



Highways Department
The Government of the Hong Kong Special Administrative Region

**Agreement No. WD 6/2007 Improvement to
Pok Oi Interchange – Environmental Impact
Assessment Study:
Environmental Impact Assessment Report
– Executive Summary**

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博愛交匯處改善工程 – 環境影響評估研究:
環境影響評估研究行政摘要

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Environmental Resources Management
21/F Lincoln House
Taikoo Place 979 King's Road
Island East Hong Kong
Telephone 2271 3000
Facsimile 2723 5660




Highways Department

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Environmental Impact Assessment
Study: *Environmental Impact
Assessment Report – Executive
Summary*

November 2008

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For and on behalf of Environmental Resources Management
Approved by: <u>Dr Robin Kennish</u>
Signed: <u></u>
Position: <u>Director</u>
Date: <u>11 NOVEMBER 2008</u>

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1 INTRODUCTION

1.1 BACKGROUND

At present, traffic queues are already observed on the northern approach of Pok Oi Roundabout (POR) during the evening peak period, and the southern approach during both morning and evening peak hours. The situation will likely deteriorate further when nearby developments are completed. The tailback of traffic onto the southbound carriageway on the northern approach to POR may block the through traffic from Tai Lam Tunnel / New Territories (NT) North to Tuen Mun / Tin Shui Wai / Hong Kong - Shenzhen Western Corridor. A traffic improvement scheme is considered necessary to relieve the traffic congestion.

ERM-Hong Kong, Ltd (ERM), supported by Halcrow China Ltd (Halcrow), has been commissioned by the Highways Department (HyD) to undertake the *Improvement to Pok Oi Interchange - Environmental Impact Assessment Study* ("the Assignment") under *Agreement No. WD 6/2007*. As part of the Assignment, an Environmental Impact Assessment (EIA) Study has been prepared in accordance with the *EIA Study Brief* (No. ESB-166/2007) issued under the *Environmental Impact Assessment Ordinance (EIAO)*.

The EIA Report addresses potential environmental impacts associated with the construction and operation of the Improvement to Pok Oi Interchange ("the Project"). This *Executive Summary* summarises the key findings of the EIA.

1.2 OBJECTIVES OF AND APPROACH TO THE EIA STUDY

The objectives of the EIA Study are to provide information on the nature and extent of environmental impacts arising from the Project; to recommend appropriate mitigation measures to control the potential environmental impacts so that it complies with the requirements of the *Technical Memorandum on Environmental Impact Assessment Process of the EIAO* (EIAO-TM); and to confirm the environmental acceptability of the Project. Key environmental issues identified in the *EIA Study Brief* include air quality, noise, water quality, waste management, and landscape and visual impacts.

The EIA was conducted in accordance with the guidelines on assessment methodologies provided in the *EIAO-TM*. The general approach for the assessment includes description of baseline environmental conditions for the impact assessment, identification and evaluation of potential impacts and recommendation of mitigation measures and an environmental monitoring and audit programme. The assessments in this EIA Study are conducted using well-proven and internationally accepted methods based on reasonable worst-case conditions.

Alternative construction methods and sequences of works have been considered and environmentally friendly construction methods have been adopted to avoid / minimise impacts to the surrounding sensitive receivers, where appropriate and practicable.

