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## 1 INTRODUCTION

### 1.1 Project Background

1.1.1 West Kowloon Cultural District (WKCD) is an arts and cultural facilities (ACF) building programme which aims to deliver new performance and visual arts venues, museums, open spaces, education resources, commercial and retail opportunities for the residents of Hong Kong and visitors from overseas. The related works include a mainly 2-lane flyover (including approaching roads) across the toll plaza of Western Harbour Tunnel (Austin Road Flyover).

1.1.2 As raised by Members of District Council in the Yau Tsim Mong District Council Meeting in November 2014, traffic leaving WKCD to Austin Road West Roundabout and Nga Cheung Road Flyover would add significant burden on the capacity of these road networks, which are already congested with traffic at the moment. As such, the Revised Austin Road Flyover from WKCD should be proposed to allow access to the section of Lin Cheung Road running in parallel to the West Kowloon Highway (Route 3) aiming to divert traffic from Nga Cheung Road Flyover and Austin Road West Roundabout. The location plan of the Revised Austin Road Flyover is shown in **Figure 1.1**.

1.1.3 The Revised Austin Road Flyover (The Project) integrates the proposed exit road with the proposed Flyover. The proposed exit road would connect the service road of West Kowloon Highway (Route 3 – Western Harbour Crossing Tunnel Area) with a potential additional exit route for Yau Ma Tei Public Cargo Working Area (PCWA). Other than providing connection from WKCD to adjacent local roads, the Revised Flyover provides an additional single road way to alleviate the traffic from the WKCD to the West Kowloon Highway.

1.1.4 West Kowloon Cultural District Authority (WKCDA) has commissioned AECOM Asia Company Ltd to undertake this Environmental Impact Assessment (EIA) study.

1.1.5 The Project is a Designated Project (DP) under the Environmental Impact Assessment Ordinance (EIAO). A Project Profile (No. PP-580/2019) was submitted to the Environmental Protection Department (EPD) on 4 April 2019 for application for an Environmental Impact Assessment (EIA) Study Brief under section 5(1)(a) of the EIAO and the EIA Study Brief No. ESB-316/2019 for the Project was issued on 16 May 2019 under the EIAO.

1.1.6 The purpose of the EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and associated works that will take place concurrently. This information will contribute to decisions by the Director of Environmental Protection on:

- The overall acceptability of any adverse environmental consequences that are likely to arise as a result of the Project;
- the conditions and requirements for the detailed design, construction and operation of the Project to mitigate against adverse environmental consequences wherever practicable; and
- the acceptability of residual impacts after the proposed mitigation measures are implemented.

### 1.2 Designated Projects under EIAO

1.2.1 The Project covers the following DP elements of Schedule 2, Part I under the EIAO (Cap.499):

- Item A.1, Part I, Schedule 2 of the EIAO - A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing roads
- Item A.8, Part I, Schedule 2 of the EIAO - A road or railway bridge more than 100 m in length between abutments

### **1.3 Purpose of this Executive Summary**

- 1.3.1 This Executive Summary (ES) summarizes the findings, recommendations and conclusions of the EIA Report for the Project.

