立法會 CB(1)1316/16-17(02)號文件
LC Paper No. CB(1)1316/16-17(02)

九龍東環保連接系統
詳細可行性研究
中期公眾諮詢

Detailed Feasibility Study for Environmentally Friendly Linkage System (EFLS) for Kowloon East (KE)
Interim Public Consultation

EFLS
九龍東環保連接系統
Environmentally Friendly Linkage System for Kowloon East

2017年7月17日

17 July 2017

背景 Background

2012-2014

初步可行性研究公眾諮詢

公眾普遍認同需要加強九龍東的聯繫，公眾對擬議高架單軌鐵路系統的意見大致可歸納為三個關鍵議題：

(1) 高架鐵路為本連接系統的需要，

(2) 走線和覆蓋範圍，以及

(3) 對觀塘避風塘的影響。

Public Consultation for Preliminary Feasibility Study

Public generally agreed that there was a need to enhance the connectivity in KE. However there were diversified views on the proposed elevated monorail system which can largely be categorized into three key issues: (i) need for an elevated rail-based EFLS, (ii) alignment and coverage, and (iii) implications for the Kwun Tong Typhoon Shelter.

2015

詳細可行性研究展開並分兩階段進行。首階段是評估各種環保交通模式，選取最適合及具成本效益的環保交通模式；然後在第二階段制定環保連接系統方案。

Detailed Feasibility Study (DFS) commenced and is being conducted in two stages. The first stage is to evaluate various green transport modes and select the most suitable and cost-effective green transport mode for developing the EFLS scheme at the second stage.

2017

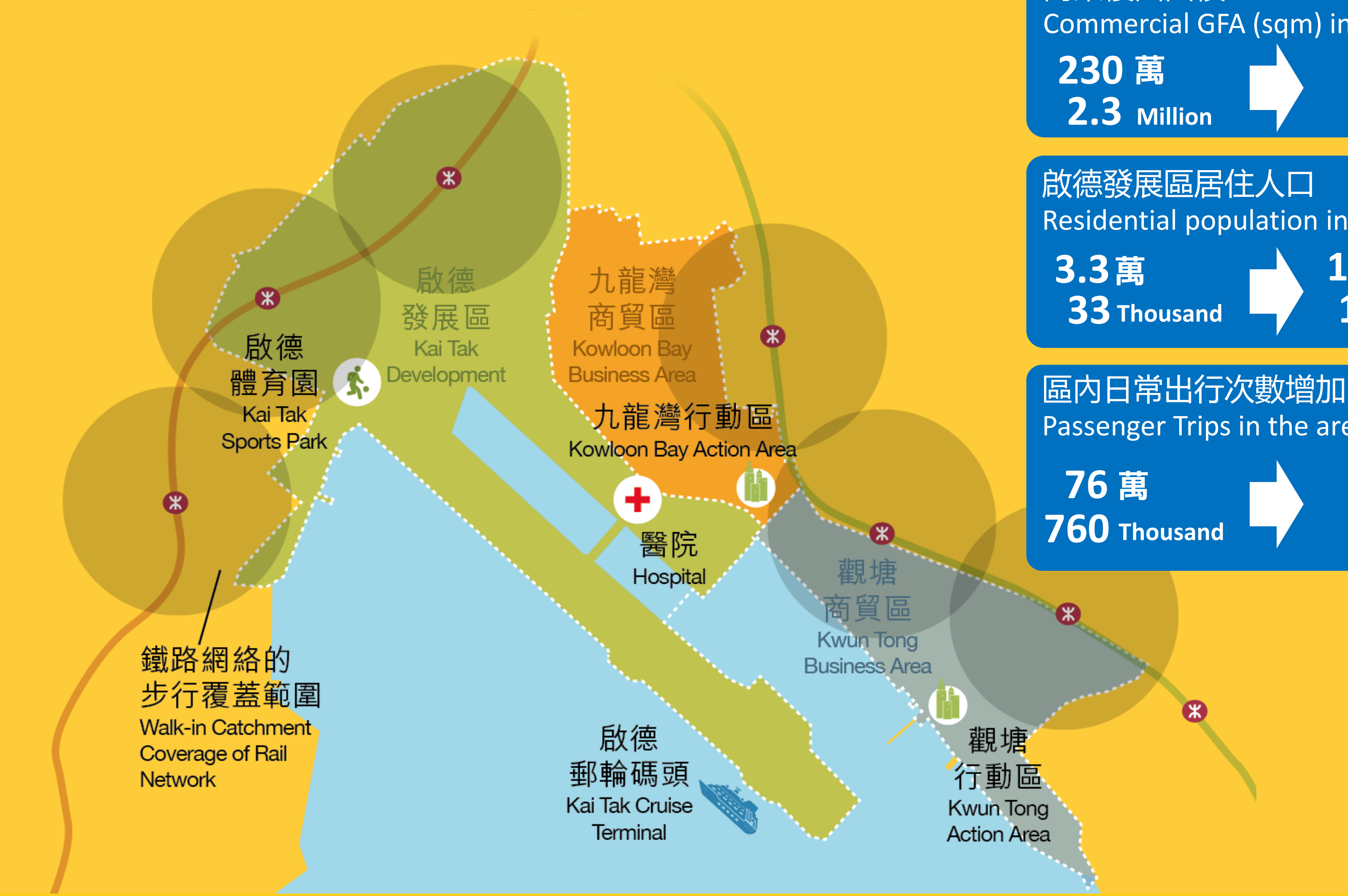
中期公眾諮詢

就首階段研究結果建議的高架模式諮詢公眾。

Interim Public Consultation

To seek public views on the Stage 1 Study recommendation on elevated transport modes.

九龍東的連繫需要
Connectivity Needs in Kowloon East



九龍東核心商業區 (平方米)
商業樓面面積
Commercial GFA (sqm) in CBD in KE

230 萬 / 2.3 Million → **700萬 / 7 Million**

啟德發展區居住人口
Residential population in KTD

3.3 萬 / 33 Thousand → **13.4 萬 / 134 Thousand**

區內日常出行次數增加
Passenger Trips in the area will rise

76 萬 / 760 Thousand → **156 萬 / 1.56 Million**

環保公共交通模式評估
Evaluation of Green Transport Modes

環保連接系統需要具備的主要因素

Visionary Criteria for EFLS

載客量 Capacity

載客量須足夠應付九龍東的長遠交通需求

Sufficient capacity to meet KE's long term traffic demand

高效 Efficiency

快捷，能夠縮短行程時間，疏導繁忙時間的人流，對交通及其他道路使用者、公用服務及日常出行的影響低

Fast, able to shorten journey time and ease the congested pedestrian flow during peak hours, and minimal impact on road users and public transport as well as daily communal traffic

可靠 Reliability

班次穩定及準時，服務可靠性高

Scheduled and on-time services with high level of reliability

可持續 Sustainability

惠及環境、社會及經濟的長遠發展

Sustainable in long term development on environmental, social and economic aspects

EFLS 九龍東環保連接系統 Environmentally Friendly Linkage System for Kowloon East

環保公共交通模式評估
Evaluation of Green Transport Modes

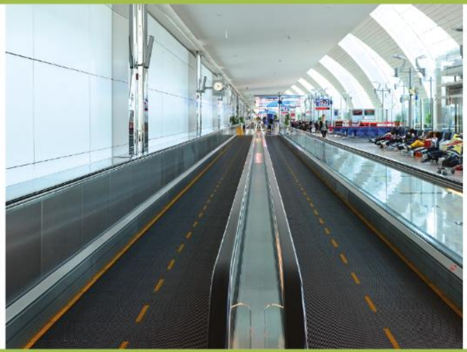
個人快速運輸系統
Personal Rapid Transit (PRT)

英國倫敦
London, the United Kingdom

載客量較低
Lower capacity

自動行人道
Travellator

阿聯酋杜拜
Dubai, the United Arab Emirates



速度慢、服務距離短
Slow and for short-distance service

維修時間長
Long suspension period for maintenance

吊車
Cable Car

英國泰晤士河
River Thames, the United Kingdom

服務容易受天氣影響和維修時間較長、難度較高
Service subject to weather conditions and long suspension period for maintenance

速度慢
Slow

載客量較低
Lower capacity

纜車
Cable-liner

美國奧克蘭
Oakland, the United States

服務的靈活性較低
Lower flexibility in service

環保公共交通模式評估
Evaluation of Green Transport Modes

進一步評估及分析
Further evaluation and assessment

高架 Elevated

旅客捷運系統
Automated People Mover (APM)

日本東京
Tokyo, Japan

?

高架 Elevated

單軌鐵路
Monorail

阿聯酋杜拜
Dubai, the United Arab Emirates

?

地面（專線）At-grade (dedicated)
地面（共用路面）At-grade (shared)

現代化電車
Modern Tramway (MT)

法國布列塔尼
Brittany, France

?

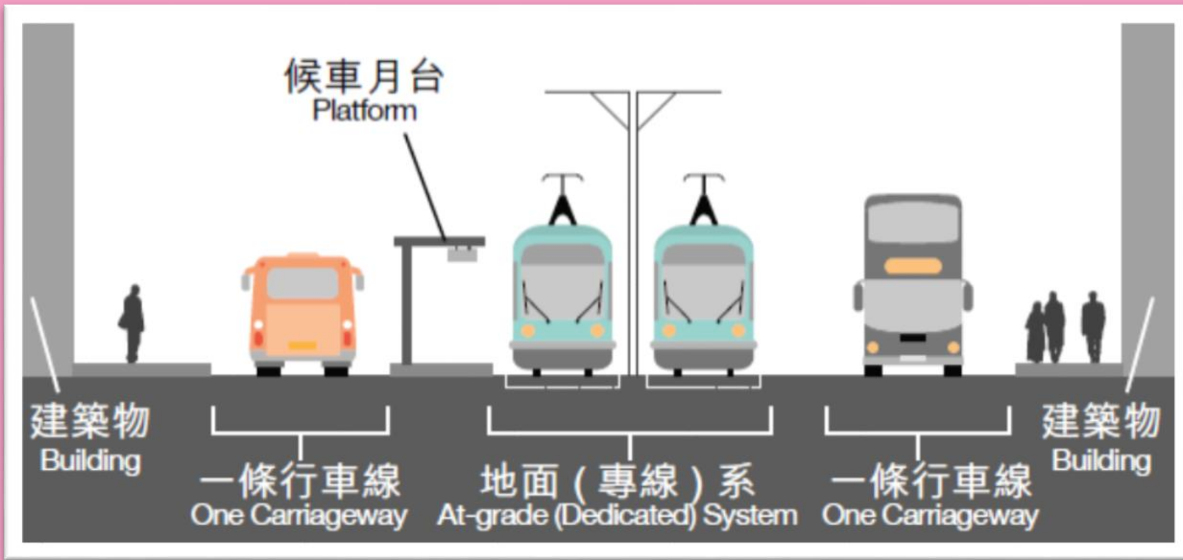
地面（專線）At-grade (dedicated)

巴士捷運系統
Bus Rapid Transit (BRT)

巴西里約熱內盧
Rio De Janeiro, Bazil

?

地面（專線）系統評估
At-grade (Dedicated) System Assessment



佔用最少1 條行車道，車站位置亦佔用較多空間
At least one traffic lane per direction will be occupied, more space needed at station locations

於車站加設行人過路設施，同時所有途經的交通燈需要作大規模改動；系統須人手操作，速度由司機按照路面情況自行判斷

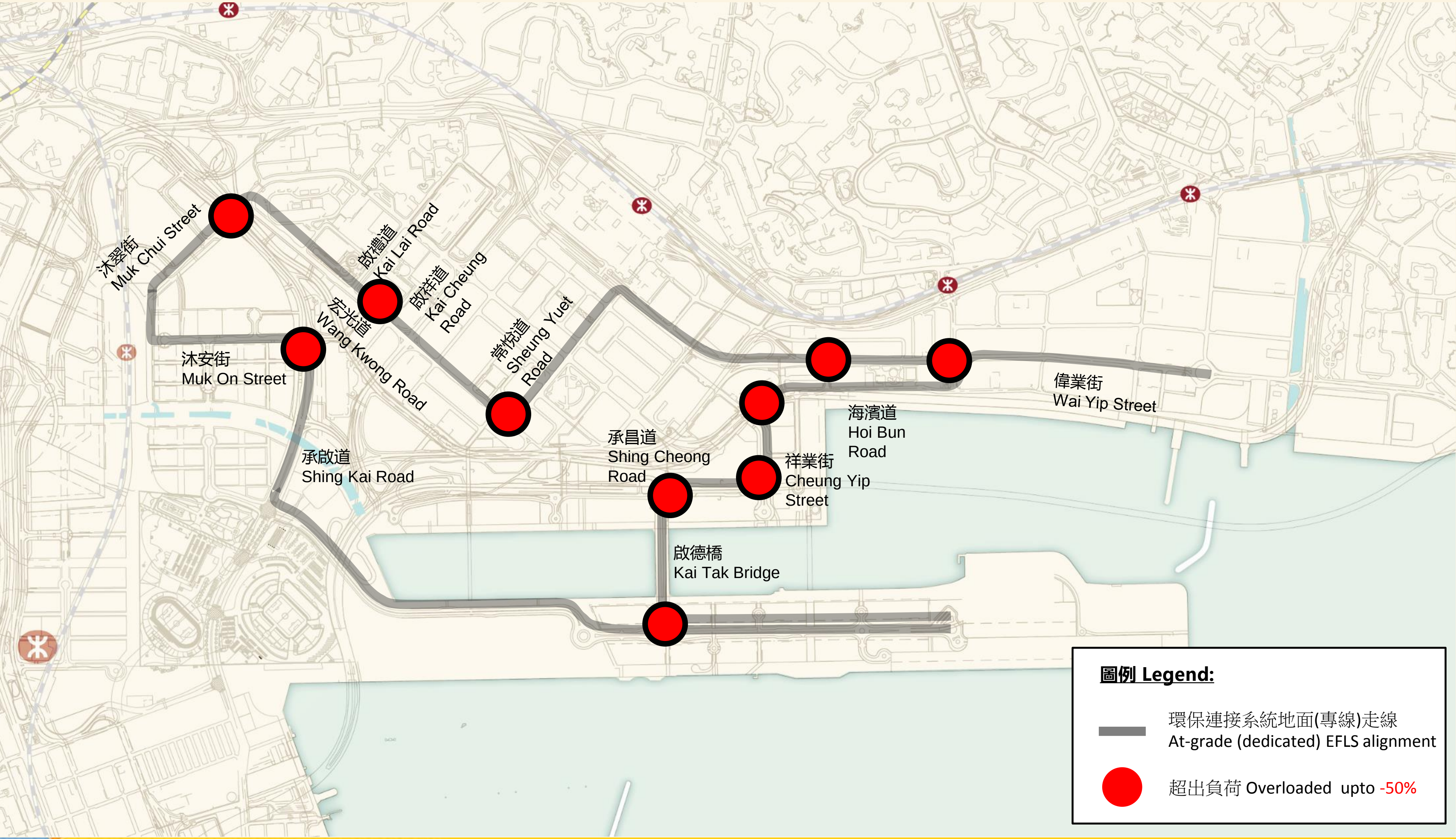
Additional pedestrian crossing facility at station, large-scale modification to all traffic lights along the corridor, system operated by drivers and the speed will be managed by the driver according to road conditions.