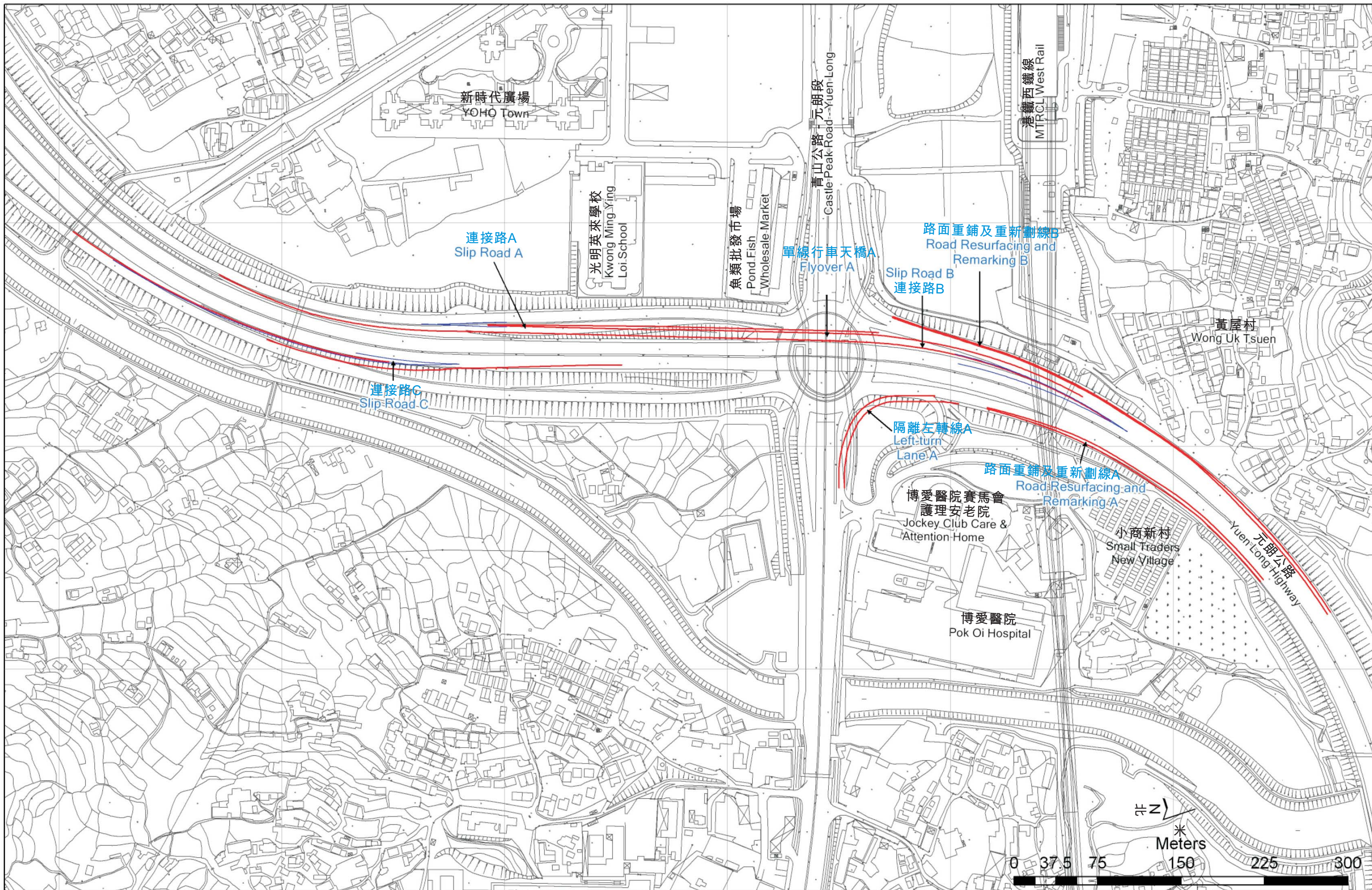
2.1 SCOPE OF THE PROJECT

The proposed alignment of the Project is shown in *Figure 2.1a*. The scope of the Project is as follows:

- provision of a single lane flyover (approximately 140m in length) adjacent to the northbound carriageway of Pok Oi Flyover (POF) (denoted as Flyover A in *Figure 2.1a* and subsequent sections of this report);
- construction of a slip road (approximately 410m in length) connecting the northbound carriageway of the ground level road of Yuen Long Highway (YLH) on the southern arm of POR to the proposed flyover (denoted as Slip Road A in *Figure 2.1a* and subsequent sections of this report);
- construction of a slip road (approximately 100m in length) connecting the proposed flyover to the northbound carriageway of the ground level section of YLH on the northern arm of POR (denoted as Slip Road B in *Figure 2.1a* and subsequent sections of this report);
- construction of a slip road (approximately 280m in length) connecting the southbound carriageway of POF to the southbound carriageway of the ground level section of YLH on the southern arm of POR (denoted as Slip Road C in *Figure 2.1a* and subsequent sections of this report);
- resurfacing and re-marking of a stretch of the southbound carriageway (approximately 280m in length) of the ground level section of YLH on the northern arm of POR to increase the number of traffic lanes on the carriageway from three to four (denoted as Road Resurfacing and Remarking A in *Figure 2.1a* and subsequent sections of this report);
- resurfacing and re-marking of a stretch of the northbound carriageway (approximately 470m in length) of the ground level section of YLH on the northern arm of POR (denoted as Road Resurfacing and Remarking B in *Figure 2.1a* and subsequent sections of this report);
- construction of a segregated left-turn lane (approximately 110m in length) at the northern arm of POR (denoted as Left-turn Lane A in *Figure 2.1a* and subsequent sections of this report); and
- associated ancillary works.

