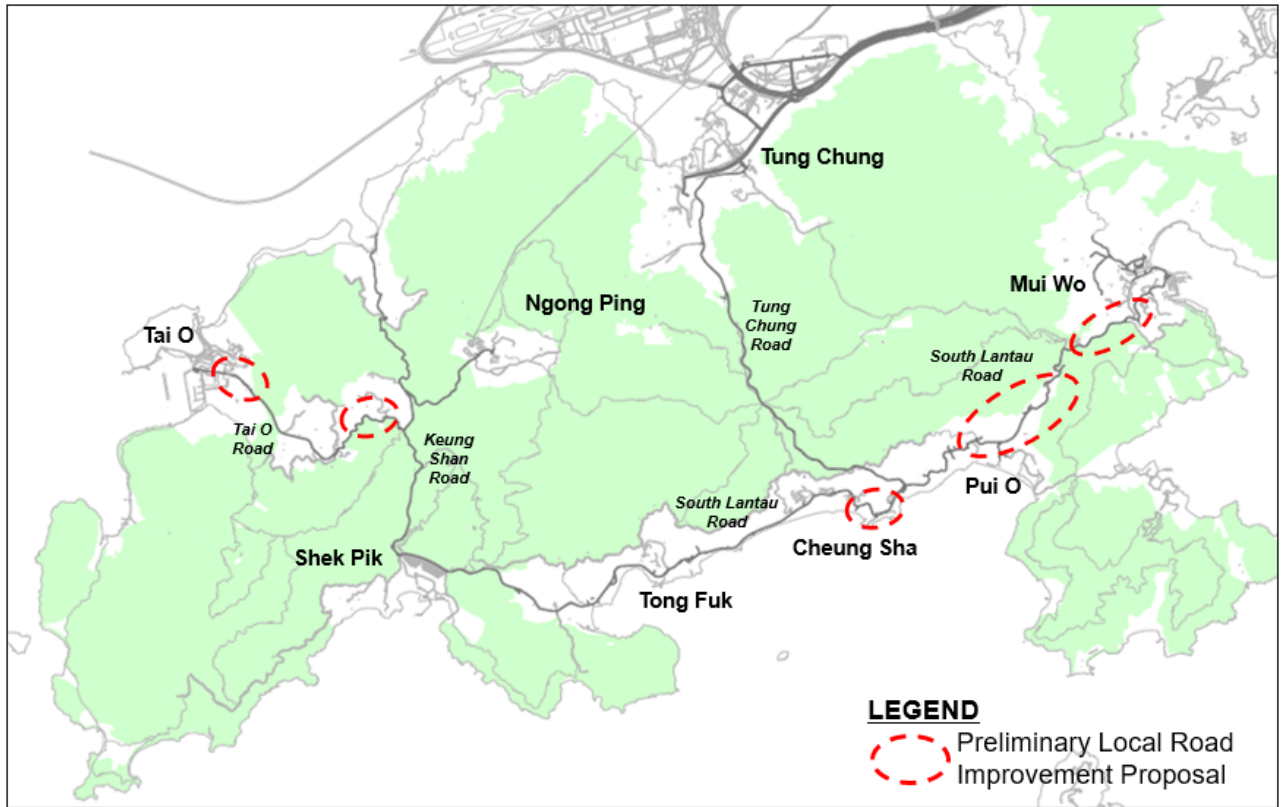


Figure 4.1 Preliminary Local Road Improvement Proposals

5 Pier Facility Improvements

5.1 Overview

- 5.1.1 With a view to complementing the land-based transport in Lantau and enhancing the accessibility and connectivity with surrounding areas in Lantau, the Study assessed the need and conducted preliminary feasibility study on providing pier facilities/landing steps for water transport in Lantau.
- 5.1.2 The Study acknowledged that CEDD are implementing the Pier Improvement Programme (PIP), which includes several existing public piers in Lantau such as Yi O, Ma Wan Chung, etc. In addition to these recommended pier improvement works under PIP, when formulating the pier facility improvement proposals under this project, the Study took into account various factors including locations and conditions of existing pier facilities in Lantau, the Conservation for the South principle under the Sustainable Lantau Blueprint, and the requests from locals for pier upgrading, etc. In addition, the existing marine transport connectivity was reviewed and opportunities for new or upgraded marine traffic routes were identified.
- 5.1.3 The Study recommended that besides complementing land-based transport and help diverting road traffic during holidays, water transport could also provide an alternative leisure transport mode for Lantau residents and tourists to other hotspots in South Lantau including Cheung Sha and Pui O which have been included in the South Lantau Eco-recreation Corridor under the “Lantau Conservation and Recreation Masterplan” promulgated in 2020.
- 5.1.4 The Study recommended that new pier facilities or improvement of existing piers at the four locations in South Lantau, i.e. Tong Fuk, Cheung Sha, Pui O and Man Kok Tsui. Detailed considerations and the location plan are at **Table 5.1** and **Figure 5.1**.

Table 5.1 Recommended Potential Pier Improvement Locations

Location	Consideration
Tong Fuk	<ul style="list-style-type: none"> There is a need for public pier(s) in South Lantau to serve the visitors under the planned South Lantau Eco-Recreation Corridor in the Lantau Conservation and Recreation Masterplan. It could be considered as one of the potential new pier sites. Berthing safety might be an issue where the water depth may not be adequate, in particular during low tides and hence it is required further study.
Cheung Sha	<ul style="list-style-type: none"> The potential for water-based activities at Cheung Sha is mentioned in the Lantau Conservation and Recreation Masterplan, forming part of the planned South Lantau Eco-Recreation Corridor. It could be considered as one of the potential new pier sites. Feasibility of the pier proposal needed to be confirmed.
Pui O	<ul style="list-style-type: none"> The potential for eco-recreation with conservation education at Pui O is mentioned in the Lantau Conservation and Recreation Masterplan, forming part of the planned South Lantau Eco-Recreation Corridor. It could be considered as one of the potential new pier sites.
Man Kok Tsui	<ul style="list-style-type: none"> Berthing safety might be an issue where the water depth may not be adequate, in particular during low tides and hence it is required further study.