完全遷移專線範圍內的地底公用設施
Completely relocate underground utilities along the dedicated corridor

地面（專線） - 對路口的影響

At-grade (Dedicated) - Impacts to Road Junctions

地面（專線） - 對路口的影響
At-grade (Dedicated) - Impacts to Road Junctions



地面(專線) - 旅程時間及車輛排隊的影響

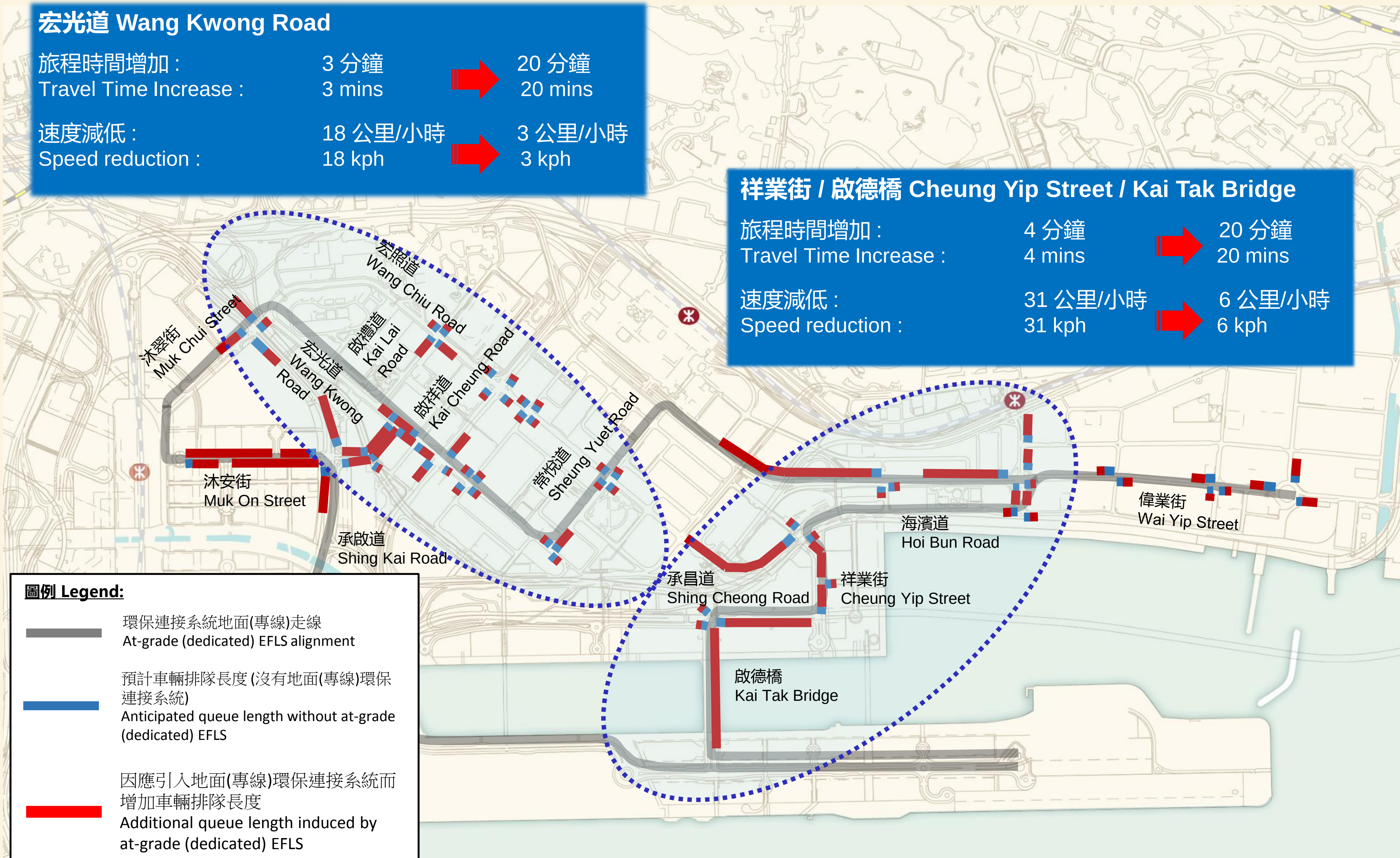
At-grade (Dedicated) - Travel Time and Vehicular Queue Impact

宏光道 Wang Kwong Road

旅程時間增加 : Travel Time Increase :	3 分鐘 3 mins	→	20 分鐘 20 mins
速度減低 : Speed reduction :	18 公里/小時 18 kph	→	3 公里/小時 3 kph

祥業街 / 啟德橋 Cheung Yip Street / Kai Tak Bridge

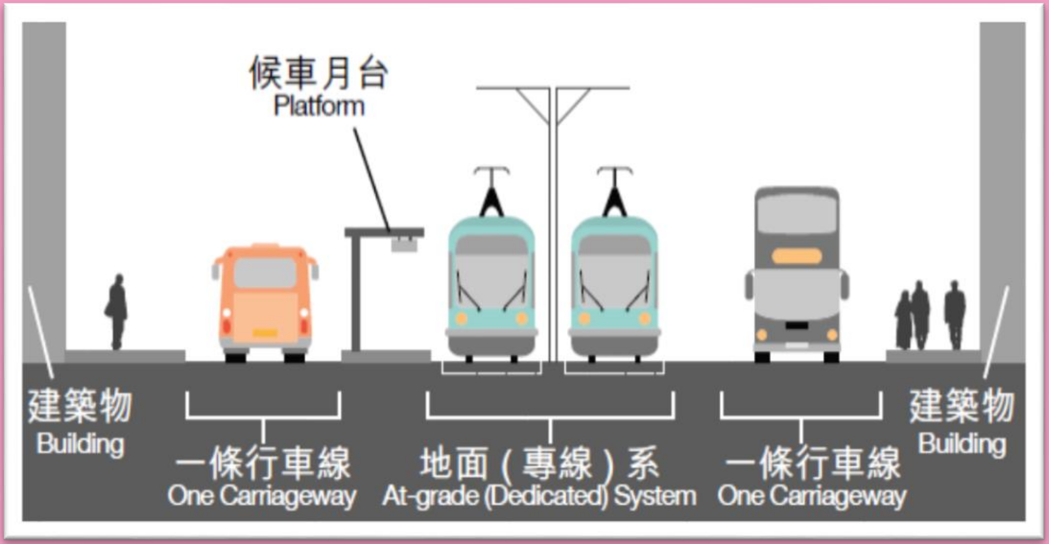
旅程時間增加 : Travel Time Increase :	4 分鐘 4 mins	→	20 分鐘 20 mins
速度減低 : Speed reduction :	31 公里/小時 31 kph	→	6 公里/小時 6 kph



圖例 Legend:

- 環保連接系統地面(專線)走線
  At-grade (dedicated) EFLS alignment
- 預計車輛排隊長度 (沒有地面(專線)環保連接系統)
  Anticipated queue length without at-grade (dedicated) EFLS
- 因應引入地面(專線)環保連接系統而增加車輛排隊長度
  Additional queue length induced by at-grade (dedicated) EFLS

地面（專線）系統評估
At-grade (Dedicated) System Assessment



高效 Efficiency ✘
對其他道路使用者造成嚴重阻延
Serious delay to other road users

可靠 Reliability ✘
系統以人手操作，並與其他交通工具共用路口，受制於路面交通情況，服務班次不穩定
System operated by drivers and shared lane with other vehicles. Subject to traffic conditions, the service frequency is not stable

可持續 Sustainability ✘
於建造及營運期間對其他交通造成嚴重阻延,其他道路使用者需要花費更多旅程時間
Serious delay to other traffic during construction and operation stage. The journey time of other road user would be increased.

地面(專線)系統對地下公共設施有大範圍的影響，所有旅客的旅程時間大增，故地面(專線)系統未能為社會帶來正面的經濟效益。

At-Grade (Dedicated) system has extensive impact on underground utilities. Travelling time of all passengers would be lengthened. This system would not bring any positive overall benefit to the society.

地面（共用路面）系統評估
At-grade (Shared) System Assessment

高效 Efficiency ✗

速度與巴士相約，行車效率沒有明顯優勢，不能有效減少日常行程時間

Speed is comparable to bus and no obvious advantage of travelling efficiency, cannot reduce journey time effectively.

可靠 Reliability ✗

系統以人手操作，並與其他交通工具共用路口，受制於路面交通情況，服務班次不穩定

System operated by drivers and shared lane with other vehicles. Subject to traffic conditions, the service frequency is not stable

可持續 Sustainability ✗

於建造期間對其他交通造成嚴重阻延，而營運期間如發生故障亦會影響其他交通

Serious delay to other traffic during construction stage. Accidents during operation stage would also affect other traffic.

鑑於系統需要額外建造成本，但所有旅客的旅程時間並沒有減少，未能為社會帶來正面的經濟效益。

Due to additional capital investment, and no reduction in overall passenger travelling time, it would not bring any positive benefit to the society.

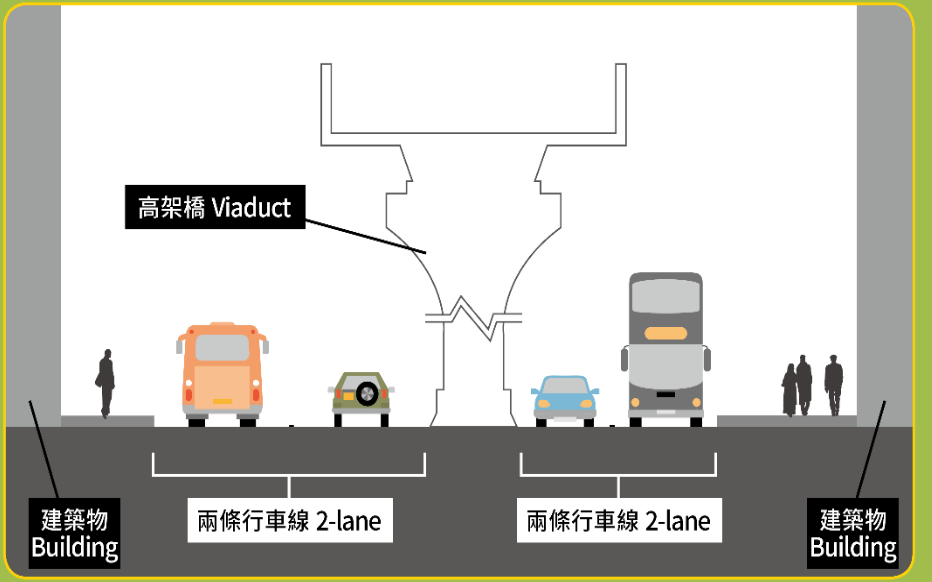
高架系統評估 - 好處 / 限制
Elevated System Assessment – Benefits / Limitations

好處 Benefits

- 以高架專線形式行駛，和其他路面交通分隔。
  Operate on elevated dedicated corridor and segregated with other road traffic.
- 高架橋支柱可建於行車道中間的位置，不佔用行車道。
  Viaduct columns to be constructed at the central divider of carriageway and do not occupy traffic lane.
- 對地下公用設施影響較少。
  Less impact on underground utilities.
- 全自動化無人駕駛, 可靠快捷。
  Fully automated and driverless, reliable and fast.
- 速度較快，可節省旅程時間。
  Fast speed and reduce journey time
- 不受路面交通影響，班次準時及穩定。
  Not affected by road traffic, with a reliable and on-time service

限制 Limitations

- 成本因素 - 於高架橋上行駛，建造成本較高。
  Cost factor - Operates on viaduct, higher construction cost
- 環境因素 - 可能造成視覺影響。
  Environmental factor - visual impact



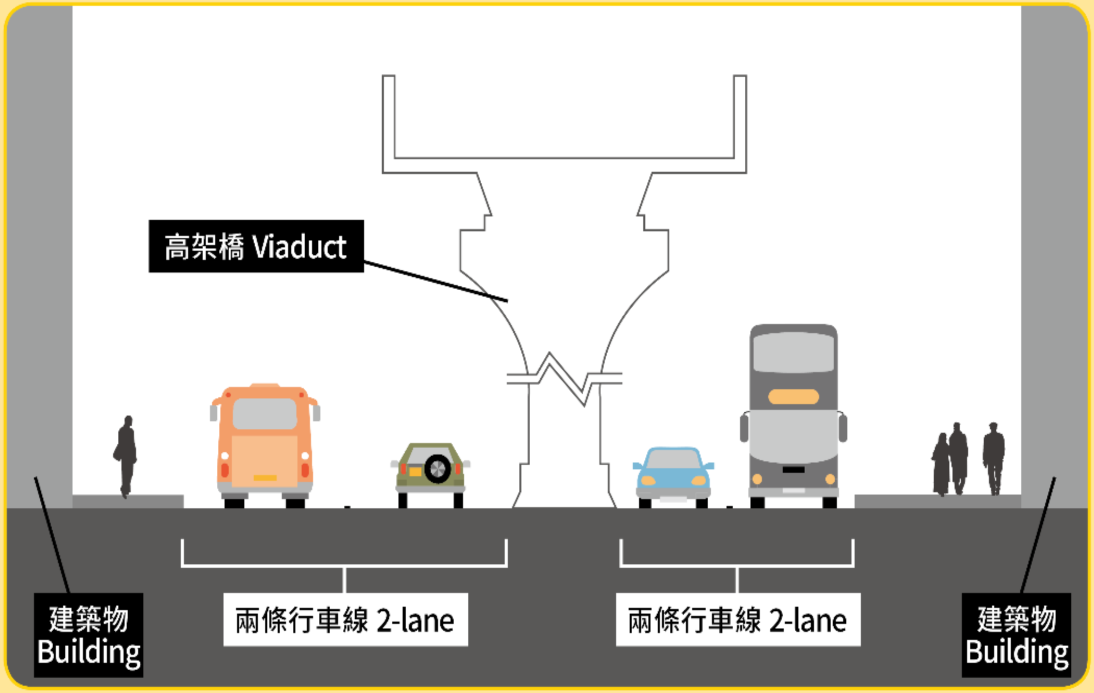
高架系統對地下公共設施有局部的影響。雖然建造成本高，但可縮短所有旅客的旅程時間，能為社會帶來正面的經濟效益。

Elevated system has localized impact on underground utilities. Travelling time of all passengers would generally be shortened. It would bring positive overall benefit to the society.

旅程時間比較
Travel Time Comparison

適合作為九龍東環保公共交通模式評估
Evaluation of Most Suitable EFLS for KE

高架系統
Elevated System



結論: 高架模式為最適合九龍東作為公共運輸的骨幹系統
Conclusion: “Elevated System” is the most suitable Public Transport Mode as the transport backbone of Kowloon East.