2.2 WORK PROGRAMME

The construction of the Project is scheduled to commence in December 2009 and to be completed in December 2011.



The potential environmental impacts associated with the Project are summarised in the following sections.

3.1

AIR QUALITY

Potential dust nuisance from construction activities and gaseous emissions from diesel-powered construction plant have been considered. With the implementation of the recommended dust control measures and adoption of good construction site practices, adverse dust and air quality impacts from the construction of the Project are not anticipated.

Upon completion of the Project, vehicular emissions from the open roads would be the potential source of air quality impact. The key air pollutants from vehicular emissions include Nitrogen Dioxide (NO₂) and Respirable Suspended Particulates (RSP). A quantitative assessment has been conducted using the peak hourly traffic flow of the proposed new roads and the surrounding road network and fleet emission factors estimated using the EMFAC-HK model. The prediction indicated no exceedance of hourly and daily average concentrations of NO₂ or daily average concentrations of RSP in the vicinity of the Project.

It must be emphasised that the objective of the Project is only to relieve the traffic pressure and traffic queues of the existing POR and the design traffic flow / capacity ratio will be maintained. There will not be any increase in the overall traffic flow as a result of this Project.

The vehicular emissions associated with road traffic with the implementation of the Project are expected to comply with the respective AQOs, and therefore will not cause an adverse air quality impact.

Regular site audits are recommended to ensure the implementation of recommended dust control measures and adoption of good site practices during construction.

3.2

NOISE

Potential construction noise impacts will mainly be due to road works, construction of flyover, construction of retaining walls, abutments and embankments. During normal daytime working hours, the predicted noise levels at some of the representative noise sensitive receivers (NSRs), including the Jockey Club Care & Attention Home, Kwong Ming Ying Loi School and the village houses near YLH will exceed the construction noise criteria stipulated in the *EIAO-TM*. With the implementation of noise mitigation measures such as the use of quiet powered mechanical equipment, movable noise barriers and scheduling of PMEs/construction activities, the noise levels at the NSRs would comply with the *EIAO-TM* construction noise criteria.

The potential road traffic noise impacts have been assessed based on the Year 2026 traffic forecast, which is the maximum projected traffic level. With the provision of a 2.5 m high vertical noise barrier for the planned school, no adverse noise impacts are predicted at the NSRs during the operational phase of the Project. In the design year for the Project, the traffic noise levels for the case with the Project in operation will not be significantly higher, ie by 1.0 dB(A) or more, than those for the case without the Project. Based on the above, the traffic noise impact due to the Project is considered insignificant. Furthermore, the mitigated noise levels due to the road sections within the meaning of Item A.1 of Schedule 2 under the *EIAO* complied with the noise criteria as stipulated in the *EIAO-TM*.

Monitoring of construction noise and road traffic noise is recommended to verify the effectiveness of the mitigation scheme during the construction period and during the first year after the commencement of operation.

3.3 WATER QUALITY

Potential sources of water quality impact associated with the Project include Site runoff, discharges from construction activities and sewage effluents from the on-site workforce. Water quality impacts from the land-based construction works can be controlled to acceptable levels by implementing the recommended mitigation measures. All the effluents and runoff generated from the Site will be treated to relevant standards stipulated in the *Technical Memorandum - Standards For Effluents Discharged Into Drainage And Sewerage Systems, Inland And Coastal Waters* issued under *Water Pollution Control Ordinance (WPCO-TM)* before discharge. No unacceptable water quality impact is expected from the land-based construction activities with the adoption of appropriate drainage management and mitigation measures. Regular site inspections are recommended to ensure that the recommended mitigation measures are properly implemented.