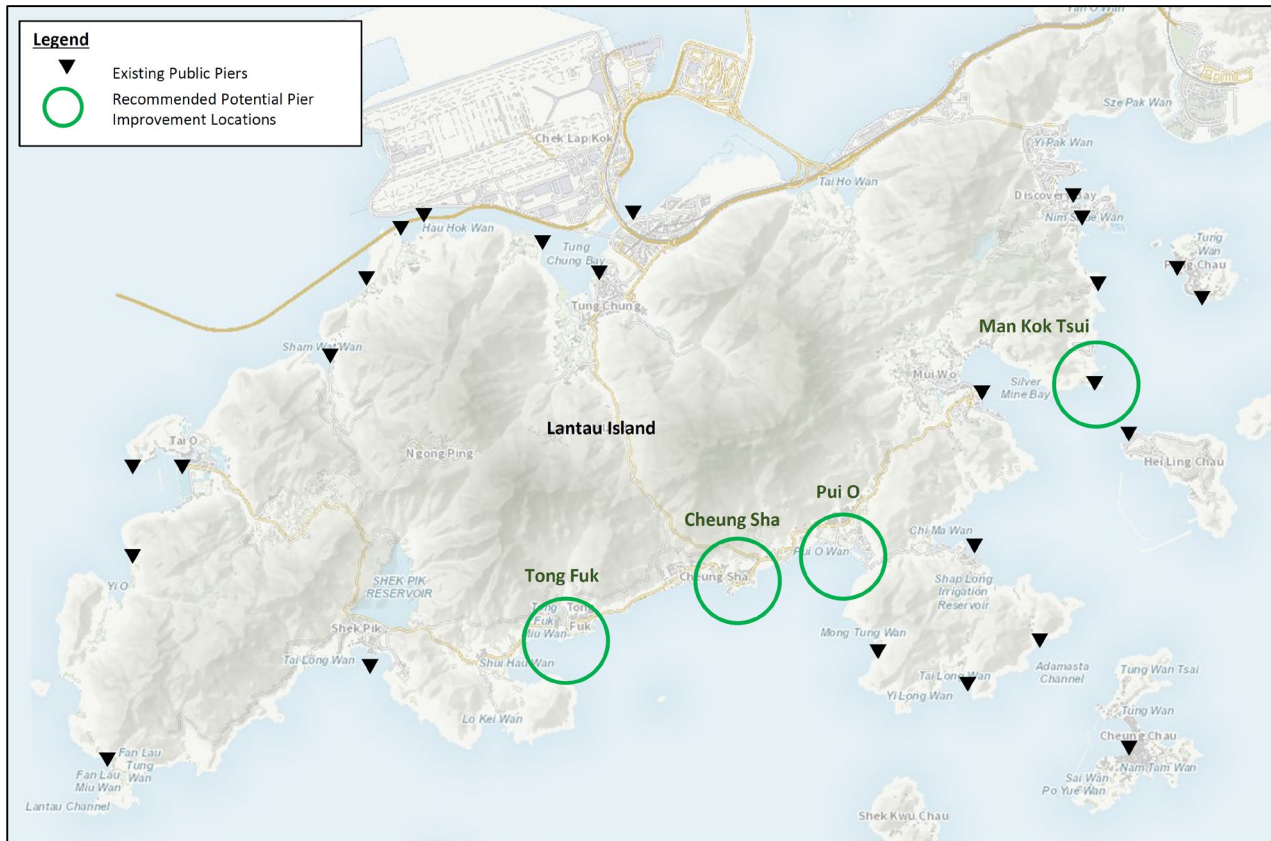





Figure 5.1 Recommended Potential Pier Improvement Locations

5.2 Recommended Potential Pier facility Improvements

- 5.2.1 Broad assessments were conducted under the Study to (i) provide preliminary engineering assessment on the feasibility of the pier improvement works, and (ii) identify other key issues and constraints of these piers that need to be further investigated in future study, if the pier improvement works are to be taken forward.
- 5.2.2 Initial preliminary design of the proposed new/improved piers have been prepared and are summarised in **Table 5.2**. These are preliminary only, further investigation and review shall be carried out when the pier improvement works are to be taken forward.

Table 5.2 Preliminary Design of Proposed New / Improved Piers

Location	Type	Vessel Type	Catwalk		Pier Head	
			Length (m)	Width (m)	Length (m)	Width (m)
Tong Fuk	New Pier	V01 V03	110	4	35	8
Cheung Sha (Sha Tsui)	New Pier	V01 V02 V03	200	4	60	4
Pui O (Option 1)	New Pier	V01 V03	270	4	35	8
Pui O (Option 2)	New Pier	V01 V03	370	4	35	8
Man Kok Tsui	Improvement Works	V01 V03	160	3	35	4

Vessel Type		Type of Vessel	Capacity (pax)	Length Overall (LOA) (m)	Draft (m)
V01		Ferry	80	18	1.8
V02		Ferry	300	25	2.5
V03		Kai To	10	10	1.5

- 5.2.3 More detailed studies on these potential pier improvement works should be carried out to ascertain their feasibility in the aspects of engineering, planning, environmental, marine impact, etc. for further development of the schemes if taken forward.
- 5.2.4 The Man Kok Tsui pier improvement works have been included in the Phase 2 of the Pier Improvement Programme. On the other hand, the feasibility study “Initiatives for South Lantau Eco-recreation Corridor – Investigation” which will further review the needs and select suitable sites for the provision of new pier facilities in South Lantau waterfront, such as Tong Fuk, Cheung Sha and Pui O, commenced in November 2021.