## 2 PROJECT DESCRIPTION

### 2.1 Purpose and Scope of Project

- 2.1.1 The purposes and objectives of the Project are to alleviate the forecast traffic demand from the ongoing WKCD development and also the elevated Nga Cheung Road roundabout, which is already congested by providing connection to the at-grade road at the WKCD and the West Kowloon Highway (Route 3 – West Harbour Crossing Tunnel Area).
- 2.1.2 The flyover spanning over the WHC toll plaza connecting to the elevated junction of Nga Cheung Road / Austin Road West will be put forward to provide a second access for the Mega Performance Venue (MPV) and Exhibition Centre (EC) located in Zone 4 of the WKCD. Under normal conditions, the flyover will be used by general traffic. The flyover also provides flexibility for event management as a route of “very important persons (VIPs)”, performers to the MPV / EC and to enhance the accessibility and robustness of the operational arrangements including post event dispersal. The flyover can also be used as a second emergency route to supplement the at-grade Museum Drive.
- 2.1.3 With the introduction of a single ramp connecting to the Museum Drive at the WKCD, it will help to disperse traffic away from the busy elevated junction of Jordan Road / Nga Cheung Road and also provide a short cut between the Kowloon Station Topside Developments and the West Kowloon Highway.
- 2.1.4 The location plan of the Revised Austin Road Flyover is shown in **Figure 1.1**. The Project site is situated within part of the WKCD area and across the toll plaza of the Western Harbour Crossing (WHC). The western boundaries of the study area are at the side of the WKCD Waterfront Promenade to the west of the WHC toll plaza, while the eastern boundaries of the study area are at the side of the Austin Road West / Nga Cheung Road roundabout.
- 2.1.5 With reference to the approved WKCD Development Plan No. S/K20/WKCD/2 and South West Kowloon Outline Zoning Plan No. S/K20/30, the lands in the vicinity of WKCD are mainly “Comprehensive Development Area”, “Open Space”, “Residential (Group A)”, “Government, Institution or Community” and “Other Specified Uses”. According to the covering Notes of the concerned Development Plan and the Outline Zoning Plan, road works coordinated or implemented by Government and/or West Kowloon Cultural District Authority are always permitted on land falling within the boundaries of the Plans except where the uses or developments are specified in Column 2 of the Notes of the individual zones. A layout plan showing the land uses is illustrated in **Figure 2.1**.
- 2.1.6 The scope of the Revised Austin Road Flyover is to construct and operate a mainly 2-lane flyover of about 400m connecting the western end of the elevated Austin Road West with the WKCD at the western side of the WHC toll plaza area and mainly comprises:
- (i) Construction of a mainly 2-lane flyover of about 400m long across WHC toll plaza area;
  - (ii) Construction of a single 2-lane ramp of about 250m long from the western end of the Revised Austin Road Flyover to the WKCD;
  - (iii) Construction of a single-lane ramp of about 300m long from the western end of the Revised Austin Road Flyover towards the northbound service road of WHC; and
  - (iv) Modification of at-grade roads within the interface of WKCD road network to connect with the ramp stated in (ii).

### 2.2 Need and Benefits of the Project

- 2.2.1 Transport Department (TD) completed in 2009 a West Kowloon Reclamation Development Traffic Study identifying road improvement schemes to meet the long-term traffic demand of the West Kowloon Reclamation Area taking into account the developments in the Area

including WKCD, West Kowloon Terminus of the Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL) and its top-side property developments, and the developments above Austin Station (AUS). The recommended schemes would be (i) Access Ramp; (ii) Permanent Improvement Works to the junctions at Jordan Road/Nga Cheung Road (elevated) (J8); and (iii) Permanent Improvement Works to Lin Cheung Road/Jordan Road (J11) for 2031 under the WKCD Development Plan.

2.2.2 West Kowloon Cultural District Authority (WKCDA) commissioned at the end of 2016 a traffic review (the Authority's traffic review) based on the updated land usage of P46 and P47 of the WKCD for the Exhibition Hub Development Area (EHDA) planned for 2022 (the assumed year of completion when the 2016 study was carried out). The Authority's traffic review identified that the junction at Lin Cheung Road/Jordan Road would be at full capacity in 2025 with the increasing number of traffic from the WKCD. From junction capacity point of view, the Authority's traffic review identified that combinations of (a) Access Ramp and/or (b) New Exit Road and/or (c) WHC Flyover would provide some feasible traffic improvement schemes required in 2025 to alleviate the anticipated network capacity problems.

2.2.3 Further review on identifying the preferred traffic improvement scheme for the WKCD development has been conducted under this Project.

### 2.3 Consideration of Alternative Design and Layout of Road

2.3.1 In addition to the Original Austin Road Flyover Scenario (refer to **Figure 2.2** for illustration), 3 different options of the road layout and alignment have been developed:

- Option 1 – At-grade Exit Road: This Option consists of the at-grade Exit Road connecting the at-grade roads of WKCD and the northbound service road of the WHC portal. The schematic road alignment for this Option is illustrated in **FIGURE 2.3**.
- Option 2 – At-Grade Exit Road and WHC Flyover: This Option consists of the at-grade Exit Road as mentioned in Option1 and a flyover across the Western Harbour Crossing (WHC). The schematic road alignment for this Option is illustrated in **Figure 2.4**.
- Option 3 – Enhanced WHC Flyover: Having studied the land requirement of Option 2, this Option is proposed to reduce the land use by combining the at-grade Exit Road and flyover across the WHC as mentioned in Option 2. The schematic road alignment for this Option is illustrated in **Figure 2.5**.