第二階段研究工作
Stage 2 DFS

高架系統
Elevated System

- 走線研究 Alignment study
- 日後延伸設計 Future extension design
- 採購模式 Procurement approach
- 成本和財務分析 Cost and financial analysis
- 車廠位置和佈局 Locations and layout of depot
- 車站位置和出口接駁 Station locations and connections
- 營運模式 Operation plan
- 觀塘連接橋 Kwun Tong Transportation Link

謝謝

Thanks

www.ktd.gov.hk/efls

九龍東
環保連接系統
詳細可行性研究
中期公眾諮詢

EFLS 九龍東環保連接系統

發展局
Development Bureau

土木工程拓展署
Civil Engineering and Development Department

ARUP

您的意見，我們重視

我們已完成詳細可行性研究的首階段工作，提出**最合適作為九龍東環保連接系統的交通模式**。歡迎公眾於 2017 年 7 月 2 日或之前，就首階段研究結果及建議表達意見，好讓我們能繼續下一階段的研究工作。

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❝ 為回應公眾於初步可行性研究期間提出的關注，我們現正分階段展開詳細可行性研究，以增強九龍東的連繫，配合九龍東轉型為一個新的核心商業區。❞

1 研究背景

2007 年的《啟德分區大綱圖》已建議一個於啟德發展區內行走的環保連接系統。其後，2011 年至 2012 年《施政報告》宣布把涵蓋啟德發展區、九龍灣和觀塘商貿區的九龍東轉型為另一個核心商業區，以帶動香港的長遠經濟發展。為了提升新核心商業區的暢達性，建議的環保連接系統需作適當調整，以提供快捷便利的區內連繫服務。

2007 年

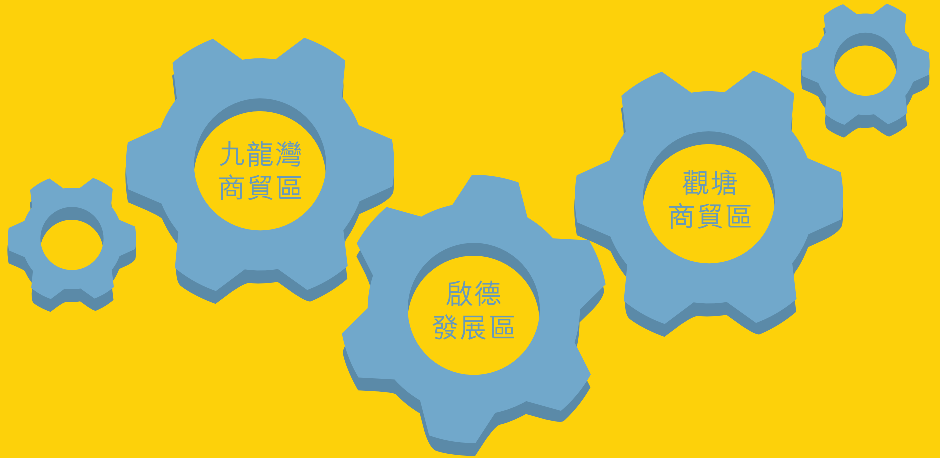
《啟德分區大綱圖》載有行走於啟德發展區的環保連接系統

2009 年

於 12 月展開**初步可行性研究**，檢視環保連接系統的初步可行性

2011 年

初步可行性研究建議發展一條 9 公里長、共 12 個車站的高架單軌系統，連接啟德發展區、九龍灣及觀塘商貿區。



2012-2014 年

初步可行性研究公眾諮詢

公眾普遍認同需要加強九龍東的聯繫，然而，對於擬議的高架單軌系統、走線和覆蓋範圍，以及對觀塘避風塘的影響則意見紛紜。

2015 年

於 10 月展開**詳細可行性研究**，首階段我們重新審視了各種環保公共交通模式，建議最適合作為九龍東環保連接系統的交通模式；在下一階段，我們會就連接系統的未來路向包括走線設計及營運模式等作出進一步研究。

審視各種不同的
環保公共交通模式

EFLS 九龍東環保連接系統

確立最合適的
環保公共交通模式

2017 年

我們在此

完成首階段的詳細可行性研究並進行中期公眾諮詢，收集公眾對建議最適合作為九龍東環保連接系統的交通模式的意見。

下一階段研究工作

制定連接系統的走線設計、車站位置、營運及採購模式等工作，並諮詢公眾。

❝九龍東是一個發展迅速的多元社區，九龍灣及觀塘區內的工商活動頻繁，現有道路兩旁商廈林立，路面交通繁忙，行人環境亦有改善的空間；而啟德發展區的行人環境相對寬敞，及有近百公頃公園用地貫串其中，亦有單車網絡的配置。❞


觀塘偉業街


九龍灣觀塘道


啟德沐翠街


規劃中的啟德單車網絡


觀塘巧明街

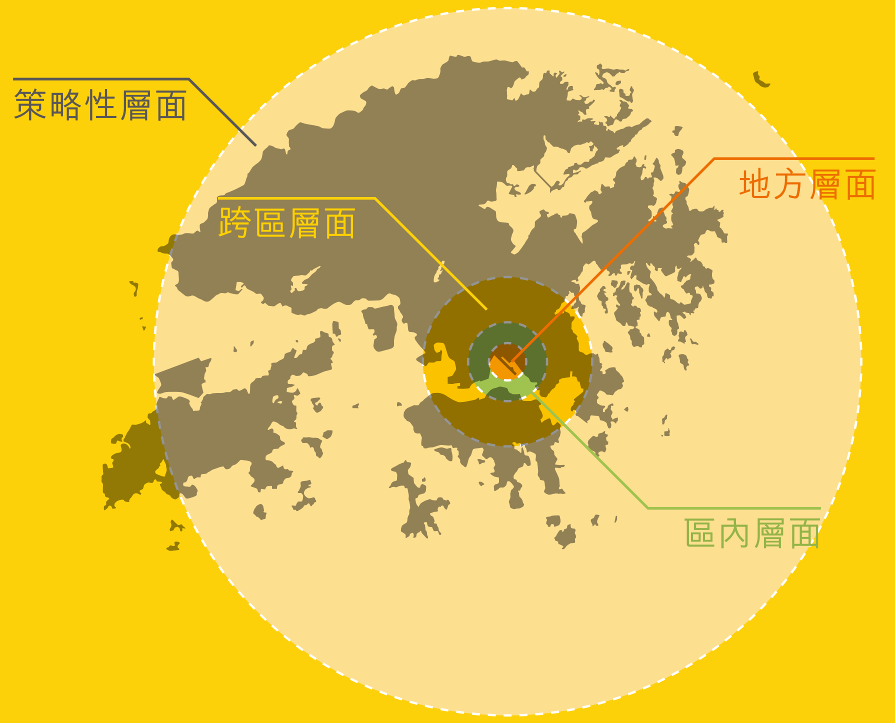

九龍灣啟祥道

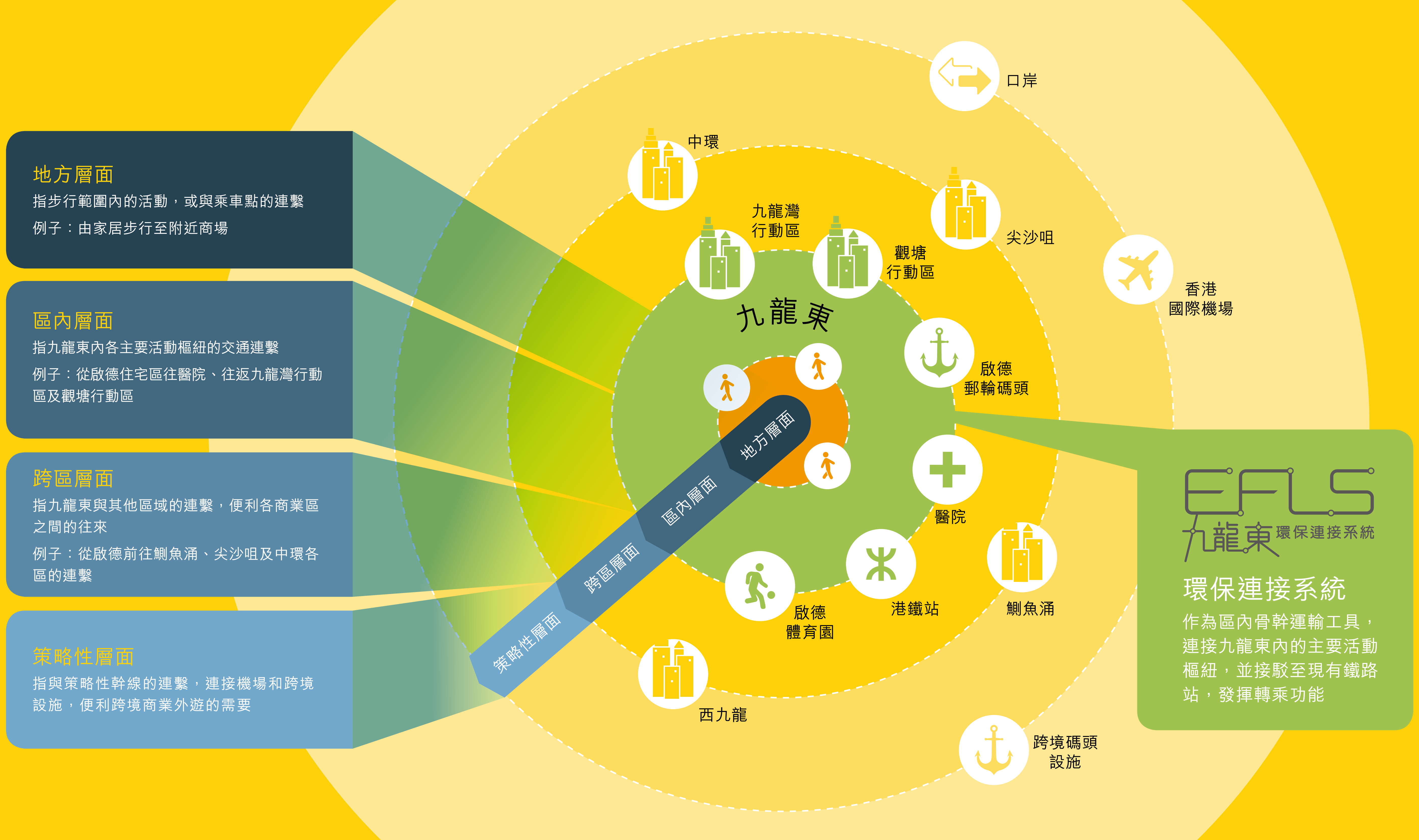
2 九龍東的連繫需要

九龍東現有各類公共交通設施包括港鐵、巴士、小巴、的士及步行網絡，組成綜合多模式連接系統，照顧市民日常的區內活動、跨區上班及假日外遊等不同層面的出行需要。

隨著九龍東轉型為核心商業區，預計傳統路面交通工具和經優化的步行環境能夠應付初期的交通需求；長遠而言，興建中的沙中線及已規劃的六號幹線可應付跨區的交通需求，但鑑於區內的道路空間有限，單靠現有路面交通工具，難以提供優質的服務，配合發展所帶來的交通增長，故此需要引進環保連接系統作為新增的交通模式，處理區內正在增加的出行需求，提升九龍東的連接性。

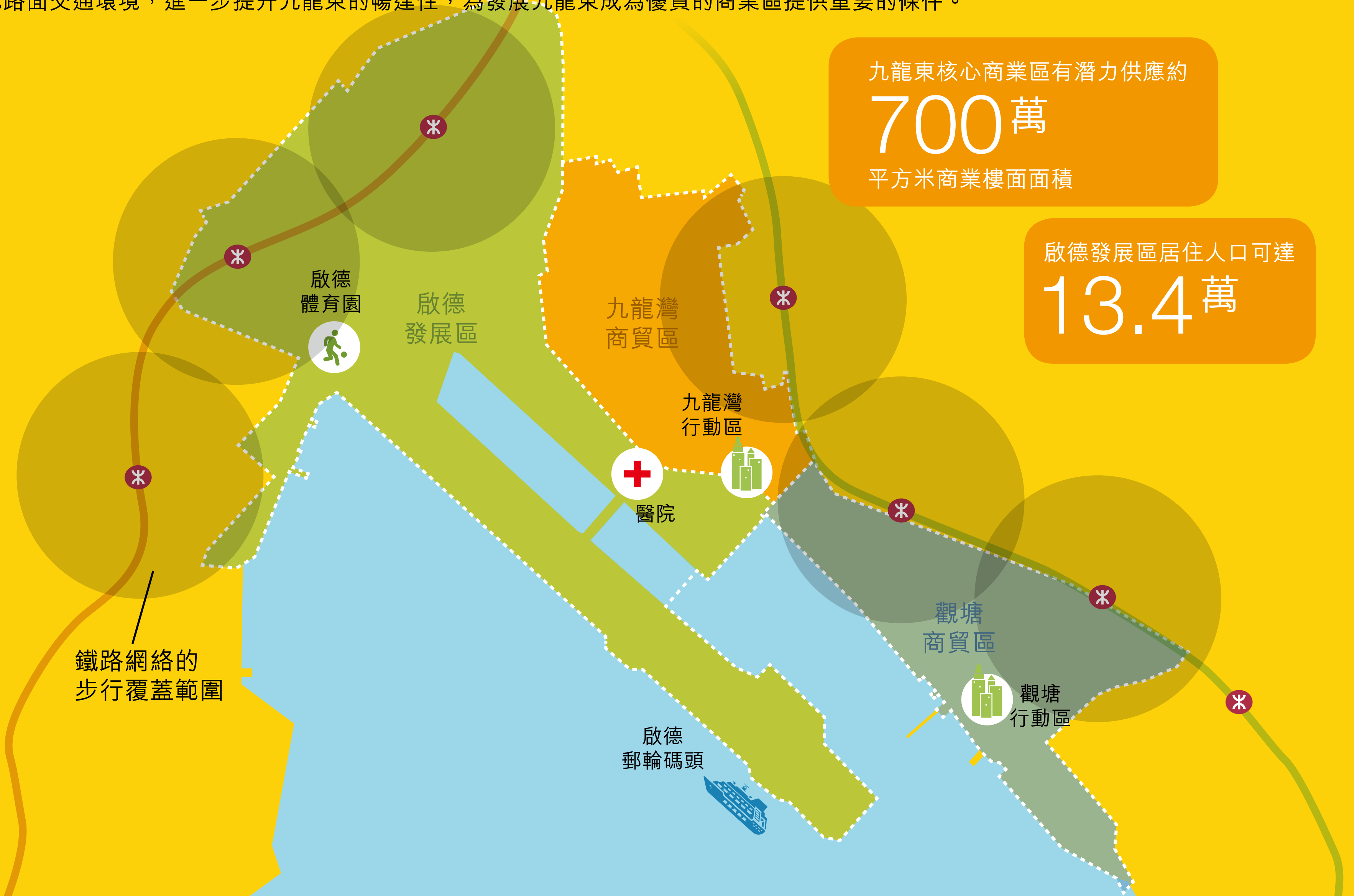
不同的日常出行層面





為甚麼需要環保連接系統？

九龍東核心商業區將有潛力供應約 700 萬平方米商業樓面面積，令區內就業人口增加，加上啟德發展區居住人口可達 13.4 萬，各類公共設施則會吸引使用者前往該區，交通需求會增加，預計到 2036 年，區內每日的出行次數將比現時多出 1 倍。然而，現時的鐵路網絡只圍繞著該區的邊緣行走，頗大範圍僅依靠路面交通支援，過去一直是機場禁區的啟德，更是遠離鐵路網絡及主要道路。如果可以引入環保連接系統，連接區內的活動樞紐，提供接駁至現有的鐵路站、鄰近的主要公共交通及行人設施，便能滿足發展所衍生的交通增長，並優化路面交通環境，進一步提升九龍東的暢達性，為發展九龍東成為優質的商業區提供重要的條件。