For the operational phase, a road drainage system with appropriate silt or grit traps will be provided to collect runoff from the road surface during periods of rain. With the provision of an appropriate road drainage system, no adverse water quality impacts are anticipated. No operational water quality monitoring is considered necessary.

3.4 WASTE MANAGEMENT

Wastes generated by the construction activities are likely to include construction and demolition (C&D) materials from the construction works, general refuse from the workforce and chemical waste from any maintenance of construction plant and equipment. Provided that these identified waste arisings are handled, transported and disposed of using approved methods and that the recommended good site practices are strictly followed, adverse environmental impacts are not anticipated during the construction works.

The potential land contamination impacts within the Study Area have been examined. Based on the findings from the desktop studies and site inspection, no contaminated sites were identified within the vicinity of the Project boundary.

3.5 *LANDSCAPE AND VISUAL IMPACT*

Three Landscape Character Areas (LCAs), LCA1 Miscellaneous Rural Fringe Landscape, LCA2 Miscellaneous Urban Fringe Landscape, and LCA3 Urban Peripheral Village Landscapes, were identified. The residual impacts on all three LCAs will be negligible.

A total of seven Landscape Resources (LRs), LR1 Roads, LR2 Agricultural Land, LR3 Roadside Plantation, LR4 Developed Area, LR5 Disturbed Area, LR6 Nullah and LR7 Village, were identified. LR3 Roadside Plantation will experience moderate adverse and slight adverse residual impacts during construction and operation respectively. However, there will be *negligible* residual impacts on all other Landscape Resources.

Four Visually Sensitive Receivers (VSRs), VSR1 Sun Yuen Long Centre, VSR2 Pok Oi Hospital, VSR3 Kwong Ming Ying Loi School and VSR4 Yeung Uk Tsuen, were identified. There will be negligible residual impacts (impact at year 10) on all four VSRs.

According to *Annex 10* of the *EIAO-TM*, the landscape and visual impacts are considered acceptable with mitigation.

3.6 *ENVIRONMENTAL MONITORING AND AUDIT*

Environmental monitoring and audit (EM&A) requirements have been identified and recommended to ensure the effectiveness of the recommended mitigation measures. These requirements are outlined in the EIA Report. Monitoring of construction noise and operational road traffic noise is recommended to check compliance with relevant statutory criteria and to ensure the effectiveness of the mitigation measures. Site inspection and audit are also recommended to ensure that the recommended mitigation measures are in place and operating effectively during construction.

The environmental impact assessment has concluded that the construction and operation of the Project will not cause any unacceptable environmental impacts, provided that the recommended mitigation measures are implemented.

To ensure the effectiveness and proper implementation of the recommended mitigation measures, an EM&A programme has also been recommended.

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1 引言

1.1 背景

現時博愛迴旋處的南北面入口會於黃昏的高峰時期出現車龍，而南面入口亦會於早上的高峰時期出現車龍。當附近的發展完成後相信上述情況會更為惡化。在博愛迴旋處北面入口南行線上的車龍有可能會阻塞由大欖隧道/新界北前往屯門/天水圍/深圳西部通道的交通。因此有需要進行交通改善工程以舒緩交通擠塞的情況。

香港環境資源管理顧問有限公司受路政署委託，聯同合樂中國有限公司，按照協議編號WD6/2007進行博愛交匯處改善工程環境影響評估研究（以下簡稱該項工作）。該項工作的範圍包括一項環境影響評估研究（以下簡稱環評），而該環評是按照《環境影響評估條例》（以下簡稱環評條例）發出的環境影響評估研究概要（以下簡稱環評概要）編號ESB-166/2007的要求進行。

環評報告考慮了博愛交匯處改善工程（以下簡稱工程項目）施工及運作時可能產生的環境影響。本行政摘要概述環評的結果。

1.2 環評研究的目標和方法

本環評研究的目標是就著工程項目可能引起環境影響的性質及程度提供資料；建議適當的緩解措施控制有關影響，令其合乎《環境影響評估程序的技術備忘錄》（以下簡稱環評技術備忘錄）的要求；及確定工程項目在環境方面的考慮可以接受。環評概要鑑別了工程項目的主要環境考慮包括空氣質素、噪音、水質、廢物管理及景觀及視覺影響。