2.3.2 Considering the traffic requirement, constructability, land and statutory feasibility and environmental benefit, Option 3 is considered preferable in terms of it offering the best connectivity to the NER road network. It should be worth noting that the prime objective of the NER project is to provide transport infrastructure to resolve the potential traffic congestion problem associated with the completion of various WKCD facilities and venues, as well as to improve the traffic conditions in the vicinity. Amongst all the assessed options, Option 3 is the most preferable option in the traffic related aspects, i.e. capacity of adjacent network, accessibility of vehicles and accessibility of pedestrians.

2.3.3 Following the adoption of Option 3 of the NER layout, a Fine-tuned Enhanced NER Arrangement has been introduced by the Consultant, which is known as Option 4, to further optimize the alignment by reducing the impact on the land use and landscape and visual aspects within the New Yau Ma Tei Public Cargo Working Area (PCWA). The schematic road alignment for this Option is illustrated in **Figure 2.6**. This Option 4 has been agreed with the relevant authorities including TD and thus has been adopted as the final road layout design.

### 2.4 Construction Methods and Sequences of Works

2.4.1 For the selected Option 4, the proposed revised Austin Road Flyover can be erected by cast in-place concrete, prefabricated steel structure or precast concrete construction

method. Having considered the scale and site condition of the proposed bridge, it is a more effective and environmentally friendly approach to adopt precast concrete construction method.

2.4.2 The principle of precast concrete construction method is to conduct precasting works in fabrication yard away from the site and the product will be under better control of quality and workmanship. Steel mould will be used as formworks to maximize the reuse of formwork which is more environmental-friendly. In terms of construction time, more efficient construction works can be achieved as the deck segments can be cast off-site concurrently with substructure works, i.e. construction activities can be overlapped.

2.4.3 Based on the merits of precast concrete construction method as mentioned above, the main part of the revised Austin Road Flyover will be constructed by this method as far as possible. The other two construction methods as mentioned above will only be considered when precast construction method is not feasible.

## **2.5 Construction Programme**

2.5.1 The Project construction works are anticipated to commence in 2022 with completion of the Project by 2025.

### 3 SUMMARY OF THE ENVIRONMENTAL IMPACT ASSESSMENT

#### 3.1 Key Environmental Problems Avoided

3.1.1 Avoidance of environmental impacts has been one of the key considerations in this EIA study. A potentially contaminated area (i.e. vehicle maintenance area) has been identified at the New Yau Ma Tei PCWA within the site boundary. To avoid land contamination impacts, encroachment of the project road alignment into the New Yau Ma Tei PCWA has been avoided and no construction works would be conducted within the PCWA. As such, no land contamination impacts would be anticipated during both construction and operation phases of the Project.

3.1.2 Other than incorporation of environmentally friendly options, some environmental designs are recommended and would be implemented to further minimize the environmental impacts induced by the Project. Precast concrete method would be adopted as far as possible to minimize the extent and duration of construction activities required on site and hence minimize the potential environmental impacts in the vicinity during construction phase. Trip-ticket system would be implemented to monitor, document and verify the disposal of construction and demolition (C&D) materials at landfills and public fill reception facilities and to control fly tipping. In addition, an environmental monitoring and auditing programme would be implemented to ensure timely and orderly implementation of the proposed mitigation measures. A summary of the environmental impacts associated with the Project is presented in **Table 3.1**.

#### 3.2 Air Quality Impact

3.2.1 Potential air quality impacts associated with the construction and operational phases of the project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Clause 3.4.3 and Appendix B of the EIA Study Brief, as well as Annexes 4 and 12 of EIAO-TM. The assessment area for air quality impact assessment is within 500m from the boundary of the Project site.