九龍東環保連接系統需要具備的主要因素

環保連接系統必須有能力處理九龍東未來的區內交通需求。相對其他交通工具，系統亦必須提供可靠、舒適及準時的服務，以提供快捷及具時間優勢的行程。而且，作為一種環保交通模式，系統必須對環境及社區有可持續性，盡量減少建造及營運期間的影響。

❝我們需要在眾多的環保公共交通模式中，選取合適的系統，以符合載客量、高效、可靠及可持續這些準則。可供選擇的環保公共交通模式當中，部分明顯難以滿足我們建議的準則，其餘則需要作進一步的技術分析及比較。❞

更多有關環保交通模式的資訊，可以參考項目網站。

按**載客量**、**高效**、**可靠**及**可持續**的準則，個人快速運輸系統、吊車、自動行人道及纜車都並非作為九龍東環保連接系統的理想選擇。

個人快速運輸系統

個人快速運輸系統以專線軌道行駛，每個車廂只可運載 4 至 6 人，與的士相若，服務一般按需要而提供，較少應用於主要交通幹道上。外國應用例子包括倫敦希斯路機場的系統。

英國倫敦

載客量較低

自動行人道

自動行人道速度慢，服務距離短，維修時間較長，為輔助性行人設施，目標為縮短步行時間，及提供一個較舒適的步行環境，適合用於短距離接駁，例子可見香港國際機場內的自動行人道。


阿聯酋杜拜

速度慢、服務距離短

維修時間長

吊車

吊車以架空纜索垂吊於半空中，速度較慢，一般用作旅遊或遊樂設施，較少應用為日常公共交通工具，其載客量較低，服務容易受天氣情況影響，維修需時較長。例子有香港昂坪360、海洋公園登山纜車及英國泰晤士河纜車。


英國泰晤士河

服務容易受天氣影響和維修時間較長、難度較高

速度慢

載客量較低

纜車

纜車以專線行走，車廂扣在鋼纜上，服務的靈活性低，維修期間的停駛時間較長。例子見於美國奧克蘭機場。


美國奧克蘭

服務的靈活性較低

3 環保公共交通模式評估

現代化電車、巴士捷運系統、單軌鐵路和旅客捷運系統在載客量、高效、可靠及可持續方面的表現需要經詳細的技術分析才能作出比較。

巴士捷運系統

巴士捷運系統被視為升級版巴士，採取專線行駛模式，特色為獨立的車站及入閘設施，乘客於登車前已完成購票繳費程序，縮短停站時間。然而，系統依然以人手操作，並與其他交通工具共用路口，行車時間受路面交通影響。應用例子見於南韓首爾、日本名古屋及巴西里約熱內盧。

巴西里約熱內盧

現代化電車

現代化電車的形式與新界西的輕鐵系統相似，可以專線行駛或與其他交通工具共用路面，然而，系統依然以人手操作，並與其他交通工具共用路口，行車時間受路面交通影響。現代化電車採用低地台車廂設計，方便乘客上落，多個城市都有應用作日常出行交通工具，如西班牙巴塞羅那及法國布列塔尼。

法國布列塔尼

單軌鐵路

單軌鐵路以高架專線行駛，不受路面交通影響，班次準時穩定，亦可以全自動操作。多個城市都有應用單軌鐵路為日常公共交通運輸系統，例如日本東京、南韓大邱、中國重慶、阿聯酋杜拜及巴西聖保羅。

阿聯酋杜拜

旅客捷運系統

旅客捷運系統以高架專線形式行駛，運作模式與單軌鐵路相近，不受路面交通影響、班次準時穩定、可全自動操作，多個城市都有應用，例如香港國際機場的旅客捷運系統、日本東京新交通臨海線（百合鷗號）及新加坡榜鵝 / 盛港系統。

日本東京

地面(專線)、地面(共用路面)或高架

四種需要詳細技術分析的交通模式中，巴士捷運系統和現代化電車主要於地面行駛。巴士捷運系統與一般巴士的主要分別，在於其以地面專線模式行走，這亦是其運作優勢；現代化電車則可以專線或共用路面形式行走。

單軌鐵路及旅客捷運系統屬於高架系統，於高架橋上以專線形式行走。

對於九龍東核心商業區而言，最理想的方案是高架、地面(專線)，還是地面(共用路面)呢？我們將因應區內的情況，包括交通、空間及現有設施等，就高架、地面(專線)或地面(共用路面)系統引伸的影響，作進一步分析，從而建議合適的方案。

巴士捷運系統

現代化電車

單軌鐵路

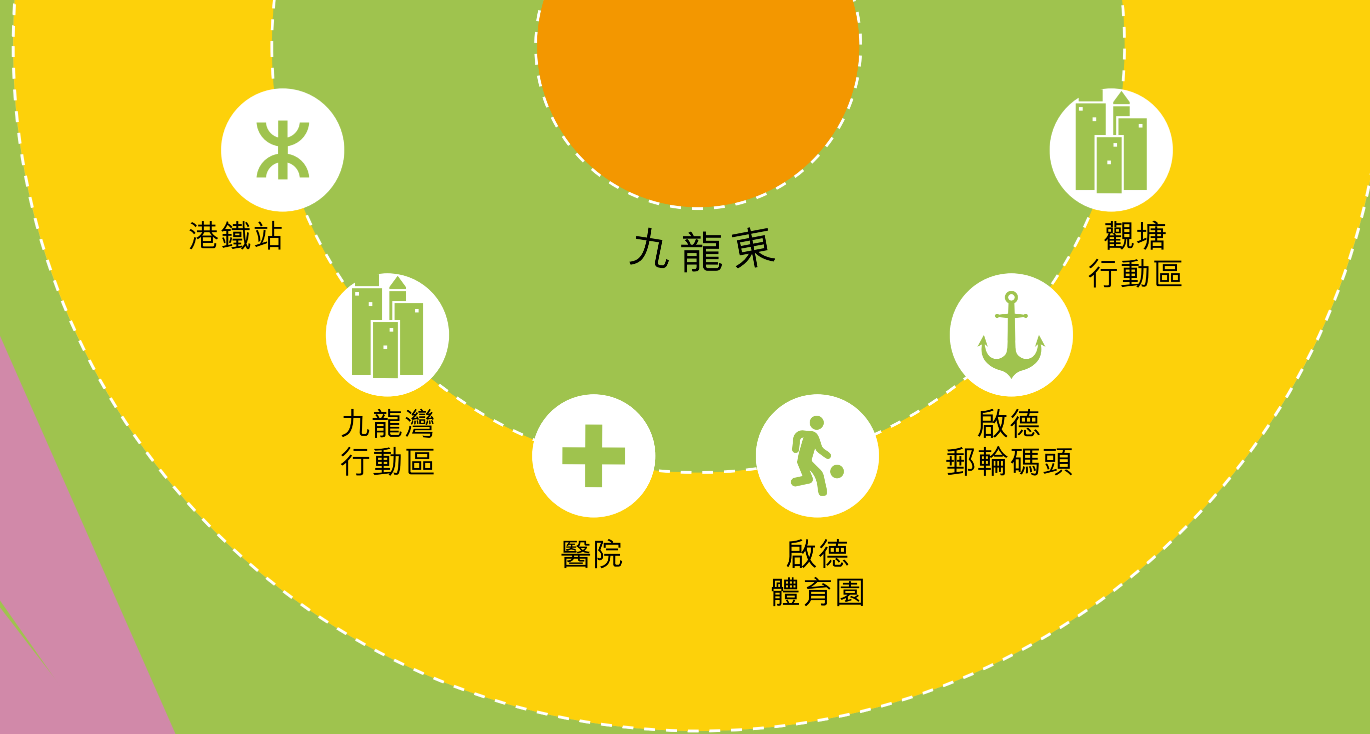
旅客捷運系統

地面(專線)

地面(共用路面)

高架

進一步分析和比較



地面(專線)

好處

- 利用現有道路空間，毋須興建高架橋
- 低地台設計，車站設置於地面，方便上落
- 較少視覺影響

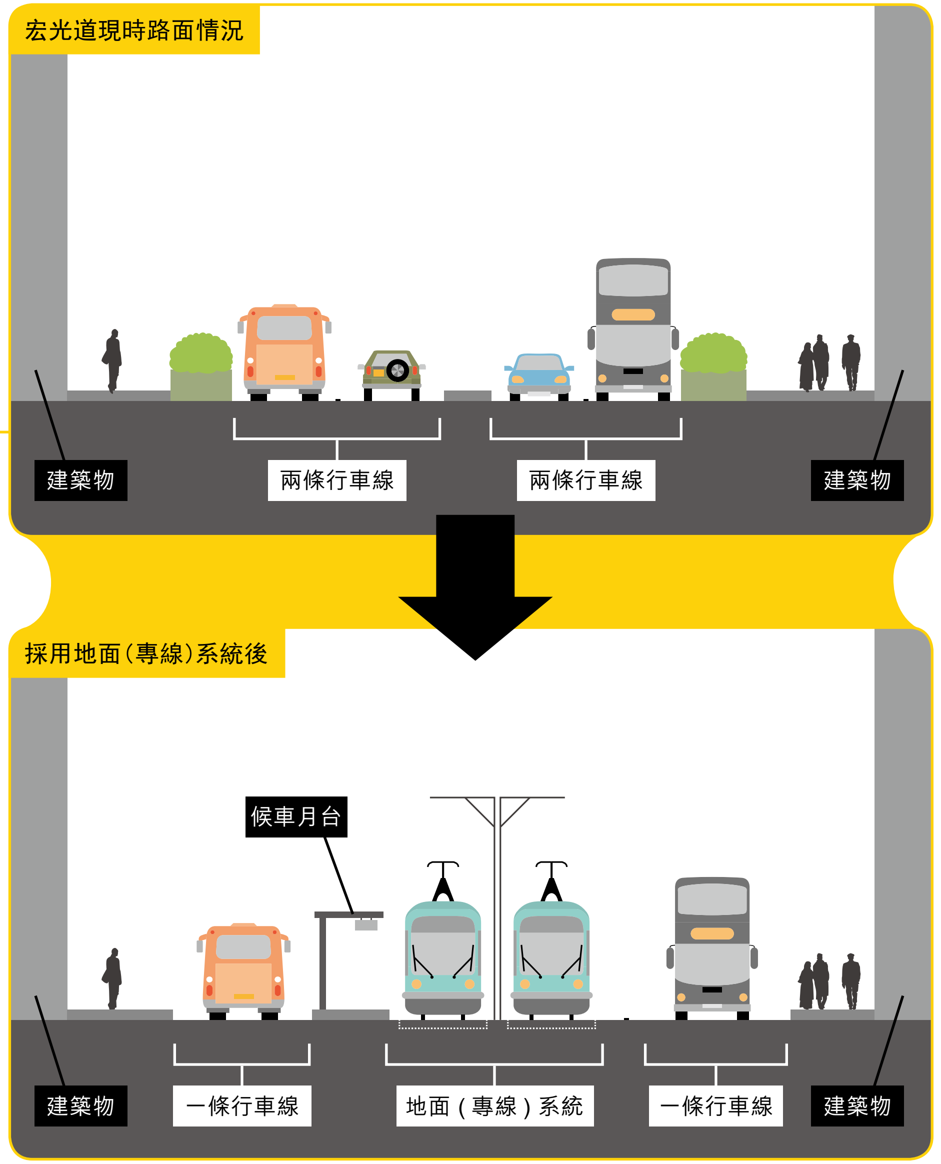
限制

成本因素

- 地面系統須人手操作
- 需要完全遷移專線範圍內的地底公用設施，增加建造成本及時間
- 專線系統途經的所有路口、交通燈及行人過路設施，需要作大規模改動配合

交通影響

- 每方向佔用最少 1 條行車道，其他車輛不可進入系統專用範圍，車站所處位置亦佔用較多空間，情況與現時新界西的輕便鐵路系統相似
- 為確保系統能夠高效運作，容許系統優先使用路口，增加其他車輛等候時間
- 車站位置要加設行人過路設施，有可能影響交通



分析結果

- 地面(專線)下，現有行車線需要縮減，其他道路使用者因行車線減少，導致行車時間更長，行車速度幾乎與步行速度相若，造成路面擠塞，系統對九龍東整體交通帶來嚴重影響，未能為社會帶來正面的經濟效益，方案並不可取。

紅色標示的街道會出現擠塞情況，預計於這些地區的行車速度幾乎與步行速度相若

地面（共用路面）

現代化電車

好處

- 不設專用通道，除車站位置外，原有行車道大致不變
- 低地台設計，車站設置於地面，方便上落
- 較少視覺影響

限制

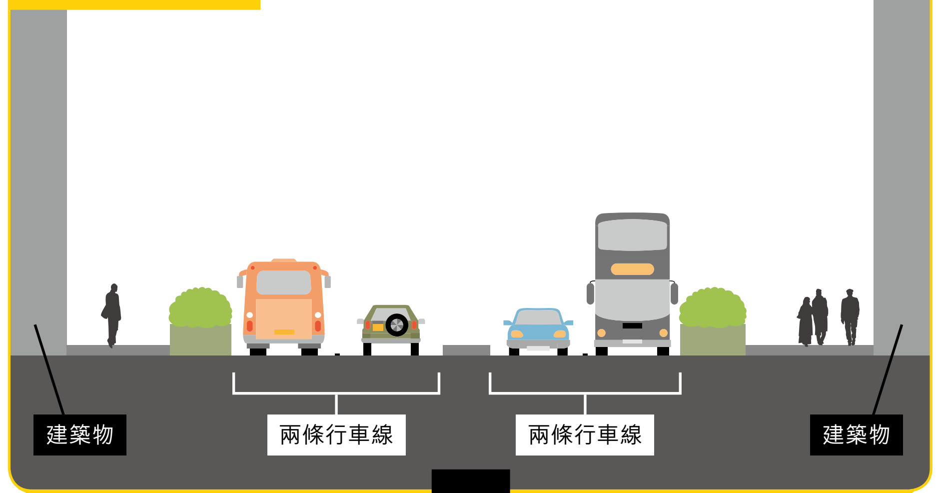
成本因素

- 地面系統須人手操作
- 需要完全遷移走線範圍內的地底公用設施，增加建造成本及時間
- 車站位置需要加設行人過路設施

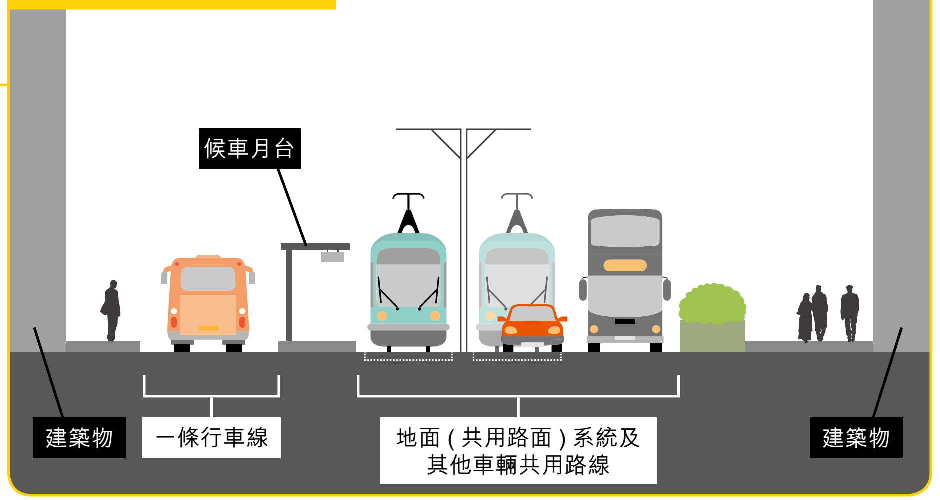
交通影響

- 車站位置須劃作專屬範圍，車站以外行車道可以與其他車輛協調行駛，情況與現時新界西輕便鐵路系統的共用路面段相似
- 受制於路面交通情況，行車效率沒有明顯優勢，速度與其他車輛相若
- 車站位置要加設行人過路設施，有可能影響交通