6 Other Potential Traffic Improvement Measures

6.1 Wayfinding / Signage for Tung Chung Development Pier

- 6.1.1 Besides road transport, travel to South Lantau (to Sha Lo Wan and Tai O) could be by means of ferry. The existing Tung Chung Development Pier to the north of Tung Chung MTR Station is about 1 km from the Station. With a view to promoting the use of water transport for complementing the land-based transport, the Study recommended enhancement of connectivity and walking experience of the routing between these places. One possible way is to improve the wayfinding and signage for better navigation and walking experience along the journey.

6.2 Hop-On/Hop-Off Shuttle Service in Lantau

- 6.2.1 There are numerous tourist hotspots and leisure and recreation activities in Lantau, especially in south Lantau. The Study recommended that the introduction of hop-on / hop-off (HH) shuttles in south Lantau could improve the connectivity among these tourist spots, it is also an attraction to enable the visitors to enjoy the scenic view of natural coastlines in South Lantau.
- 6.2.2 Having reviewed the existing HH shuttle services in Hong Kong as well as those in other cities such as Sydney and New York City, the Study identified key considerations when exploring the potential HH shuttle service in Lantau. They included service headway, routing, interchange points, financial sustainability, etc.
- 6.2.3 Two routes are proposed for potential HH services on Lantau. The first route (referred to as 1A) would operate between Tung Chung and Tai O along Tung Chung Road, South Lantau Road, and Tai O Road, passing by several key attractions including the Tung Chung Town Park, flowers/trees appreciation at Country Park and South Lantau waterfront. In the eastbound direction starting from Tai O, the route will also serve Ngong Ping. The second route (referred to as 1B) would operate between Tung Chung and Mui Wo along Tung Chung Road and South Lantau Road, passing by several key attractions including Tung Chung Town Park, flowers/trees appreciation at Country Park, South Lantau waterfront and Mui Wo Mountain Bike Practice Ground.
- 6.2.4 Given that there are franchised bus services serving Lantau, if the HH shuttle services are to be considered in future, factors such as passenger demand, impact on existing franchised bus services, provision of supporting infrastructure and facilities, and financial viability should be taken into account. It is suggested that if the HH shuttle service is to be pursued in future, a market sounding exercise should be carried out to identify if there are private operators interested in providing such service.







7 Provision of Green Transport

7.1 Recommended Green Transport in Lantau

7.1.1 Green transport can be generally defined as a transport mode that is more environmentally friendly, low-carbon, sustainable, healthier, efficient and cost-effective as compared to driving or traditional road-based public transport modes using fossil fuels. With a view to improving the air quality and achieving a sustainable Lantau, introduction of suitable green transport mode(s) should be contemplated.

7.1.2 A desktop study of various green transport modes (including electric bus, trolleybus, and various rail modes) was undertaken to appreciate the merits and demerits of each mode in the Lantau context. A comparison of these modes is summarised in **Table 7.1**. Assessment criteria included the maximum capacity of each mode (in terms of passengers per hour per direction (pphpd)), average travelling speed, reliability (level of interaction with adjacent traffic or pedestrians, operability under different conditions, etc.), as well as the required infrastructures (and thus the capital costs).

Table 7.1 Summary of Green Transport Modes

Item	Electric Bus 	Trolley Bus 	Automated People Mover (APM) 	Modern Tram 	Monorail 	Travellator 
Reference	KMB Routes, HKSAR	Zurich	Macao SAR	Sydney Light Rail	Chongqing	Tsim Sha Tsui East Station
Maximum Capacity (pphd)	1,500	2,400	9,000	13,500 (assuming dedicated corridor)	43,000	3,000
Average Speed (kph)	<30	<15	<35	<25	<40	<6.5
Reliability	Low	Low	High	Low (shared corridor) to Medium (dedicated corridor)	High	Low (especially during maintenance)
Infrastructures	Charging facilities at termini/depot	Overhead catenary for electricity supply, depot	Tracks, stations and rolling stocks, depot	Guideway, rolling stocks, depot	Tracks, stations and rolling stocks, depot	Travellators and electricity supply

- 7.1.3 Among the green transport modes assessed above, the Study considered that the electric buses would be a relatively suitable green transport mode in Lantau, since other transport modes such as APM and Monorail would require extensive civil works/infrastructure, and the electric buses would be capable of coping with the visitor demand. It is also in line with the “Hong Kong Roadmap on Popularisation of Electric Vehicles” announced by the Government in March 2021. Nevertheless, the implementation of green transport mode in Hong Kong would require a thorough study by relevant policy bureau/department take into account various factors, including reviewing the current trial run results of the electric bus in Hong Kong, latest technology advancement on green public transport, operability in hilly terrain in rural areas, provisioning of supporting facilities, etc.
- 7.1.4 To promote the popularization of electric vehicles (EV) in Lantau, the Study recommended providing and enhancing the EV charging infrastructure and relevant supporting facilities in Lantau, such as EV charging stations.

8 Expansion of Biking Networks in Lantau

8.1 Overview

8.1.1 In order to promote cycling to enhance connectivity and improve accessibility to various recreation nodes both in North and South Lantau, biking networks comprising cycle track (CT) and mountain bike trail (MBT) alignment options were identified and evaluated with a view to creating an accessible and comprehensive biking network which would cater for a wide range of cyclists, while inducing the least disturbance to local residents and other visitor activities as well as the environment. Constraints on engineering, land use, environmental, social aspects and interfacing with other planned projects were fully considered when developing the biking proposals.