本環評研究根據環評技術備忘錄內有關評估方法的指引進行。有關方法大致上包括現有環境狀況的描述、鑑別及評估可能產生的環境影響、建議緩解措施和環境監察及審核計劃。本環評研究內的評估都是採用可靠及國際間認同的方法，再加上最差情況而進行。

工程項目已考慮各種可用的施工方法及操作工序，並在適當及可行情況下採用了對環境較佳的施工方法以避免或盡量減低對鄰近敏感地點的影響。

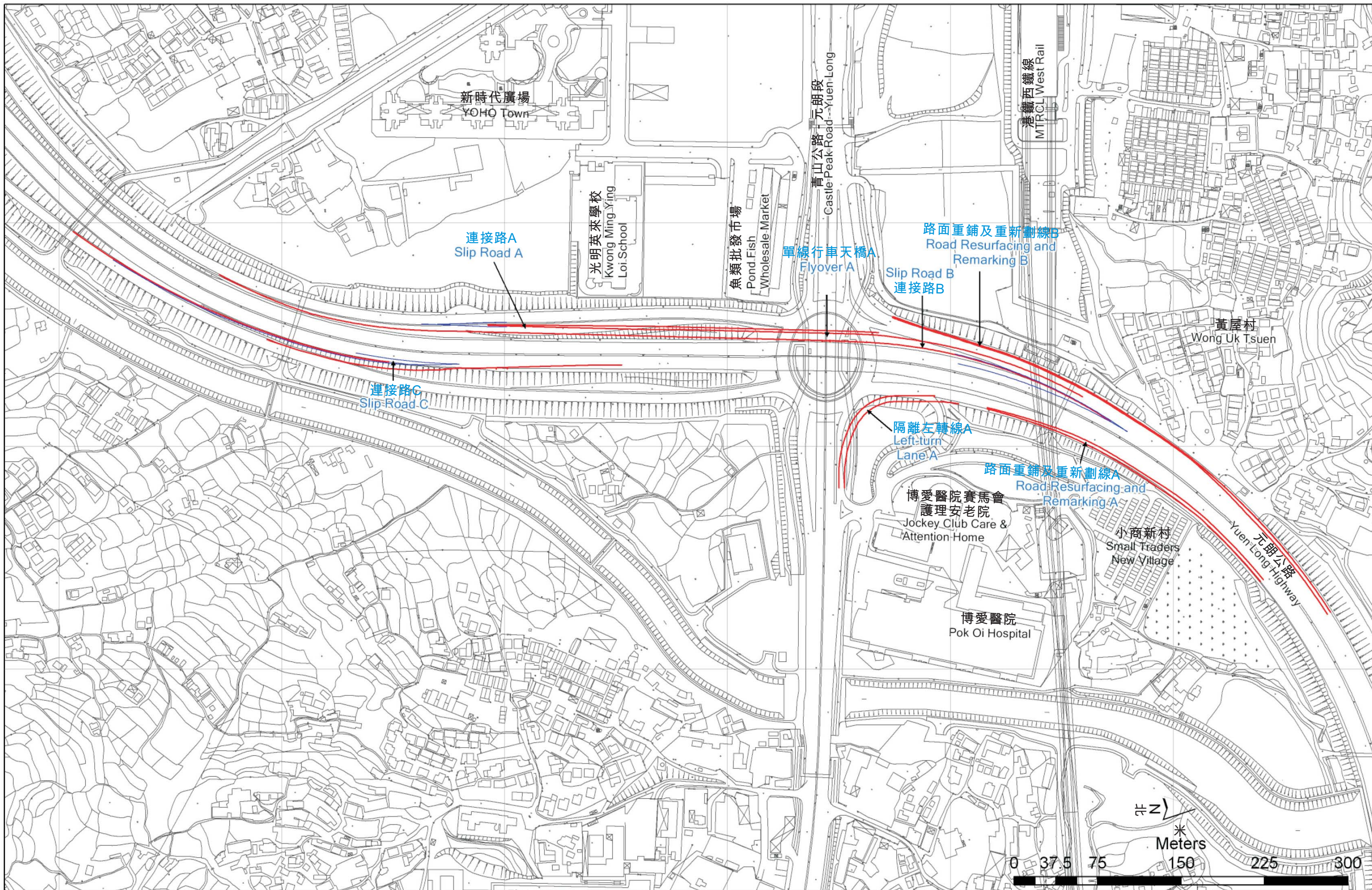
2.1*工程項目內容*

圖2.1a顯示工程項目的定線。項目的內容如下：

- 於博愛行車天橋北行線旁提供一條單線行車天橋（約長140米）（於圖2.1a及本報告中示之為單線行車天橋A）；
- 興建一條連接路，以連接位於博愛迴旋處南引道之元朗公路地面路段的北行線及建議的行車天橋（約長410米）（於圖2.1a及本報告中示之為連接路A）；
- 興建一條連接路，以連接建議的行車天橋至位於博愛迴旋處北引道之元朗公路地面路段的北行線（約長100米）（於圖2.1a及本報告中示之為連接路B）；
- 興建一條連接路，以連接博愛行車天橋南行線及位於博愛迴旋處南引道之元朗公路地面路段的南行線（約長280米）（於圖2.1a及本報告中示之為連接路C）；
- 將一段位於博愛迴旋處北引道之元朗公路地面路段的南行線由三線擴闊至四線（約長280米）（於圖2.1a及本報告中示之為路面重鋪及重新劃線A）；
- 擴闊一段位於博愛迴旋處北引道之元朗公路地面路段的北行線（約長470米）（於圖2.1a及本報告中示之為路面重鋪及重新劃線B）；
- 於博愛迴旋處的北引道南行線興建一條隔離的左轉線（約長110米）（於圖2.1a及本報告中示之為隔離左轉線A）；及
- 相關的輔助工程。

2.2*工程項目時間表*

工程項目現時計劃於2009年12月動工及於2011年12月完成。



<p>Highways Department The Government of the Hong Kong Special Administrative Region</p>	<p>ERM Environmental Resources Management</p>	<p>Halcrow Halcrow China Ltd. As Engineering Sub-consultant</p>	Agreement No. 協議編號: WD 6/2007	Executive Summary 行政摘要	FIGURE 圖 2.1a		