宏光道現時路面情況



採用地面（共用路面）系統後



新界西輕便鐵路系統下的共用路面情況

分析結果

- 地面（共用路面）系統受制於路面交通情況，若道路擠塞，不單系統的行車時間會延長，班次亦受影響而誤點，令系統的運作如同一般路面的公共交通工具。鑑於需要額外的建造成本，未能為社會帶來正面的經濟效益，方案並不可取。

高架

好處

- 高架橋支柱可建於行車道中間的位置，佔用較少路面
- 對地下公用設施影響較少
- 於專屬全分隔的軌道行駛，安全並且速度較快，可節省旅程時間
- 不受路面交通影響，班次準時及穩定
- 可全自動操作

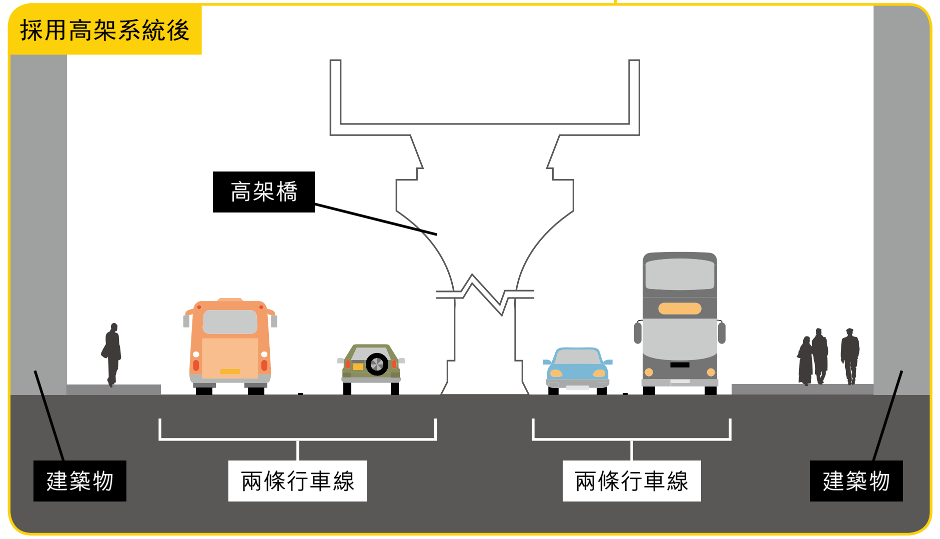
限制

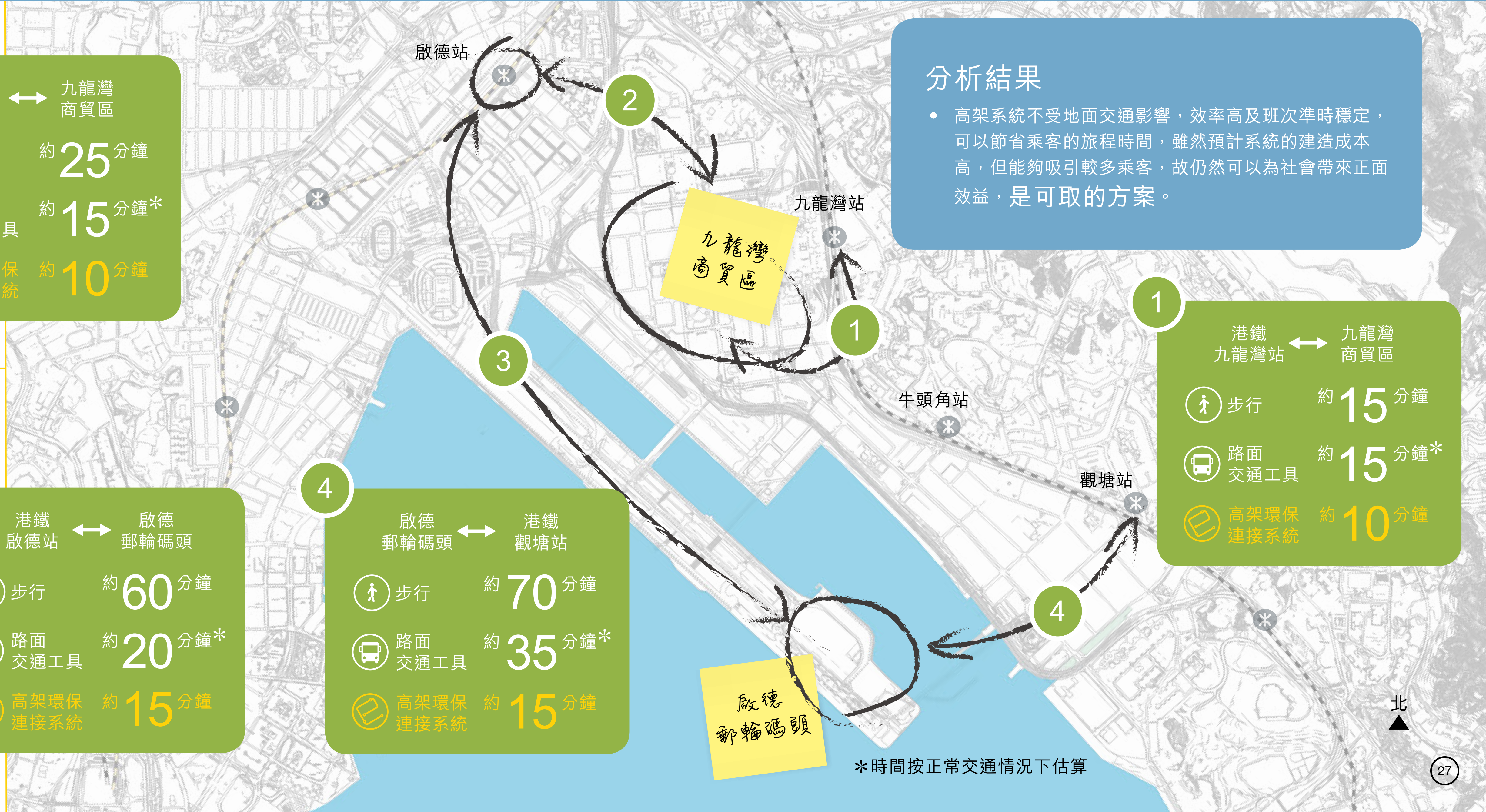
成本因素

- 於高架橋上行駛，建造成本較高
- 一些行車道及兩旁行人路須縮小及調整，以預留空間興建高架橋支柱

環境因素

- 可能造成視覺影響





分析結果

- 高架系統不受地面交通影響，效率高及班次準時穩定，可以節省乘客的旅程時間，雖然預計系統的建造成本高，但能夠吸引較多乘客，故仍然可以為社會帶來正面效益，是可取的方案。

1 港鐵九龍灣站 ↔ 九龍灣商貿區

步行	約 15 分鐘
路面交通工具	約 15 分鐘*
高架環保連接系統	約 10 分鐘

2 港鐵啟德站 ↔ 九龍灣商貿區

步行	約 25 分鐘
路面交通工具	約 15 分鐘*
高架環保連接系統	約 10 分鐘

3 港鐵啟德站 ↔ 啟德郵輪碼頭

步行	約 60 分鐘
路面交通工具	約 20 分鐘*
高架環保連接系統	約 15 分鐘

4 啟德郵輪碼頭 ↔ 港鐵觀塘站

步行	約 70 分鐘
路面交通工具	約 35 分鐘*
高架環保連接系統	約 15 分鐘

*時間按正常交通情況下估算

詳細分析的項目	佔用現有路面空間的影響	對地底公用設施的影響	路口、交通燈號及行人設施的改動	建造成本	所有旅客的旅程時間	視覺影響	整體效益
 地面（專線）	大量 🙁	大範圍 🙁	大規模 🙁	低 🙂	大增 🙁	輕微 🙂	負面 🙁
 地面（共用路面）	中等 😐	大範圍 🙁	局部 😐	低 🙂	大致不變 😐	輕微 🙂	負面 🙁
 高架	中等 😐	局部 😐	輕微 🙂	高 🙁	減少 🙂	廣泛 🙁	正面 🙂

分析結論
高架系統為最合適的交通模式

考慮到九龍東的環境條件，地面 (專線) 或地面 (共用路面) 系統都對其他道路使用者造成較大影響，並不能為社會帶來正面效益。相比之下，高架系統不容易受道路交通影響，佔用較少路面空間，對原來的行車線及行人路影響相對較少，亦可充分利用快速高效的優勢，有效地縮短行程時間，為乘客帶來時間效益，讓乘客更方便快捷地往返區內活動樞紐及與港鐵換乘，就核心商業區的需求而言，高架模式的表現相對理想，適合作為九龍東環保連接系統。

EFLS 九龍東環保連接系統

高架系統
環保公共交通模式

4 下一步工作

透過是次公眾諮詢，確立環保連接系統採用高架模式的大方向下，我們會進行下一階段的研究工作，包括在高架模式運作下的詳細走線方案、車站位置和出口接駁安排、日後延伸設計、車廠位置和布局、營運和採購模式、成本以及財務分析等。

高架系統
環保公共交通模式

單軌鐵路

旅客捷運系統

走線研究

在確立採用高架模式後，我們將根據不同高架系統的結構大小和設計限制，為各詳細走線方案進行可行性評估，計算造價差別、客流量和行車時間，綜合分析以找出最具效益的走線方案。

在稠密的環境中加設高架結構，須符合緊急車輛通道的要求，確保加建結構後仍然有足夠空間供緊急車輛之用。

車站位置和出口接駁

車站位置和布局均受系統大小和月台設計等因素影響。我們會研究車站與周邊發展的連接性，以便利乘客使用和提高效益。

日後延伸設計

進行下一步研究時，須考慮走線日後延伸的可行性，盡量為日後延線預留條件。

車廠位置和布局

不同的高架系統對車廠面積需求有所不同，我們需要仔細檢視車廠的所需空間，並於稠密的九龍東環境內尋找合適位置，確保車廠的選址最能有利系統的營運。

成本和財務分析

我們會因應詳細的走線、車站和車廠設計，估算所需要的建造、營運和保養維修成本，評估項目的經濟和財務表現，以及研究不同採購方案和建造時間表。

營運模式

環保連接系統有別於本港現有的鐵路系統，我們須要因應所選擇的車種，制定一套管理、營運和維修策略，亦須研究有關監管法例的安排。

採購模式

大型基建的採購模式有多種選擇，例如傳統工務計劃採購模式，或私人機構參與採購模式，後者亦可於建造、營運、擁有、移交等方面設定不同條件。我們須詳細研究不同的採購模式對於此項目的利弊，建議合適的方案。

觀塘連接橋

研究走線時，亦會就建議的觀塘連接橋進行詳細研究，當中可能涉及對觀塘避風塘的影響，並需確保工程符合《保護海港條例》的要求。

5 公眾諮詢活動

我們誠意邀請您參與公眾諮詢活動，歡迎於 2017 年 7 月 2 日或之前，透過郵寄、傳真、電郵或電話方式表達意見。提交意見時，請註明「九龍東環保連接系統詳細可行性研究 - 中期公眾諮詢」。

公眾論壇

2017 年 5 月 27 日 (星期六)
下午 2 時至 4 時

啟德社區會堂
九龍啟德協調道 3 號

有興趣參與的人士，歡迎於 2017 年 5 月 25 日或之前，致電 2268 3781，或到項目網站填寫登記表格留座。

公眾亦可參閱前往工業貿易大樓的交通工具路線，然後步行往啟德社區會堂。

聲明：凡在《九龍東環保連接系統詳細可行性研究》過程中向土木工程拓展署提供意見和建議的個人或團體，將被視作同意土木工程拓展署可將部分或全部的內容（包括個人姓名及團體名稱）公布，但聯絡資料如電話及電郵地址等則會保密。如你不同意這個安排，請於提供意見和建議時作出聲明。

我的意見

九龍東環保連接系統詳細可行性研究的中期公眾諮詢經已展開，首階段建議最適合九龍東的環保連接系統模式，我們誠意邀請您於 2017 年 7 月 2 日或之前，就研究結果及建議，透過郵寄、傳真、電郵或電話方式表達意見。

姓名 ____________________ 機構 ____________________

電話 ____________________ 電郵 ____________________

土木工程拓展署
九龍拓展處啟德辦事處

地址 九龍尖沙咀麼地道 68 號帝國中心 7 樓
電話 2268 3781　傳真 2268 3963　電郵 info@efls.hk

啟德 KAI TAK

我的意見

聲明：凡在《九龍東環保連接系統詳細可行性研究》過程中向土木工程拓展署提供意見和建議的個人或團體，將被視作同意土木工程拓展署可將部分或全部的內容（包括個人姓名及團體名稱）公布，但聯絡資料如電話及電郵地址等則會保密。如你不同意這個安排，請於提供意見和建議時作出聲明。

巡迴展覽

- 5 月 9 日至 12 日　啟晴邨中央舞台
- 5 月 15 日至 26 日　工業貿易大樓
- 5 月 27 日至 6 月 9 日　觀塘海濱長廊
- 6 月 10 日至 21 日　灣仔稅務大樓
- 6 月 22 日至 7 月 2 日　北角政府合署

巡迴展覽時間表可能有所更改，請參閱項目網站留意最新安排。

土木工程拓展署
九龍拓展處啟德辦事處

地址 九龍尖沙咀麼地道 68 號帝國中心 7 樓
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Detailed Feasibility Study for

Environmentally Friendly Linkage System for Kowloon East

Interim Public Consultation

EFLS
Environmentally Friendly Linkage System
for Kowloon East

發展局
Development Bureau

CEDD
土木工程拓展署
Civil Engineering and Development Department

ARUP

Your Views are Important

The first stage of the Detailed Feasibility Study has been completed, with **the most suitable transport mode as the EFLS for Kowloon East** being recommended. Public are welcome to express views on the findings and recommendation of the first stage study by 2 July 2017 for us to proceed with the next stage of study.