8.1.2 When considering the biking alignment options, the following key considerations were taken into account:

- Comfortability – facilities that are fit-for-purpose and appeal to existing and new cyclists;
- Connectivity – well-connected to key transport facilities and pedestrian footpaths;
- Completeness – establish a continuous routes and corridors, linking and/or extending the existing and future planned network;
- Safety – an appropriate degree of separation based largely on the movement function of the street; and
- Inclusiveness – designed to cater for different types for road and touring cyclists and mountain bikers, also cater for various cycling purposes.

8.1.3 For MBTs, they are generally natural surfaced and primarily aligned within country park for a better fit. The key consideration for the proposed MBT alignment is to avoid massive intrusive engineered structures and private lots and minimize the adverse environmental impacts. In addition, a comprehensive MBT network should ideally include a wide variety of different trail types, suiting local topography, and considering location of other point of interest or routing, etc.

8.1.4 A set of assessment criteria were considered in evaluating the alignment options and recommending the biking alignment routes, which are summarised below:

- User criteria including connectivity, user experience, accessibility, looping, user safety, etc.;
- Engineering criteria including cost-effectiveness, engineering feasibility, pedestrian / vehicular access, interface with existing hiking trails, impacts to existing villages, geotechnical impacts, etc.;
- Environmental criteria; and
- Financial criteria.

8.2 Recommended Potential Biking Alignments for Cycle Track

8.2.1 At present, the cycle track between Tung Chung and Tai Ho Interchange is being implemented under the Tung Chung New Town Extension project. Furthermore, the Engineering Study on Road P1 (Tai Ho - Sunny Bay Section) is examining the need and feasibility of further extending the cycle track to Sunny Bay. Subject to further liaison with concerned parties and feasibility study, the biking network in North Lantau might

be further extended to the Airport Island via existing cycle track along Tung Chung Waterfront Road/ Shun Tung Road.

- 8.2.2 In addition to the above, the Study recommended three biking alignments in South Lantau for further consideration, which are summarised in **Table 8.1** and illustrated in **Figure 8.1**. These potential biking alignments are subject to further study under Agreement No. 87/2020 (CE) “Sustainable Leisure and Recreation Initiatives in Shek Pik and Adjoining Areas - Investigation”.

Table 8.1 Summary of Potential Biking Track Alignments

CT Alignment	Description
CT 1: Lantau Trail Section 7/8 (Between Wang Pui Road and Kau Ling Chung)	<ul style="list-style-type: none"> Total length is about 5 km long and generally 3.5m wide, which connects with Wang Pui Road at the east and ends at the junction with hiking trail section of Lantau Trail Section 7 at the west. It can potentially branch out to different villages and tourist attractions so as to create an alternative and green commuting route for villagers and tourists.
CT 2: Lantau Trail Section 10/ 11 (Between Shek Pik Reservoir and Pui O)	<ul style="list-style-type: none"> Total length is about 10 km long and generally 3.5m wide, which connects with the hiking trail section of Lantau Trail Section 11 near Pui O Beach at the east, and the access road to South Lantau Road near Shek Pik Reservoir at the west. It can potentially branch out to different villages and tourist attractions so as to create an alternative and green commuting route for villagers and tourists.
CT 3: Shek Pik Reservoir Circular Route	<ul style="list-style-type: none"> Total length is about 7 km long, and generally 3.5m wide which intentionally to be share used by hikers and cyclists. The proposed biking track will be at gentle gradient looping around the reservoir and back to Keung Shan Road on the reservoir dam.