3.2.2 Potential air quality impacts from the construction works of the Project would mainly be related to construction dust from site clearance (including demolition of existing carriageways), minor excavation with limited backfilling for column installation and wind erosion. With the implementation of mitigation measures specified in the Air Pollution Control (Construction Dust) Regulation together with the recommended dust suppression measures and adoption of good site practices, no adverse dust impact at air sensitive receivers (ASRs) would be anticipated due to the construction activities of the Project. No adverse residual dust impact arising from the Project would be anticipated.

3.2.3 During operation phase, the "Revised Austin Road Flyover" would improve annual average NO<sub>2</sub> concentrations at the identified ASRs. There would be a decrease in annual average NO<sub>2</sub> concentration compared to the "Original Austin Road Flyover" Scenario which indicated the Project would bring improvements in terms of air quality aspect and no adverse impact would be generated due to the Project during the operation phase. The exceedances of annual average NO<sub>2</sub> concentrations predicted at some existing and planned representative ASRs are mainly resulted from the relatively high concentration of background air pollution in this area. In addition, the predicted 19<sup>th</sup> highest hourly average NO<sub>2</sub>, 10<sup>th</sup> daily average and annual average RSP and FSP concentrations at all representative ASRs would comply with the respective AQOs.

3.2.4 With a view to further improve the air quality condition in the concerned area, some enhancement measures would be taken forward such as reduction of vehicular tailpipe emissions at WKCD by the use of electric vehicles for the feeder services and shuttle bus travelling inside WKCD between Xiqu Centre and Hong Kong Palace Museum. In addition, use of NO<sub>x</sub> reduction measure in form of de-NO<sub>x</sub> painting on the parapet would be considered as an enhancement measure to further improve the surrounding air quality impact and would be further investigated in the future detailed design. No adverse residual

air quality impact arising from the Project during operation phase of the Project would be anticipated.

### **3.3 Noise Impact**

3.3.1 Potential noise impacts associated with the construction and operational phases of the project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Clause 3.4.4 and Appendix C of the EIA Study Brief, as well as Annexes 5 and 13 of the EIAO-TM. The study area for noise impact assessment is defined by a distance of 300m from the site boundary of the Project.

3.3.2 Construction noise is expected from the use of Powered Mechanical Equipment (PME) during various construction activities, such as site clearance (including demolition of existing carriageways), foundation and superstructure works for the proposed road works within Project boundary. Noise impact arising from construction activities of the Project was assessed. The predicted maximum unmitigated construction noise levels at the representative noise sensitive receivers (NSRs) in the vicinity of the Project work sites would be 63 – 75 dB(A). The assessment results indicated that the predicted construction noise levels at all representative NSRs would comply with the noise criteria without mitigation measures. With the implementation of good site management practices, no adverse construction noise impact arising from the Project would be anticipated. No adverse residual construction noise impact arising from the Project would be anticipated.

3.3.3 The assessment for the potential road traffic noise impact from operation of the Project has been conducted. The assessment results indicated that the predicted road traffic noise levels at some of the representative NSRs would exceed the noise criteria under unmitigated scenario, with the predicted noise levels in the range of 68 to 81 dB(A). The exceedances were dominantly contributed by the other existing roads. The contributions from the Project Roads at all NSRs are 0.0 – 0.1 dB(A), less than 1.0 dB(A) and all predicted noise levels of the Project Roads comply with the noise criteria (70dB(A)). Thus, no adverse residual road traffic noise impacts arising from the Project would be anticipated and direct mitigation measures on the Project Roads are considered not necessary.

### **3.4 Water Quality Impact**

3.4.1 The water quality impact assessment was conducted in accordance with the requirements in Annexes 6 and 14 of the EIAO-TM and the requirements in Section 3.4.5 and Appendix D of the EIA Study Brief. The Study area for water quality impact assessment covered the Victoria Harbour (Phase Two) Water Control Zone (WCZ) as designated under Water Pollution Control Ordinance (WPCO), including inland water bodies within 500m from the site boundary.

3.4.2 Minor water quality impact would be associated with land-based construction works. Impacts may result from general construction activities, construction site runoff, accidental spillage of chemicals, and sewage from on-site construction workers. Impacts could be controlled to comply with the WPCO standards by implementing the recommended mitigation measures. No unacceptable adverse water quality impact would be expected during the construction phase of the Project with the recommended mitigation measures properly implemented. No adverse residual water quality impact arising from the Project would be anticipated.