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❝ To address the various public concerns raised during the preliminary feasibility study (PFS), a detailed feasibility study (DFS) is being conducted in stages to enhance the connectivity in Kowloon East for its transformation into a new Core Business District. ❞

The Kai Tak Outline Zoning Plan approved in 2007 has incorporated the alignment of an Environmentally Friendly Linkage System (EFLS) running within Kai Tak Development (KTD). The 2011-12 Policy Address announced that Kowloon East (KE), including KTD, Kowloon Bay and Kwun Tong business areas, would be transformed into another Core Business District (CBD) to sustain Hong Kong's long term economic development. To enhance the accessibility of the new CBD, appropriate adjustments were necessary on the proposed EFLS to provide a fast and convenient intra-district connectivity service.

2007

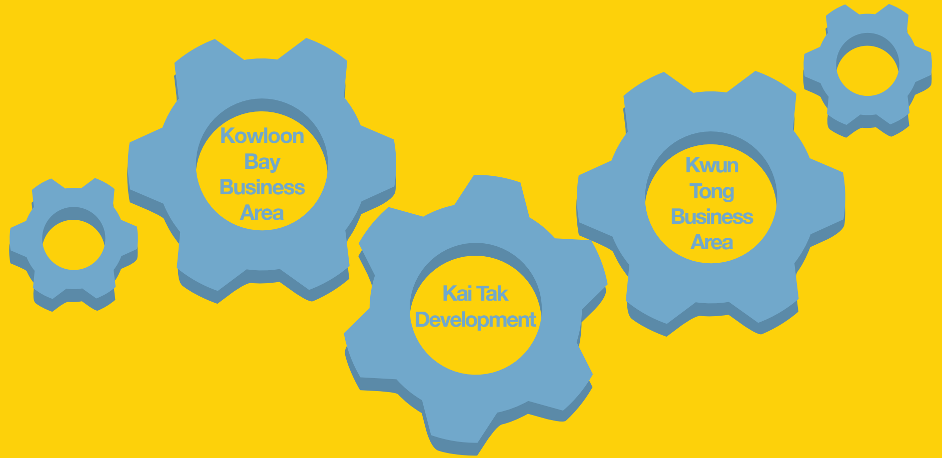
The Kai Tak Outline Zoning Plan incorporated the EFLS running within KTD.

2009

PFS was conducted in December to review the preliminary feasibility of the EFLS.

2011

A 9-km long elevated monorail system with 12 stations was proposed in the PFS, connecting KTD, Kowloon Bay and Kwun Tong business areas.



2012-2014

Public Consultation for PFS

Public generally agreed that there was a need to enhance the connectivity in KE. However, there were diversified views on the proposed elevated monorail system, alignment, coverage and the implications for Kwun Tong Typhoon Shelter.

2015

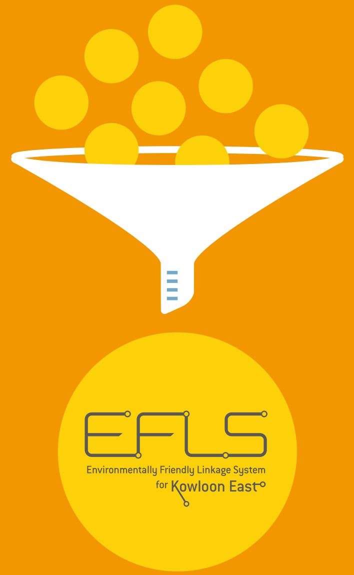
DFS commenced in October. The first stage of the study is to evaluate various green public transport modes and recommend the most suitable mode as EFLS for KE. Further studies on the way forward for the recommended EFLS scheme such as alignment and operation mode will be conducted in the next stage of the DFS.

2017

We are here

The first stage of the DFS was completed. Interim Public Consultation is launched to collect public views on the recommended most suitable transport mode as EFLS for KE.

Evaluate various green public transport modes



Identify the most suitable green public transport mode

Next stage study

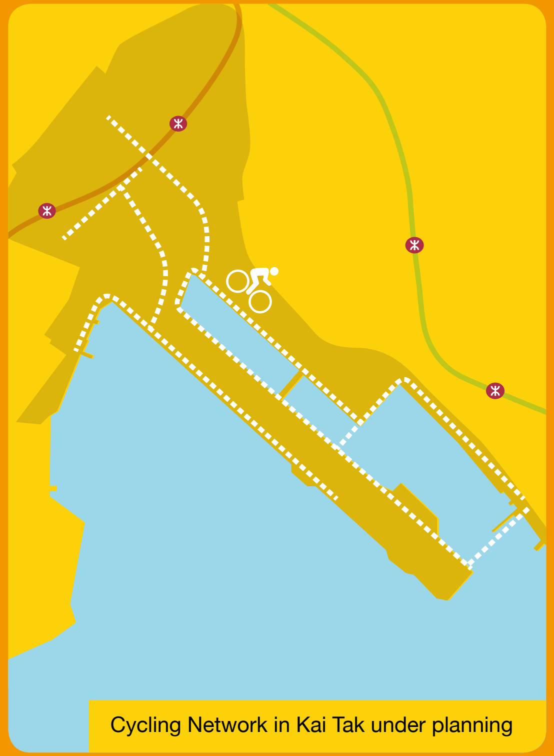
Alignment design, station locations, operation and procurement approaches, etc. will be formulated. Another public consultation will be conducted.

❝ KE is a diversified community under rapid development. There are frequent activities in the industrial and commercial areas of Kowloon Bay and Kwun Tong districts. With lots of commercial buildings located alongside the existing roads, traffic in the area is heavy; and there is room to improve the pedestrian walking environment.
In KTD, apart from spacious walking environment, the development is interconnected by about 100 hectares of open space which is equipped with a cycling network. ❞


Wai Yip Street, Kwun Tong


Kwun Tong Road, Kowloon Bay


Muk Chui Street, Kai Tak


Cycling Network in Kai Tak under planning

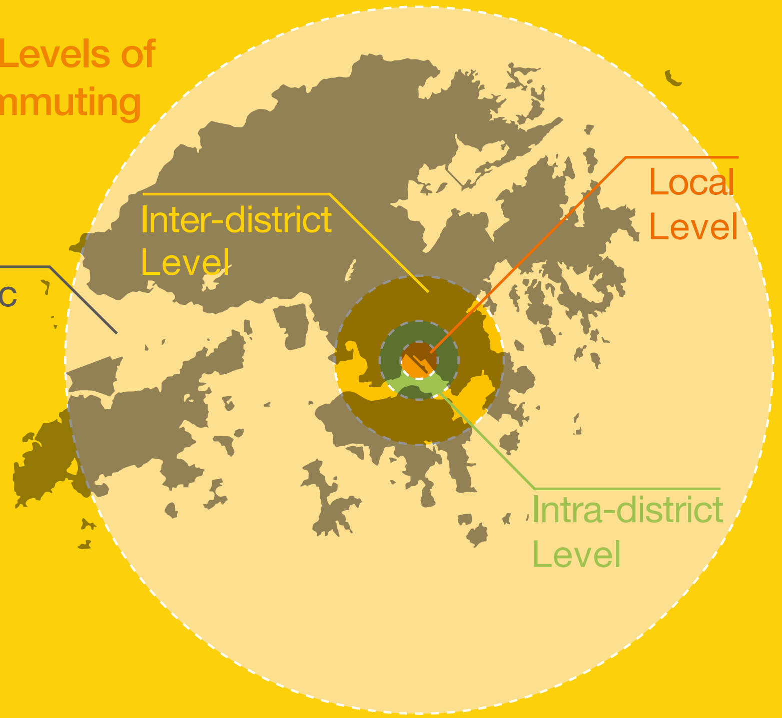

How Ming Street, Kwun Tong


Kai Cheung Road, Kowloon Bay

The existing public transport facilities, including MTR, buses, minibuses, taxis and pedestrian networks, in KE collectively make up the integrated multi-modal linkage system. These facilities are serving our daily transport needs at different levels, i.e. from local and intra- and inter-district commuting to leisure activities on weekends.

As KE is transforming into a CBD, the initial transport demand could be met by conventional road-based transport services and the enhanced pedestrian facilities. In the long run, the Shatin to Central Link under construction and the planned Route 6 could handle the inter-district transport demand. However, due to the limited road space in KE, solely relying on existing public transport services would be difficult to maintain a good quality of service to cope with the traffic growth generated by new developments. Therefore, there is a need to introduce EFLS as an additional transport mode to deal with the rising demand and to enhance the connectivity in KE.

Different Levels of Daily Commuting



Local Level
Activities within walking distance or connectivity with transport interchanges

Example: Walking from home to nearby shopping malls

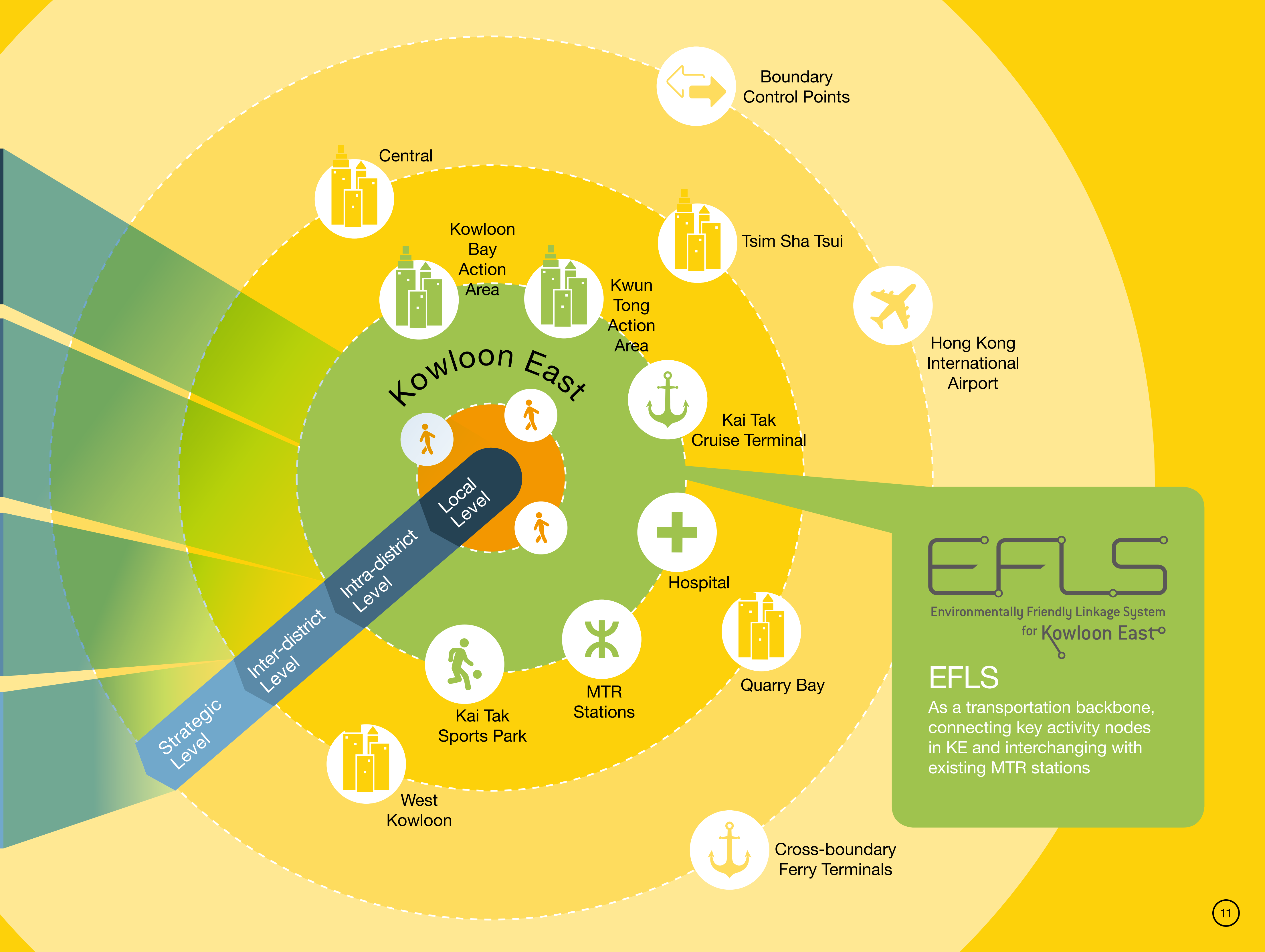
Intra-district Level
Connectivity between the key activity nodes within KE

Example: From Kai Tak residential areas to the hospital, travelling between Kowloon Bay and Kwun Tong action areas

Inter-district Level
Connectivity between KE and other districts to facilitate commuting among different business areas

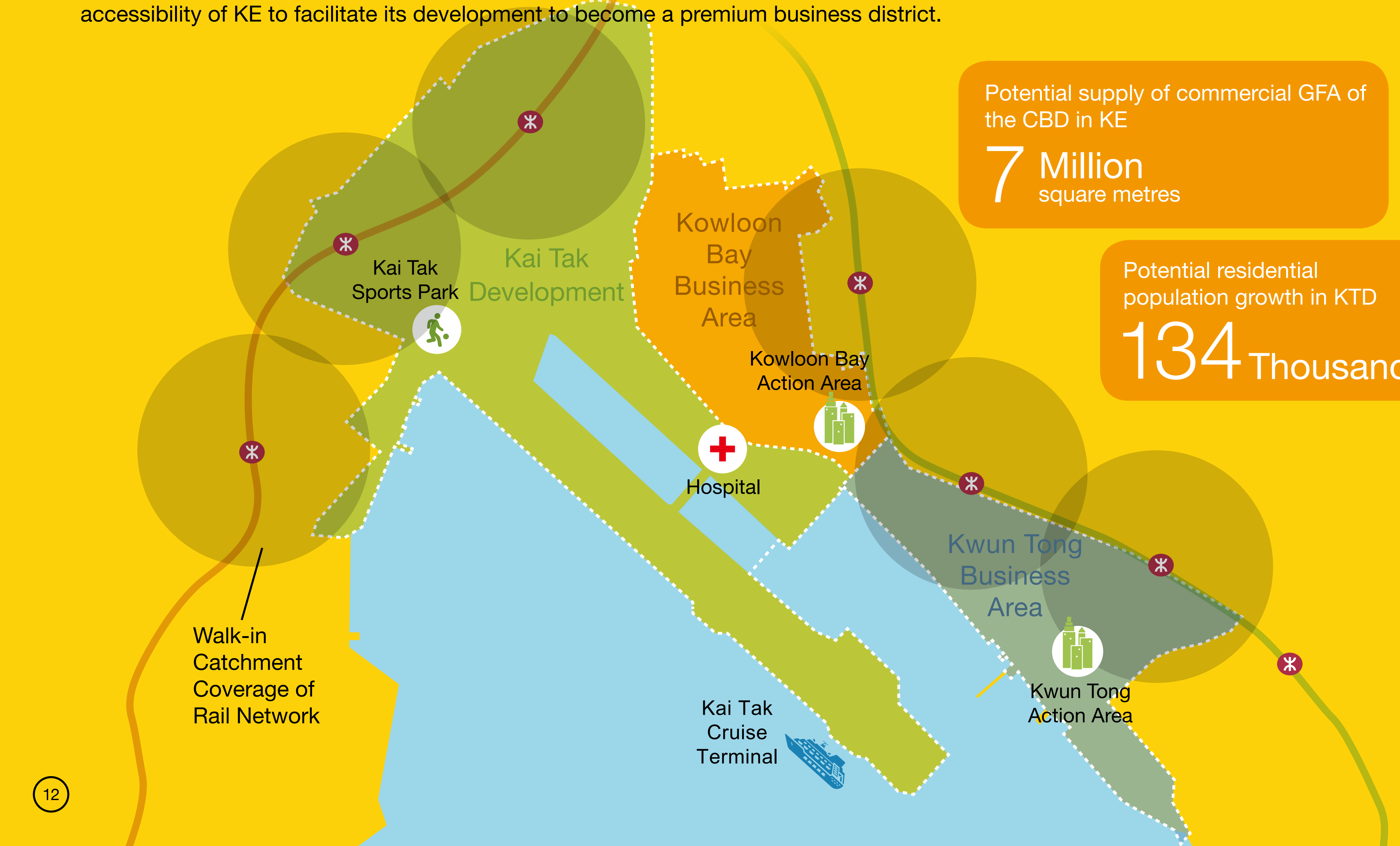
Example: Trips between Kai Tak and Quarry Bay, Tsim Sha Tsui as well as Central

Strategic Level
Connectivity with strategic link roads, airport and cross-boundary facilities to facilitate cross-boundary commercial or travelling needs



Why is there a need for EFLS?