			Project Title 項目: Improvement to Pok Oi Interchange - Environmental Impact Assessment Study 博愛交匯處改善工程 - 環境影響評估研究	Figure Title 標題: PROPOSED WORKS 工程項目	Checked 批核: PS Designed 設計: TF	Scale 比例: - Drawn 繪圖: AM	Rev. 版本: - Date 日期: 13/06/2008

3.1

空氣質素

環評考慮了施工活動可能引起的塵埃滋擾及柴油推動建築機械的廢氣排放。實施環評建議的塵埃控制措施及良好工地管理手法後，預期工程項目不會引起負面塵埃及空氣質素影響。

工程項目完工後，道路上車輛的廢氣排放將可能會是空氣質素影響的來源。車輛廢氣排放的主要空氣污染物是二氧化氮及可吸入懸浮粒子。研究用擬建道路及附近道路網絡的每小時最高交通流量和EMFAC-HK模型估算的污染物排放率進行了一項量化評估。有關評估的結果顯示在工程項目一帶的二氧化氮每小時平均濃度及每日平均濃度和可吸入懸浮粒子每日平均濃度將不會超標。

工程項目的目的是要舒緩交通對現有博愛迴旋處的壓力及車龍，而設計的交通流量/容量比例會保持不變，因此本工程項目不會令整體交通流量增加。

與工程項目運作有關的車輛廢氣排放預料會合乎相應的空氣質素指標，所以不會產生負面空氣質素影響。

環評建議施工期間進行定期工地審核以確定所有建議的塵埃管制措施及良好工地管理手法切實執行。

3.2

噪音

工程項目可能引起的施工噪音影響主要由道路工程、興建天橋、擋土牆、橋台和路堤產生。在正常的日間施工時段內，預計在某些噪音敏感受體，包括賽馬會護理安老院、光明英來學校及元朗公路附近的村屋的建築噪音水平將會超出環評技術備忘錄的準則。實施噪音緩解措施後，例如使用較寧靜的機動設備、可移動的隔音屏障及適當安排機動設備/施工活動等，在上述噪音敏感受體的噪音水平將可合乎環評技術備忘錄的準則。