3.4.3 The only source of potential adverse water quality impact in the operation phase is identified as surface runoff from the minor additional paved areas. This is expected to be minimal (1.04 m<sup>3</sup>/day) and acceptable, provided that the recommended mitigation measures for the drainage system are properly implemented. No adverse residual water quality impact arising from the Project would be anticipated.



### 3.5 Waste Management Implications

- 3.5.1 The wastes impact assessment was conducted in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.6 and Appendix E of the EIA Study Brief, as well as Annexes 7 and 15 of the EIAO-TM.
- 3.5.2 During the construction phase, the major waste types generated from the Project include C&D materials, chemical waste from the maintenance and servicing of construction plant and equipment, and general refuse from workforce.
- 3.5.3 C&D materials will be generated from demolition of the existing carriageways, site clearance/set-up/plant mobilization, underground utilities protection and diversion works, piling works, pile cap/pier/abutment construction, falsework/deck construction, and drainage and pavement construction. Based on the latest layout, the total volume of C&D materials is estimated to be approximately 14,000 m<sup>3</sup> of inert materials and 300 m<sup>3</sup> of non-inert materials.
- 3.5.4 6,400 m<sup>3</sup> of inert C&D materials from the above construction works will be sorted and reused as filling material as much as possible. The surplus of 7,600 m<sup>3</sup> will be transported to Chan Wan Public Fill Barging Point and Tseung Kwan O Fill Bank for use as filling material by other projects. Non-inert materials will be recycled as far as possible before disposed to landfill. Opportunities in minimization of generation and maximization of reuse would be continually investigated during the detailed design and construction phases.
- 3.5.5 It is also expected that minimal (in the order of a few hundred litres per month) of chemical waste and approximately 39 kg per day of general refuse would be generated from the Project. Chemical waste would be transported and disposed of at Chemical Waste Treatment Centre by a licensed waste collector or other licensed facilities, while general refuse would be disposed of at West New Territories landfill. With the implementation of the recommended good site practices and mitigation measures for the handling, transportation and disposal of the identified waste arising, no adverse environmental impacts would be anticipated. No adverse residual impact arising from the Project during construction phase of the Project would be anticipated.
- 3.5.6 It is expected that no waste will be generated during the operational phase of the Project. Adverse environmental impacts are not expected during the operation phase.

### 3.6 Land Contamination

- 3.6.1 The land contamination assessment is conducted in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.7 and Appendix F of the EIA Study Brief, as well as Section 3.1 of Annex 19 of the EIAO-TM.
- 3.6.2 Based on the assessment, adverse land contamination impact arising from Project is not anticipated.

### 3.7 Landscape and Visual Impacts

- 3.7.1 A landscape and visual impact assessment has been carried out in accordance with Section 3.4.8 and Appendix G of the EIA study brief, Annexes 10 and 18 of the EIAO-TM, and EIAO Guidance Note No.8/2010.
- 3.7.2 The key impact on existing landscape and visual sensitive receivers during the construction phase would include the affected roadside plantings and the construction works of the Flyover and its associate structures. It is estimated that approximately 129 nos. of trees were surveyed within the tree groups. In general, there are approximately 81 nos. of existing trees to be retained and 34 nos. of existing trees and 14 nos. of *Leucaena leucocephala* (undesirable tree species) to be removed during construction, subject to the approved Tree Preservation and Removal Submission. None of them are Old and Valuable Trees. In accordance with the relevant criteria and guidelines for evaluating and assessing

landscape and visual impacts, it is considered that the residual landscape and visual impacts initiated during the construction phase would be moderate / slight, which is acceptable with implementation of the proposed mitigation measures.

- 3.7.3 During the operational phase, the key source of landscape and visual impacts would be limited to the affected roadside plantings and the constructed Flyover and its associate structures. The overall residual landscape and visual impacts during operational phase would be moderate / slight for Day 1 but limited to slight / insubstantial for Year 10, which is acceptable with implementation of the proposed mitigation measures.