KE as a CBD has the potential to provide about 7 million square metres of commercial gross floor area (GFA) with an upsurge of employment population. The population in KTD will also increase to about 134 thousand. Coupled with the attraction of various public facilities in the district, inevitably there is a growth in transport demand. By 2036, the daily passenger trips are forecast to increase by more than one fold. However, the rail networks only run along the periphery of KE, leaving a large part of the area to be served only by road-based transport services. Kai Tak, formerly a restricted airport area, is relatively distant from the rail networks and major roads. With the introduction of an EFLS linking up the key activity nodes within KE and connecting with rail stations and nearby public transport and pedestrian facilities, it can meet the newly generated traffic need with enhanced road environment, and also can improve the accessibility of KE to facilitate its development to become a premium business district.



Potential supply of commercial GFA of the CBD in KE

7 Million square metres

Potential residential population growth in KTD

134 Thousand

Visionary Criteria of EFLS for KE

The EFLS should have sufficient capacity to meet future traffic demand in KE. It should also be reliable, comfortable, and on-time so as to provide a quick and time-saving service as compared with other public transport systems. Being a green transport mode, it has to be environmentally and socially sustainable with minimal impact during both construction and operation stages.

“ We will evaluate the various green public transport modes against the criteria including capacity, efficiency, reliability and sustainability in order to recommend the most suitable one. Among the various green public transport modes, some of them are obviously not able to meet the criteria, while the rest will be taken forward for further assessment in detail. ”

Visionary Criteria for EFLS

Please visit the project website for more information about various green transport modes.

Based on the criteria of capacity, efficiency, reliability and sustainability, PRT, cable car, cable-liner and travellator are considered not suitable as EFLS for KE.

Personal Rapid Transit (PRT)

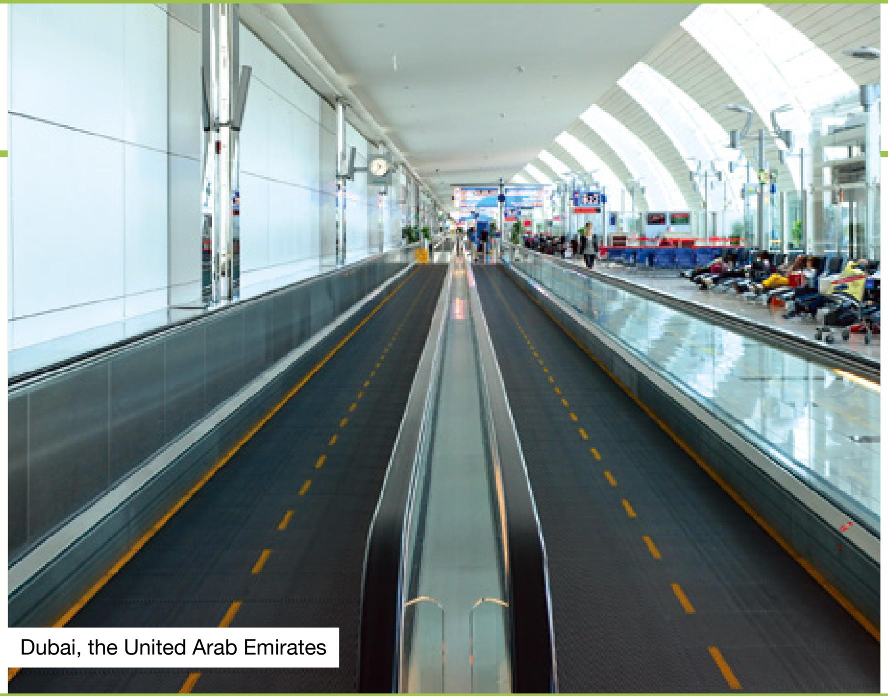
PRT runs on a dedicated corridor. Each vehicle can only accommodate 4 to 6 passengers, with a capacity comparable to a taxi. PRT typically provides on-demand service and is not commonly adopted as a public transport service on public roads. Application example includes the system at Heathrow Airport in London, the United Kingdom.

London, the United Kingdom

Lower capacity

Travellator

Travellator usually serves as a supplementary pedestrian facility to shorten walking time under a better walking environment. It operates at a slow speed and serves short distance trips. Service suspension period for maintenance is relatively long. Examples include the travellators in the Hong Kong International Airport.


Dubai, the United Arab Emirates

Slow and for short-distance service

Long suspension period for maintenance

Cable Car

Cable car is pulled by overhead cables, and operates at a slower speed with low carrying capacity. It is usually used for tourism or recreational purposes instead of serving as daily public transport. Its operation is subject to weather conditions with relatively long service suspension periods for maintenance. Examples include Ngong Ping 360, Cable Car at Ocean Park, Hong Kong and cable car system across the Thames in London, the United Kingdom.


River Thames, the United Kingdom

Service subject to weather conditions and long suspension period for maintenance

Slow

Lower capacity

Cable-liner

Cable-liner is pulled by cable wires and operates on a dedicated corridor with less flexibility in service. Service suspension-time during maintenance can be relatively long. Example includes system in Oakland, USA.


Oakland, the United States of America

Lower flexibility in service

The performance of MT, BRT, Monorail and APM in terms of capacity, efficiency, reliability and sustainability have to be further evaluated in detail for comparison.

Bus Rapid Transit (BRT)

BRT is considered as an upgraded version of a conventional bus system, running on a dedicated corridor featuring designated stations and platform gates. Passengers pay fares before boarding, saving boarding time at the station. However, BRT is manually operated by a driver and shares the same road space at junctions with other road transport. Its travelling time is affected by road traffic. Examples include systems in Seoul in South Korea, Nagoya in Japan and Rio de Janeiro in Brazil.


Rio De Janeiro, Brazil

Monorail

Monorail operates on an elevated dedicated corridor under a fully automated system and is not affected by road traffic , offering a reliable and on-time service. Monorail is commonly adopted as daily public transport system in many cities such as Tokyo in Japan, Daegu in South Korea, Chongqing in China, Dubai in the United Arab Emirates and Sao Paulo in Brazil.


Dubai, the United Arab Emirates

Modern Tramway (MT)

MT operates similar to the Light Rail (LR) in the New Territories West. The system runs on either dedicated or shared road corridor. It is manually operated by a driver and shares the same road space at junctions with other road transport. Its travelling time is affected by road traffic. The low-floor design feature of MT facilitates easier boarding of passengers. It is widely used for commuting in many cities such as Barcelona in Spain and Brittany in France.


Brittany, France

Automated People Mover (APM)

APM operates on an elevated dedicated corridor under a fully automated system, similar to monorail. Its service is not affected by road traffic, offering a reliable and on-time service. Examples include the APM at Hong Kong International Airport and "Yurikamome" in Tokyo, Japan and the Punggol / Sengkang system in Singapore.


Tokyo, Japan

At-grade (dedicated), at-grade (shared) or elevated

Among the four transport modes for further evaluation in detail, both BRT and MT mainly operate at-grade. BRT operates on a dedicated corridor, which gives it a distinct performance advantage over conventional buses. MT operates at-grade either on a dedicated or shared corridor.

Monorail and APM are essentially elevated systems, and they operate on a dedicated corridor on viaducts.

As far as the CBD in KE is concerned, will elevated, at-grade (dedicated) or at-grade (shared) be the most suitable mode for KE?

We will further assess their impacts taking into account the conditions of the area, including traffic, spatial provision and existing facilities, etc. in formulating a recommended proposal.

At-grade (dedicated)

Benefits

- Utilise existing road space, eliminating the need to construct a viaduct
- Low-floor design, with stations at ground-level, convenient for boarding and alighting
- Less visual impact

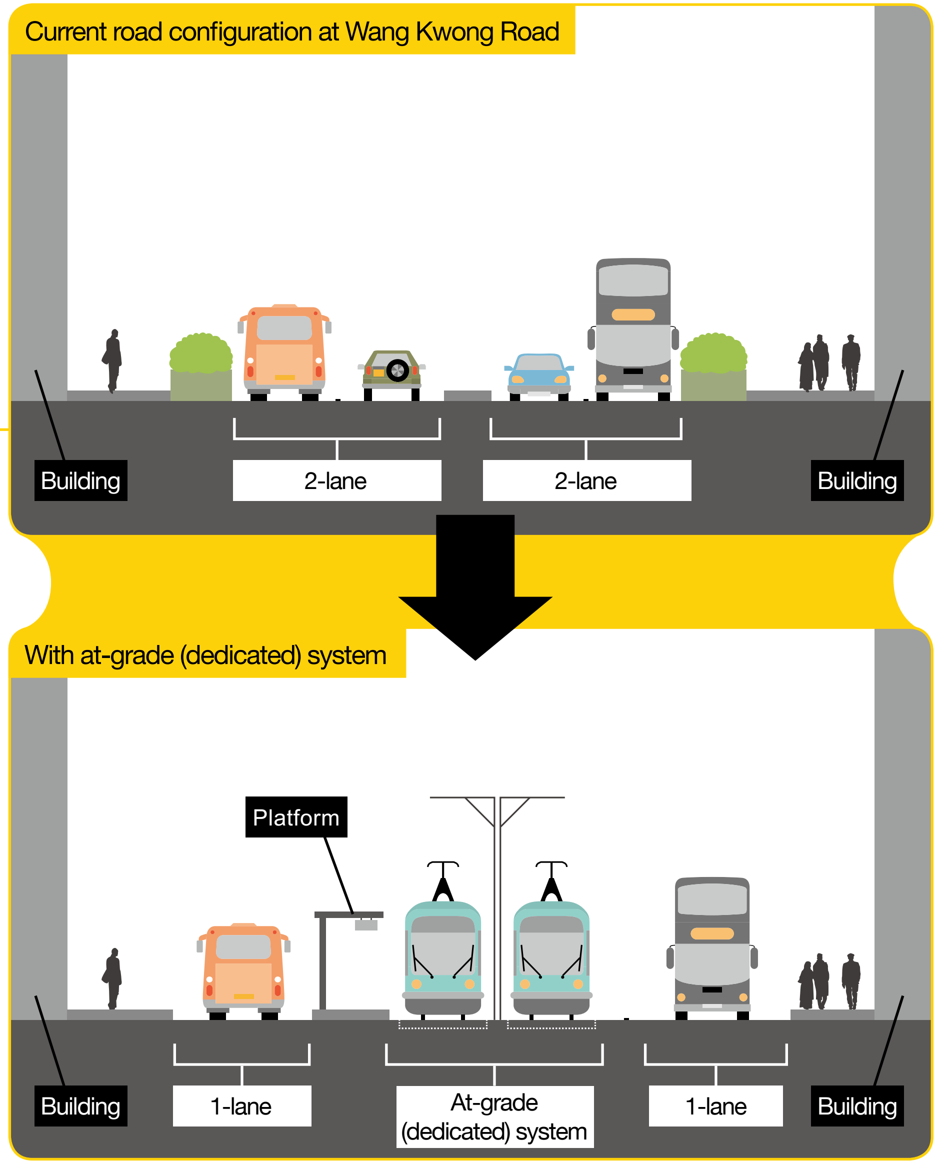
Limitations

Cost factor

- System operated by drivers
- Need to completely relocate underground utilities underneath the dedicated corridor, thus increasing the construction cost and time
- Large-scale modification to all junctions, traffic lights and pedestrian crossing facilities along the corridor

Traffic impact

- At least one traffic lane per direction will be occupied, with more space needed at station locations; other road users cannot enter the dedicated corridor; the condition will be similar to that of the existing Light Rail at the New Territories West
- Priority given to the system at junctions for operational efficiency, thus increasing waiting time for other road users
- Additional pedestrian crossing facilities at station locations may cause impact to other road users



Evaluation Result

- With the at-grade (dedicated) system, the number of existing traffic lanes would be reduced causing traffic congestion, thus resulting in longer travelling time for other road users. The reduced travelling speed of other vehicles would be comparable to walking speed. Given the considerable traffic impact in KE in general, the system would not bring positive economic benefit to society.

This option is considered not suitable.

Streets and roads in red patches indicate traffic congestion. Travelling speed of vehicles is anticipated to be similar to walking speed.