環評研究已根據2026年的預算交通流量，亦即預算的最高交通流量，評估工程項目可能引起的交通噪音影響。研究結果顯示，為計劃中的一所學校提供2.5米高的垂直式隔音屏障後，在所有的噪音敏感受體將不會有負面噪音影響。在上述最高交通流量的年份，有本工程項目的情況下的交通噪音水平並不會明顯高於（即1.0分貝（A計權）或更多）無本工程項目的情況。再者，源於符合環評條例附表2項目A.1定義的路段但已緩解的交通噪音水平，也合乎環評技術備忘錄的準則。基於以上結果，研究認為交通噪音影響並不顯著。

研究建議在施工期間監察建築噪音，並在工程項目投入運作後的第一年監察道路交通噪音，以鑑定緩解措施的效果。

3.3

水質

工程項目可能引起的水質影響主要源自工地徑流、施工活動的污水排放及地盤工人產生的污水。實施研究建議的緩解措施後，陸上工程引起的水質影響將可控制至可接受的水平。所有工地的污水和徑流將會按照《水污染管制條例》下發出的《技術備忘錄：排放入排水及排污系統、內陸及海岸水域的流出物的標準》的有關標準在排放前加以處理。基於工程項目只涉及陸上工程，而在採用適當的排水管理和緩解措施後，預料不會產生不可接受的水質影響。研究建議進行定期巡視工地以確定緩解措施切實執行。

至於運作期方面，工程項目已提供一套有隔沙井的道路排水系統，在天雨期間收集路面徑流。由於已提供上述的適當排水系統，所以預期不會有負面的水質影響。運作期間不需進行水質監察。

3.4

廢物管理

施工活動產生的廢物可能會包括源自建築工程的搭建物料、由地盤工人產生的一般垃圾及維修保養施工設備產生的化學廢物。只要上述的廢物以認可的方法搬運及處置，而良好施工手法又得以嚴謹執行，在施工期間預料不會有負面的環境影響。

研究亦已審視研究範圍內的潛在土地污染影響。根據審閱文件和現場視察的結果，在工程項目邊界以內並無發現任何土地受污染的地點。

3.5

景觀及視覺影響

研究鑑別了三個具景觀價值的地方（LCA），即LCA1其他郊區邊緣景觀、LCA2其他市區邊緣景觀及LCA3市區周邊鄉村景觀。對上述具景觀價值的地方的剩餘影響將會微乎其微。

研究鑑別了七項景觀資源（LR），即LR1道路、LR2耕地、LR3路邊植樹、LR4已發展區域、LR5已受滋擾區域、LR6明渠及LR7鄉村。LR3路邊植樹此項景觀資源將在施工及運作期間分別受中度負面和輕微負面的剩餘影響，但工程項目對其他景觀資源的剩餘影響則將會微乎其微。

研究鑑別了四個視覺敏感受體（VSR），即VSR1新元朗中心、VSR2博愛醫院、VSR3光明英來學校及VSR4楊屋村。工程項目對上述四個視覺敏感受體的剩餘影響（即工程項目投入運作十年後的影響）將會微乎其微。

根據環評技術備忘錄附錄十的準則，工程項目的景觀及視覺影響經緩解後可以接受。

3.6

環境監察及審核

研究鑑別及建議了環境監察及審核要求，以確定緩解措施得以切實執行。這些要求已於環評研究中概述。研究建議監察建築噪音和運作後的道路交通噪音，

以查核緩解措施的效果。研究也建議在施工期間進行工地審查以確定所有建議的緩解措施切實執行及有效。

環評總結本工程項目只要實行建議的緩解措施，它的施工和運作將不會引起不可接受的環境影響。

環評亦建議了一個環境監察及審核計劃，以確定建議的緩解措施切實執行及有效。