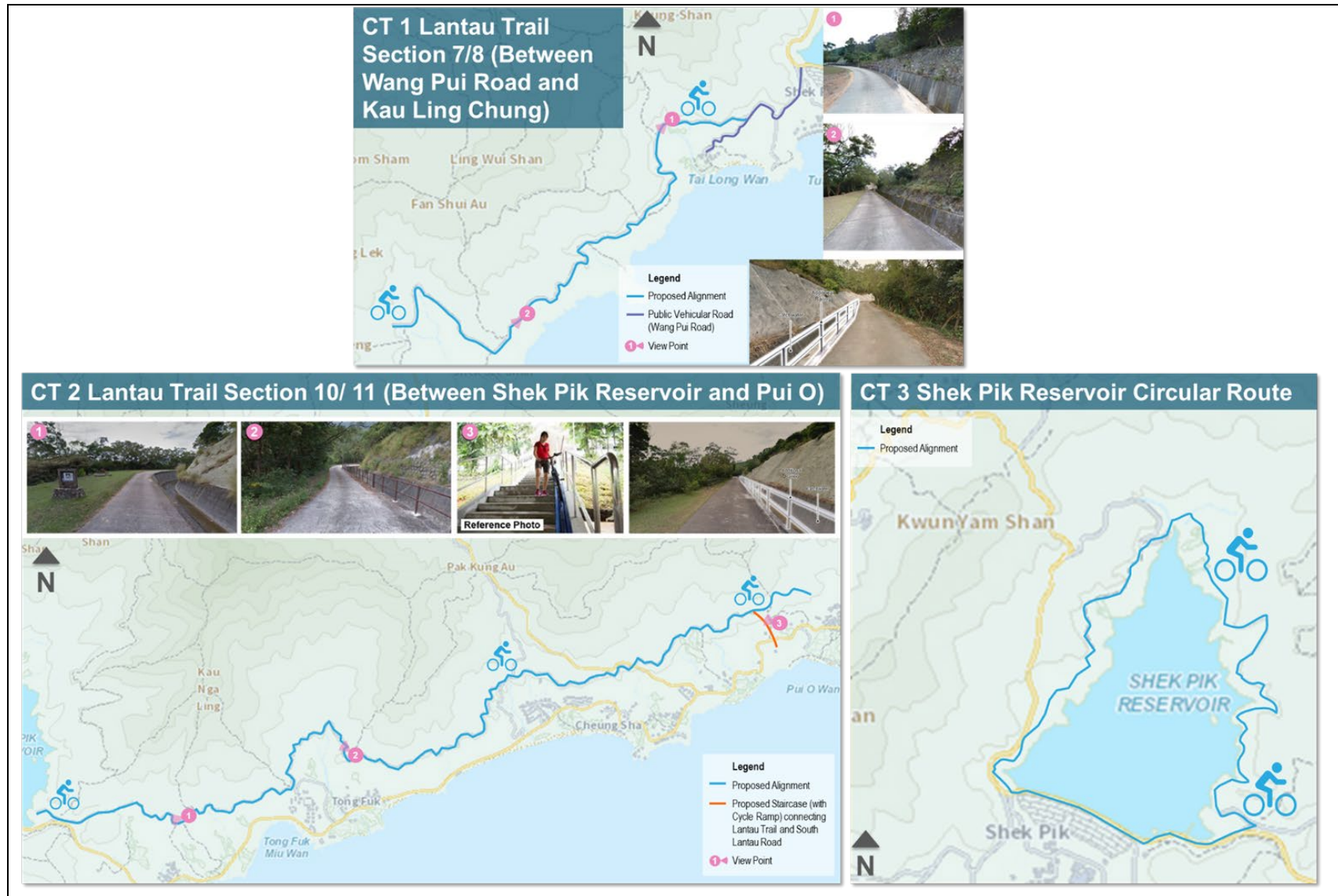


Figure 8.1 Potential Biking Alignments

8.3 Recommended Potential Biking Alignments for Mountain Bike Trail

- 8.3.1 If further expansion of the biking route for MBT is required, the Study recommended four potential MBT alignments, which are summarised in **Table 8.2** and shown in **Figure 8.2**.
- 8.3.2 These potential alignments might complete the linkage of existing/planned MBTs and biking tracks to form a comprehensive network connecting Tung Chung – Mountain Bike Practice Ground (near Lai Chi Yuen Chuen) – Chi Ma Wan – South Lantau Catchwater Road, and to accomplish a north-south bike route between North and South Lantau.
- 8.3.3 Notwithstanding the above, the Study also recommended reviewing the utilisation of existing and new MBT and practicing facilities under the Expansion of Mountain Bike Trail Networks in South Lantau (Remaining Phase) project, which will consider the need for further expanding the MBT network in due course.

Table 8.2 Summary of Potential MBT Alignments

MBT Alignment	Description
MBT 1: Tung Chung East to Olympic Trail Ridgeline	<ul style="list-style-type: none"> It provides an essential recreational and green commuting connector between North and South Lantau. The length is about 4.8 - 5.8 km. It starts from the top of Olympic Trail ridgeline at Mong To Au Rain Shelter, and offer bikers coming from Mui Wo a safer descend to Tung Chung East near the coastal underpass just outside of Pak Mong Village.
MBT 2: Olympic Trail Ridgeline to Nam Shan (Options 2a & 2b)	<ul style="list-style-type: none"> It links two major nodes between Olympic Trail and Nam Shan. Two alignment options (2a & 2b) were identified and the respective lengths are about 3.3 km (2a) / 3.8 km (2b) : Alignment 2a will branch off from Olympic Trail between A Po Long and Wong Kung Tin and end at Lantau Trail Section 2 intersection with AFCD Nam Shan Management Centre access road. Alignment 2b will connect the trail system directly without going onto existing roads. Alignment 2b is considered a safer option but requires addition trails to be constructed - a bridge option across South Lantau Road can be placed in as well, which would enable a safer hiker cum biker crossing.
MBT 3: Nam Shan to Chi Ma Wan Trail Head (Options 3a & 3b)	<ul style="list-style-type: none"> It links two major nodes between Mui Wo and Chi Ma Wan (along Shap Long San Tsuen coastline). Two alternative alignments (3a & 3b) were identified and the respective lengths are about 6.5 km (3a) / 4 km (3b) : Alignment 3a is routed from Nam Shan to Chi Ma Wan via Lai Chi Yuen Tsuen that will enhance linkage to/from Mui Wo, as well as to provide crucial connection for the Mountain Bike Practice Ground at Lai Chi Yuen Tsuen. Alignment 3b will take a more direct route from Nam Shan (near picnic site) to Chi Ma Wan that requires series of stack switchback at both ends to bring the trail to appropriate level.
MBT 4: Nam Shan to Pui O – Kau Ling Chung Catchwater Road	<ul style="list-style-type: none"> It is situated at the eastern end of the South Lantau catchwater road running from Kau Ling Chung to Pui O, and will form part of the round island route to connect multiple trails. The length is about 4 km.



Figure 8.2 Potential MBT Alignments

9 Capacity to Receive Visitors for Lantau

9.1 Overall Approach

9.1.1 For the assessment of the capacity to receive visitors for Lantau, a structured five-step approach was adopted as follows:

1) Research into international practices and established methodologies

9.1.2 The Study reviewed the theories for developing a methodological framework to assess the visitors' receiving capacity. They were mainly based on research of international practices, overseas assessment models and case studies, including their practical application to Hong Kong and those specifically for Lantau.

9.1.3 It should be noted that despite the term "capacity" is used, the assessment which was based on a broad range of quantitative and qualitative properties would not provide an absolute maximum number of visitors that a place can accept. The concept of "capacity" is more akin to a planning tool for sustainable recreation & tourism development with respect to knowing the "readiness" of a place to receive visitors as well as identifying potential issues that need attention and/or needs for appropriate mitigation/management measures.