At-grade (shared)

Benefits

- No dedicated corridor, thus the number of traffic lanes generally not affected except at station areas
- Low-floor design, with stations at ground-level, convenient for boarding and alighting
- Less visual impact

Limitations

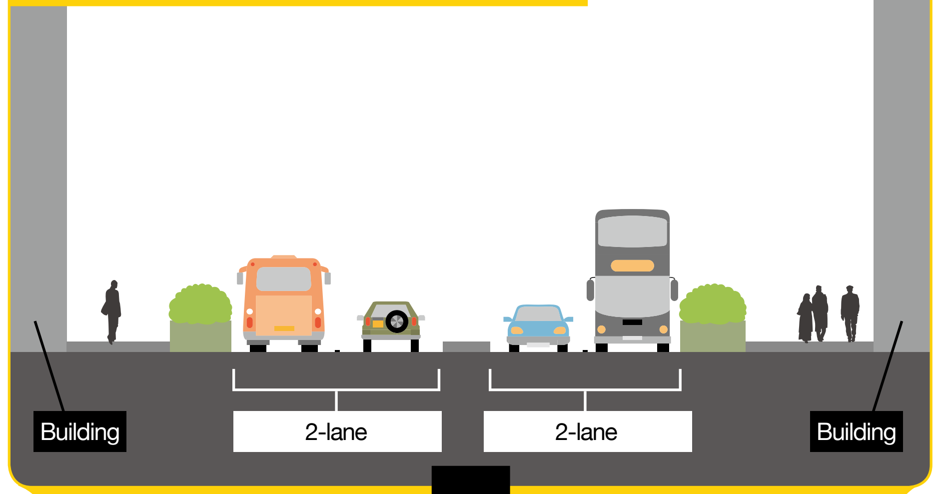
Cost factor

- System operated by drivers
- Need to completely relocate underground utilities along the alignment, thus increasing the construction cost and time
- Additional pedestrian crossing facilities at station locations

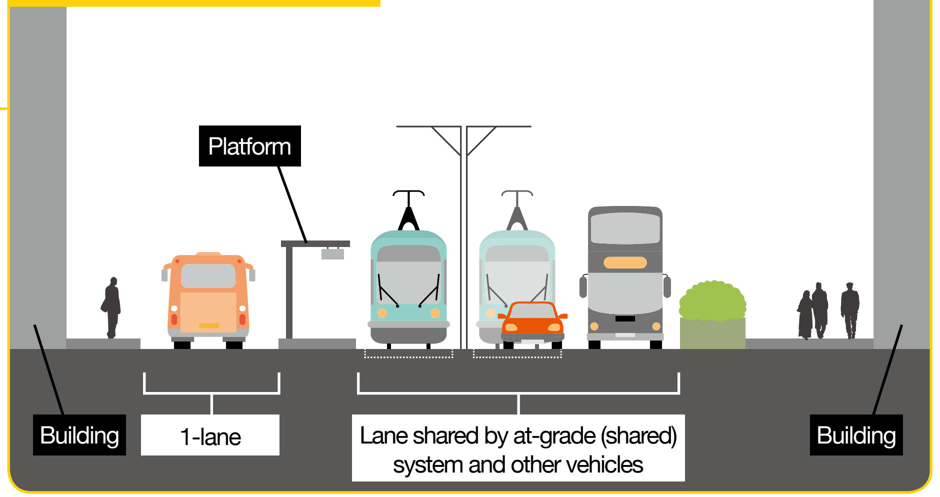
Traffic impact

- The main corridor will be shared use with other vehicles, except at station areas being dedicated for system, the condition will be similar to the shared section of the existing Light Rail in the New Territories West
- Restricted by general road traffic condition, no apparent advantages in efficiency as the system will operate at speeds comparable to that of other vehicles
- Additional pedestrian crossing facilities at station locations may cause impact to other road users

Current road configuration at Wang Kwong Road



With at-grade (shared) system




Shared section of the Light Rail in the New Territories West

Evaluation Result

- The at-grade (shared) system would be subject to traffic conditions. If there is traffic congestion, the EFLS travel time would be prolonged and its service would be affected and delayed, making its operation comparable to other road-based public transport services. Due to additional capital cost of the system, it would not bring positive economic benefit to society. **This option is considered not suitable.**

Elevated

Monorail

Automated People Mover (APM)

Benefits

- Viaduct columns to be constructed at the central divider of carriageway, occupying less road space
- Less impact on underground utilities
- Operates on dedicated elevated track, leading to a safe and fast service with reduced travelling time
- Not affected by road traffic, with a reliable and on-time service
- Fully automated system without drivers

Limitations

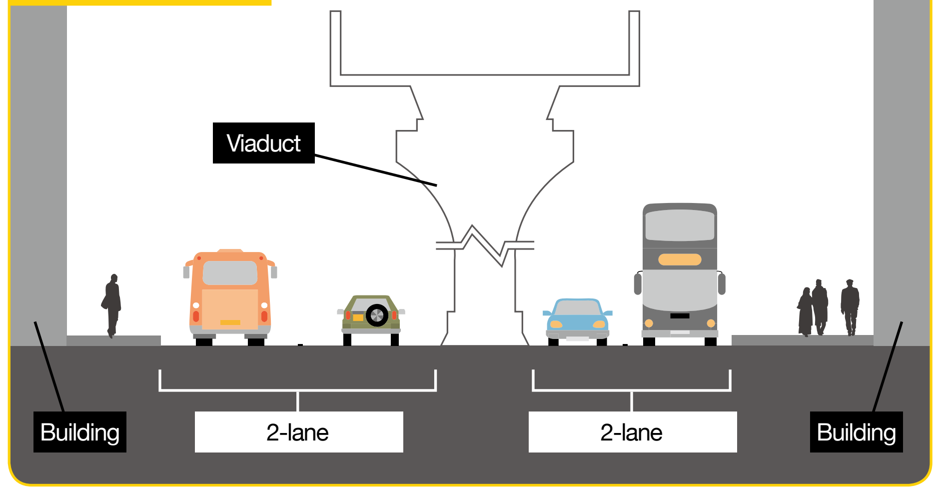
Cost factor

- Operates on viaduct, higher construction cost
- Some sections of carriageway and adjacent footpaths will need to be narrowed or adjusted to make room for the viaduct columns

Environmental factor

- May have visual impact

With elevated system



2 MTR Kai Tak Station ↔ Kowloon Bay Business Area

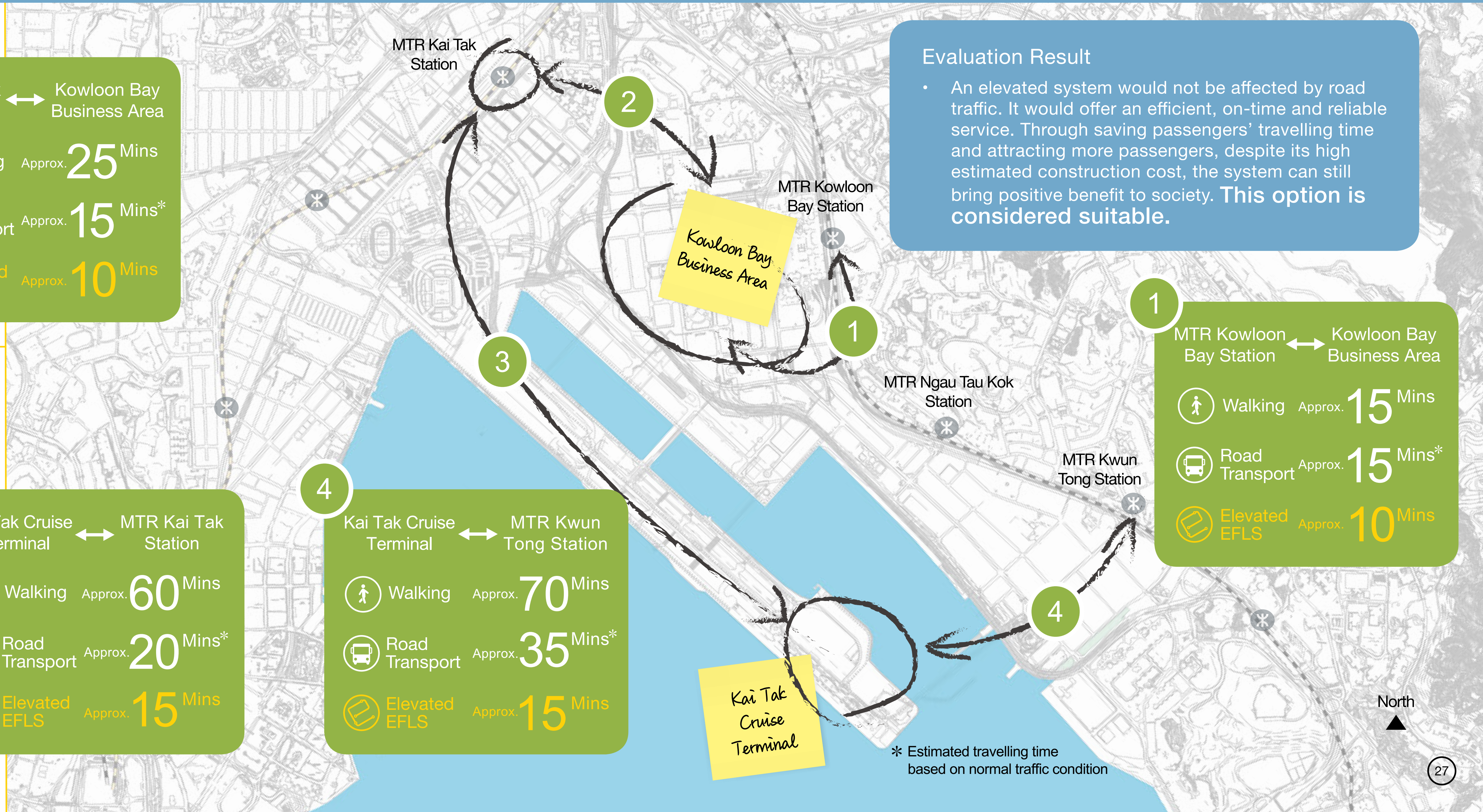
- Walking Approx. 25 Mins
- Road Transport Approx. 15 Mins*
- Elevated EFLS Approx. 10 Mins

3 Kai Tak Cruise Terminal ↔ MTR Kai Tak Station

- Walking Approx. 60 Mins
- Road Transport Approx. 20 Mins*
- Elevated EFLS Approx. 15 Mins

4 Kai Tak Cruise Terminal ↔ MTR Kwun Tong Station

- Walking Approx. 70 Mins
- Road Transport Approx. 35 Mins*
- Elevated EFLS Approx. 15 Mins



Evaluation Result

- An elevated system would not be affected by road traffic. It would offer an efficient, on-time and reliable service. Through saving passengers' travelling time and attracting more passengers, despite its high estimated construction cost, the system can still bring positive benefit to society. **This option is considered suitable.**

1 MTR Kowloon Bay Station ↔ Kowloon Bay Business Area

- Walking Approx. 15 Mins
- Road Transport Approx. 15 Mins*
- Elevated EFLS Approx. 10 Mins

* Estimated travelling time based on normal traffic condition

Items for Detailed Assessment	Occupation of Existing Road Space	Impact on Underground Utilities	Modifications of Junctions, Traffic Signals and Pedestrian Facilities	Construction Cost	Travelling Time of All Passengers	Visual Impact	Overall Benefit
 At-grade (dedicated)	Considerable ☹	Extensive ☹	Large-scale ☹	Low 🙂	Lengthened ☹	Minor 🙂	Negative ☹
 At-grade (shared)	Moderate 😐	Extensive ☹	Localised 😐	Low 🙂	Generally no change 😐	Minor 🙂	Negative ☹
 Elevated	Moderate 😐	Localised 😐	Minor 🙂	High ☹	Shortened 🙂	Considerable ☹	Positive 🙂

Evaluation Conclusion

Elevated system is the most suitable transport mode

Considering the conditions in KE, at-grade (dedicated) or at-grade (shared) systems will cause larger impacts to other road users and cannot bring any positive benefit to society. On the other hand, the performance of an elevated system will not be affected by road traffic. It occupies less road space with much less impact on the existing carriageways and footpaths. An elevated system can also fully leverage its speed and efficiency, shortening travelling time and bringing time-saving benefit to passengers. Passengers can then conveniently and quickly commute among the activity nodes in the district and interchange with the MTR system. To meet the needs of a CBD, an elevated system performs better and is considered as the most suitable transport mode as EFLS for KE.

Elevated Green Public Transport Mode

This interim public consultation is to seek public views on adopting an elevated mode EFLS. In the next stage of the DFS, we will examine in detail with regard to the alignment options, station locations and connections, future extension, depot location and layout, operation and procurement approaches, cost and financial analysis, etc. under the elevated mode.

Elevated Green Public Transport Mode

Alignment study

Once the elevated mode is ascertained, we will examine the feasibility of the various alignment options based on the structural dimensions and design constraints of different elevated systems. Cost assessment, patronage and journey time will also be collectively evaluated in detail to identify the best performing alignment option.

To construct an elevated structure within a crowded environment, it is necessary to fulfil the requirements of emergency vehicle access to enable passage of emergency vehicles after construction is complete.

Station locations and connections

The location and layout of stations are subject to various factors such as the scale of the EFLS and the platform design. The connectivity of stations with nearby developments will also be explored to facilitate passenger flow and enhance efficiency.

Future extension design

The feasibility of future extensions will be reviewed in the next stage of study to make possible provisions for future expansion.

Locations and layout of depot

The required depot size is different for APM and monorail. We have to examine the spatial requirements for a depot and identify a suitable location for the EFLS in the dense environment of KE.

Cost and financial analysis

Based on the detailed design of alignments, stations and depots, we will estimate the construction, operation and maintenance costs, and evaluate the economic and financial performance of the system. The procurement approach and implementation programme will also be studied.

Operation plan

EFLS is different from existing rail systems in Hong Kong. We will need to formulate a management, operation and maintenance strategy based on the adopted transport mode, and to review the ordinance and regulation arrangement for the EFLS.

Procurement approach

There are various approaches for procuring large scale infrastructure works, such as a conventional Public Works Programme approach or Public-Private Partnership with different conditions on construction, operation, ownership and transfer, etc. We need to examine the pros and cons of different approaches and recommend a suitable arrangement.

Kwun Tong Transportation Link (KTTL)

When examining the alignment options, we will look into details of the proposed KTTL and its possible impact on the Kwun Tong Typhoon Shelter. We need to make sure that any proposal will fully comply with the requirements of the Protection of the Harbour Ordinance.

You are cordially invited to participate in the public consultation activities and express your views by 2 July 2017 via mail, fax, e-mail or phone. Please specify "Detailed Feasibility Study for Environmentally Friendly Linkage System for Kowloon East - Interim Public Consultation".

Public Forum

27 May 2017 (Saturday)
2 – 4 pm

Kai Tak Community Hall
3 Concorde Road, Kai Tak, Kowloon

Please make reservations by 25 May 2017 either by phone at 2268 3781 or by completing the registration form on the project website.

Public may also refer to the transportation routes to Trade and Industry Tower and then walk to Kai Tak Community Hall.

Disclaimer: A person or an organisation providing any comments and suggestions to the Civil Engineering and Development Department on the "Detailed Feasibility Study for Environmentally Friendly Linkage System for Kowloon East "shall be deemed to have given consent to the Civil Engineering and Development Department to partially or wholly publish the comments and suggestions (including the names of the individuals and organisations), while contact information such as telephone numbers or email addresses will be kept confidential. If you do not agree to this arrangement, please state so when providing comments and suggestions.

My View

The Interim Public Consultation of the DFS for EFLS for Kowloon East has been launched with the most suitable transport mode as EFLS for Kowloon East being recommended. You are cordially invited to express your views on the findings and recommendation of the first stage study by 2 July 2017 via mail, fax, e-mail or phone.

Name ______________________ Organisation ______________________

Telephone ______________________ E-mail ______________________

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My View

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Roving Exhibition

9 - 12 May
Central Theatre, Kai Ching Estate

15 - 26 May
Trade and Industry Tower

27 May - 9 June
Kwun Tong Promenade

10 - 21 June
Revenue Tower, Wan Chai

22 June - 2 July
North Point Government Offices

The schedule for the roving exhibition may be changed. Please visit the project website for the latest arrangement.

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