2) Participatory process / establishment of assessment framework

9.1.4 A participatory process² was adopted to enable the development of an assessment framework and to initiate identification of criteria/indicators for evaluating the capacity to receive visitors in Lantau.

9.1.5 Taking into account that the activities of visitors would have some impacts on the local community and environment, etc., the assessment of the capacity to receive visitors for Lantau did not only consider the provisions of infrastructures/facilities required for supporting the recreation and tourism (R&T) proposals, but also other primary aspects, such as the perception of local residents, the impacts to natural environment, quality of visitors' satisfaction, etc. As such, an assessment framework comprising both quantitative and qualitative properties including the capacity of infrastructure systems, social, economic and environmental impacts was established.

3) Development of assessment indicators

9.1.6 Based on the assessment framework, a list of assessment criteria/indicators was developed for the assessment of the capacity to receive visitors for Lantau. **Table 9.1** summarizes the established assessment framework and the relevant assessment criteria/indicators.

² The participatory process included (i) a workshop conducted with relevant bureaux/departments on 8 February 2018; (ii) a briefing session to an Expert Group (comprised of scholars/academics of relevant specialist areas) on 14 September 2018; (iii) a briefing to the Task Force on Lantau Conservation of the LanDAC on 19 October 2018.

Table 9.1 Assessment Framework and Assessment Criteria/Indicators

Theme	Aspect/Assessment Criteria/Indicators
Capacity of Infrastructure Systems	Transport system/services
	Drainage/ Sewerage
	Water supply & utilities
Social Aspects	Satisfaction of & Social Benefits to Communities
	Social Impacts to Communities
	Transport Convenience & Safety
	Visitor Satisfaction
	Hygiene and Cleanliness
	Development Intensity
Economic Aspects	Visitor Seasonality
	Direct Economic Benefits
	Local Business Nature
Environmental Aspects	Air quality
	Noise
	Water quality
	Cultural heritage
	Landscape
	Waste
	Ecology

4) *Opinion surveys / assessment on capacity to receive visitors*

- 9.1.7 Opinion surveys through face-to-face and telephone interviews were conducted to collect views/opinions of the public (including locals and visitors). Questions included level of satisfaction living in/visiting Lantau, current/potential recreation/tourism assets in Lantau and their rankings in terms of value, views/opinions on the reception of the recreation/tourism developments recommended in Lantau, etc. The information collected is mostly qualitative in nature reflecting visitors' perception at the time of interview.
- 9.1.8 Based on the findings of the opinion surveys and assessment criteria/indicators, assessments were conducted for five popular areas in South Lantau, namely Tai O, Tung Chung, Ngong Ping, Mui Wo and South Lantau Waterfront (covering Shui Hau, Tong Fuk, Cheung Sha and Pui O), as shown in **Figure 9.1**.
- 9.1.9 Following the assessments, possible mitigation/ improvement measures are proposed, with a view to balancing the impacts of the tourism on economic development and people's livelihood.

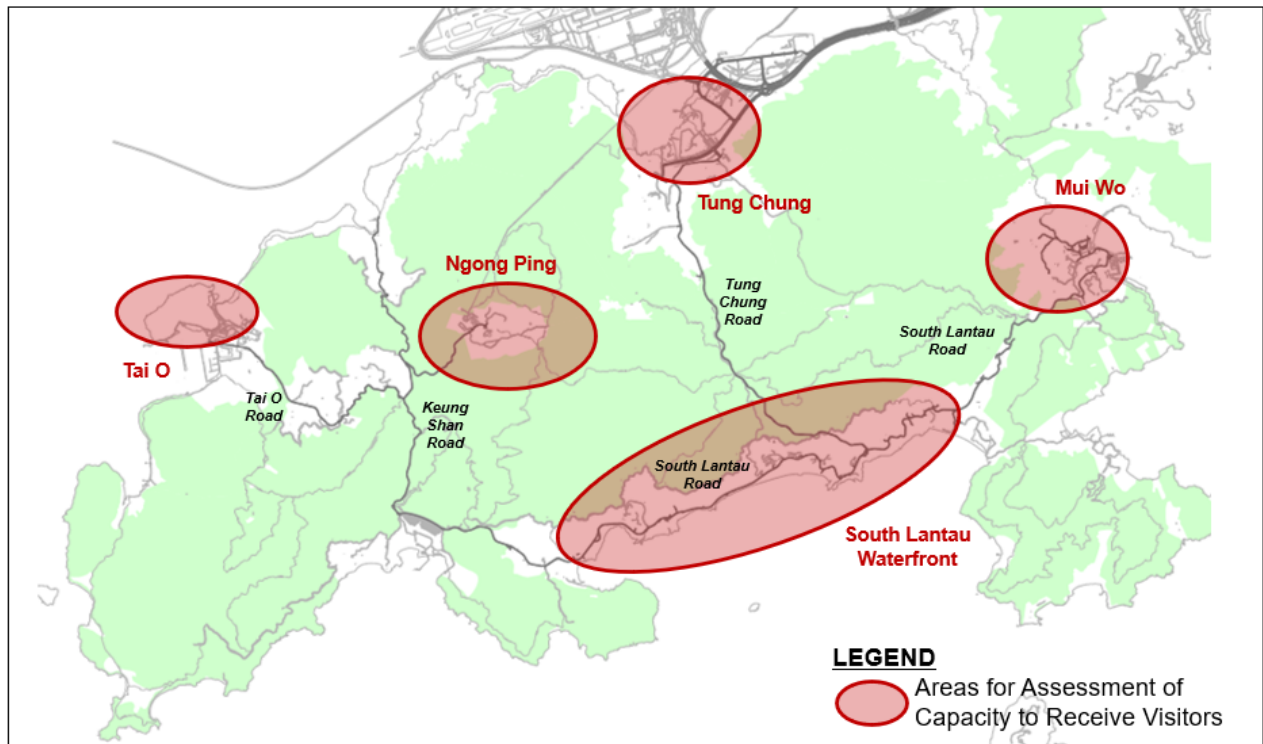


Figure 9.1 Five Areas for Assessment of Capacity to Receive Visitors

5) *Mechanism for continuous monitoring*

- 9.1.10 The assessment on the capacity to receive visitors should not be a one-off exercise. It establishes the current state of conditions that would serve as the benchmark for comparison over time.
- 9.1.11 For establishing the trend of changes of the situation and also to be responsive to continual changes of people's perceptions or satisfaction, a mechanism and procedures for continuous monitoring of the indicators application and for continuous evaluation of the implementation plans for the recreation/tourism developments may be required.

9.2 Findings of Opinion Surveys

- 9.2.1 Overall, 1 008 local residents, 100 local businesses and 1 031 visitors to Lantau (both HK residents and tourists) were successfully interviewed via street intercept face-to-face interviews during the period from late August to mid October 2019. In addition, 336 interviewees were successfully interviewed by telephone surveys, in order to collect the views/opinions of the general public who might not be captured by the street intercept surveys.
- 9.2.2 The main findings of the opinion survey are as follows:
- (a) About 80%-90% of the interviewed visitors were generally satisfied with the tourist hotspots³ (including tourist attractions and facilities, etc.) in Lantau visited;
 - (b) About 70% and 80% of the interviewed Tung Chung and Tai O local residents respectively considered that there were too many tourists at weekends, particularly in the peak hours, which led to overcrowding;
 - (c) About 70% of the interviewed Tung Chung and Tai O local residents considered that in weekends there were no spare capacity in Tung Chung and Tai O Town Centre to receive more visitors. On the other hand, about 50%-60% of the Tung Chung and Tai O visitors considered that there were no spare capacity to receive more visitors in the town centre; and
 - (d) About 70% or more of the interviewees considered that enhancing the public transport services, hotel/accommodation, food and beverage, entertainment and shopping facilities would help enhance the visitors' visiting experience.

9.3 Key Assessment Findings

- 9.3.1 The key assessment findings are summarized below:
- (a) Lantau's tourist destinations and the transport infrastructure are generally able to cope with the needs of visitors;
 - (b) The satisfaction of visitors was high;
 - (c) Some discrete locations (such as Tai O and Tung Chung Town Centre) were overcrowded with visitors at peak hours of weekends and holidays because most of the tourists were visiting these places during the peak hours. The enhancement of public transport services, hotel/accommodation, food and beverage, entertainment and shopping facilities may help enhance the visitors' visiting experience;
 - (d) Provision of more parking spaces in areas such as Tai O and Mui Wo, etc; and
 - (e) Potential impacts of visitor activities on the environment are generally acceptable.

³ They included tourist hotspots in the five assessment areas, namely Tung Chung, Tai O, Ngong Ping, Mui Wo and South Lantau waterfront.

9.4 Recommendations

9.4.1 Based on the findings of the assessment on the capacity to receive visitors for Lantau, the recommended mitigation measures / proposals are summarized in **Table 9.2**:

Table 9.2 Recommended mitigation measures / proposals on Enhancing Visitors' Visiting Experience

	Recommended mitigation measures / proposals
Traffic and Transport	<ol style="list-style-type: none"> 1) Enhance the public transport services and related supporting facilities to hotspots in South Lantau, in peak hours (such as improving the queue/alighting and boarding arrangements, etc.) 2) Enhance the dissemination of information of public transport services, such as the frequency of the ferry services between Tung Chung and Tai O 3) Enhance the walkability / wayfinding between Tung Chung Town Centre and Tung Chung Development Pier 4) Enhance the ferry services⁴ by replacing the existing fleets with greener vessels with newer facilities under the Vessel Subsidy Scheme launched by the Government 5) Provide more parking facilities in areas such as Tai O and Mui Wo
Recreation & Tourism Activities	<ol style="list-style-type: none"> 1) Explore the provision of diversified sustainable leisure and recreational facilities at different locations in Lantau in the long run
Others	<ol style="list-style-type: none"> 1) Explore the provision of real-time information on crowdedness at tourist hotspots, e.g. in Tai O

9.4.2 The assessment of the capacity to receive visitors is a continuous work. It only reflects the current state of condition for the respective assessment criteria/indicators. The information and data collected from the assessment would serve as benchmark for comparison over time to establish the trend of changes. In the process of continuous monitoring and evaluation, should there be clear indication that the performance of certain indicators decline with time, further management strategies and/or improvement/mitigation measures may need to be considered.

9.4.3 In addition, the Government has formulated the Lantau Conservation and Recreation Masterplan in 2020 to provide a guiding framework for the conservation and recreation initiatives in Lantau. The Masterplan represents a point-line-plane approach, with various attractions, activities and event bases linked up by connectors in the form of trails, bike network, and road/water transport, to create five themed clusters that include diverse contents. The provision of diversified sustainable leisure and recreational facilities can provide different experiences to the visitors and help diverse the visitors to different areas of Lantau.

⁴ The ferry services refer to “Tuen Mun – Tung Chung – Sha Lo Wan – Tai O”, “Mui Wo – Central”, “Inter-Islands” and “Mui Wo – Discovery Bay” routes.

10 Conclusion and Way Forward

- 10.1.1 With the commencement and planning of a number of strategic infrastructure and development projects in north Lantau, the role of Lantau will be further enhanced. The Study conducted different analysis to assess the strategic and local transportation infrastructure to/from and within Lantau, including the existing and planned strategic road and rail networks, road connections between Tung Chung and Tai O and between North Lantau and Mui Wo, local road improvements on main roads in South Lantau, pier facility improvement, wayfinding / signage for Tung Chung Development Pier and potential Hop-On/Hop-Off shuttle service in Lantau, green transport in Lantau, as well as expansion of cycle track and mountain bike trail networks. In addition, the Study also assessed the capacity to receive visitors in Lantau and recommended mitigation measures and follow-up based on the assessment findings.
- 10.1.2 Regarding the strategic traffic and transport infrastructure in Lantau, apart from the existing NLH, HKLR and TM-CLKL, there are other strategic transport infrastructure being taken forward including Road P1, Route 11, TY-LL, Tung Chung Line Extension and Airport City Link, etc. In addition, a set of priority transport corridor comprising road and rail links between Hong Kong Island, the artificial islands in the Central Waters, Northeast Lantau and coastal area of Tuen Mun is being explored under the studies related to artificial islands in the Central Waters. The existing and planned/ongoing strategic traffic and transport infrastructure can generally meet the long-term external transport needs of Lantau.
- 10.1.3 Having considered various factors such as the overarching principle of “Development in the North; Conservation for the South”, traffic needs, capital costs, capacity to receive visitors and environmental factors, the resilience of North-South Lantau’s road network under emergency situations, etc., it is recommended to further study the feasibility in detail on a total of five preliminary enhancement options in next stage, with a view to identifying the feasible and most suitable arrangement. Two preliminary enhancement options are for enhancement of the road connections between Tung Chung and Tai O: (a) a new road tunnel connecting Shek Pik and Tai O Road; and (b) new bridges at KSR. Other three options are for improving the resilience of the North-South Lantau’s road network under emergency situations, namely (a) a new road tunnel connecting Mui Wo and existing road/tunnel in DB; (b) a new road tunnel directly connecting Mui Wo and Siu Ho Wan; and (c) improvement of Old Tung Chung Road.
- 10.1.4 With a view to further improving the road conditions where possible, it is recommended to undertake some improvement works to some main roads in South Lantau, such as local road widening and bend improvement on some road sections of SLR, KSR and TOR.
- 10.1.5 To promote water transport as an alternate green transport mode to complement road-based transport and increase the connectivity amongst the visitors’ hotspots, it is recommended to improve the existing Man Kok Tsui Pier and to provide new pier facilities in South Lantau waterfront, such as Tong Fuk, Cheung Sha and Pui O. The Man Kok Tsui pier improvement works are being undertaken under Pier Improvement Programme Phase 2. The provision of new pier facilities together with hop-on / hop-off shuttle service in South Lantau are being studied under “Initiatives for South Lantau Eco-recreation Corridor – Investigation”. The financial viability and market sounding exercise should be carried out to confirm the implementation.
- 10.1.6 The Study considered that the electric buses would be a relatively suitable green transport mode in Lantau and recommended that further provision and enhancement of EV charging infrastructure and relevant supporting facilities in Lantau.
- 10.1.7 In addition to the cycle track between Tung Chung and Sunny Bay along the northern shore of Lantau, the Study recommended to consider three potential CT alignments for further studies in future, including potential CT along Lantau Trail Section 7/8 and 10/11,

as well as the route around Shek Pik Reservoir. Regarding the recommended potential MBT alignments, the Study had identified four potential MBT alignments, including between Tung Chung East and Olympic Trail Ridgeline, between Olympic Trail Ridgeline and Nam Shan, between Nam Shan and Chi Ma Wan Trail Head, as well as between Nam Shan and Pui O – Kau Ling Chung Catchwater Road. It is recommended to review the utilisation of existing and new MBT and practicing facilities under the Expansion of Mountain Bike Trail Networks in South Lantau (Remaining Phase) project before consider the need for further expanding the MBT network in due course.

- 10.1.8 Regarding the capacity to receive visitors in Lantau, by making reference to the international best practices, a comprehensive assessment framework was established with due regard to the overarching principle of “Development in the North, Conservation for the South” in Lantau. The assessment was undertaken for five popular areas in South Lantau including Tai O, Tung Chung, Ngong Ping, Mui Wo and South Lantau Waterfront. The assessment was multi-faceted, fully taking into consideration the capacity of infrastructure systems, social, economic and environmental aspects. To take a holistic view balancing different views and interests of all concerned parties, opinion surveys were conducted during the third and fourth quarters of 2019 which interviewed more than 2 000 local residents, visitors, local businesses and the general public on current situation of Lantau and their views on sustainable leisure and recreational activities. The study findings indicated that Lantau’s tourist destinations and the transport infrastructure were generally able to cope with the needs of visitors and the satisfaction of visitors was high. However, some discrete locations (such as Tai O and Tung Chung Town Centre) were overcrowded with visitors at peak hours of weekends and holidays because most of the tourists were visiting these places during the peak hours.
- 10.1.9 The Study recommended corresponding mitigation measures including enhancing the public transport services and supporting facilities (such as improving the queue up/alighting and boarding arrangements), enhancing the dissemination of information of public transport services (such as ferry services frequency between Tung Chung and Tai O), enhancing the walkability between Tung Chung Town Centre and Tung Chung Development Pier, and exploring the provision of crowdedness information at tourist hotspots, etc. Liaison and follow up with relevant departments on the subsequent work arising from the recommendations of the study are required.
- 10.1.10 The assessment on receiving capacity reflects the state of conditions as well as visitors’ perception at the time the assessment conducted. The performance values should serve as benchmark for comparison over time to establish the trend of changes. Continuous monitoring and evaluation process is recommended as this would help to identify potential issues and any measures/actions to be taken.