## **4 ENVIRONMENTAL MONITORING AND AUDIT (EM&A)**

- 4.1.1 Environmental Monitoring and Audit (EM&A) requirements for air quality, noise, water quality, waste management, land contamination, and landscape and visual impacts have been recommended, with regular site inspection and audits during construction phase to ensure that the recommended mitigation measures are properly implemented. The EM&A requirements are specified and detailed in the EM&A Manual.

## **5 CONCLUSION**

- 5.1.1 The findings of the EIA provided information on the nature and extent of the environmental impacts likely to arise from the construction and operation of the Project. The EIA has, where appropriate, identified mitigation measures to ensure compliance with environmental legislation and standards.
- 5.1.2 Overall, the EIA concluded that the Project would comply with the requirements of the EIA Study Brief and EIAO-TM with the implementation of the proposed mitigation measures during the construction and operational phases of the Project. The schedule of implementation of the proposed mitigation measures has been provided in the EIA Report. An EM&A programme has also been recommended to check the effectiveness of the proposed mitigation measures.

**Table 3.1 Summary of Environmental Impacts**

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
<b>Air Quality Impact</b>					
<b>Construction Impact</b>					
Representative existing residential, commercial developments and government uses within 500m from the boundary of the Project Site	<ul style="list-style-type: none"> <li>No adverse dust impact from construction activities considering the small scale of the project, and works will be undertaken at multiple work fronts at different construction periods.</li> <li>No adverse air quality impact from fuel combustion from use of Powered Mechanical Equipment (PME) in view of Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation.</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 4 and 12 of the EIAO-TM</li> <li>Air Quality Objectives (AQO)</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	The approved non-road mobile machinery (NRMMs) under NRMM Regulation (excluding exempted NRMMs) would be used on site and NRMMs supplied with mains electricity instead of diesel-powered should be adopted as far as possible to minimize the potential emission from NRMMs.  Dust suppression measures and good site practices <ul style="list-style-type: none"> <li>Skip hoist for material transport should be totally enclosed by impervious sheeting.</li> <li>All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.</li> <li>All stockpiles of aggregate or spoil should be covered and/or water applied.</li> <li>The height from which excavated materials are</li> </ul>	<ul style="list-style-type: none"> <li>No adverse residual impacts anticipated</li> </ul>

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
				<p>dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading.</p> <ul style="list-style-type: none"> <li>• Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites.</li> <li>• The load of dusty materials carried by a vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle.</li> <li>• Erection of hoarding of not less than 2.4m high from ground level along the site boundary which adjoins a road, street, service lane or other area accessible to the public.</li> </ul>	
<b>Operation Impact</b>					
Existing and planned residential, commercial developments and government uses within	<p><u>NO<sub>2</sub></u></p> <ul style="list-style-type: none"> <li>• 19<sup>th</sup> highest 1-hr average conc.: 134 – 199 µg/m<sup>3</sup></li> <li>• Annual average conc.: 25 – 53 µg/m<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>• AQO <u>NO<sub>2</sub></u></li> <li>• 1-hr average conc.: 200 µg/m<sup>3</sup> (Number of exceedances)</li> </ul>	<p><u>NO<sub>2</sub></u></p> <ul style="list-style-type: none"> <li>• 19<sup>th</sup> highest 1-hr average conc.: No exceedance was predicted</li> </ul>	Although unacceptable air quality impact is not anticipated due to the Project during the operation phase, some mitigation measures such as relocation of fresh air intakes at	<ul style="list-style-type: none"> <li>• No adverse residual impacts anticipated</li> </ul>

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
500m from the boundary of the Project Site	<p><u>RSP</u></p> <ul style="list-style-type: none"> <li>10<sup>th</sup> highest 24-hr average conc: 81 – 89 µg/m<sup>3</sup></li> <li>Annual average: 36 – 39 µg/m<sup>3</sup></li> </ul> <p><u>FSP</u></p> <ul style="list-style-type: none"> <li>10<sup>th</sup> highest 24-hr average conc: 61 – 67 µg/m<sup>3</sup></li> <li>Annual average: 25 – 28 µg/m<sup>3</sup></li> </ul>	<p>allowed: 18)</p> <ul style="list-style-type: none"> <li>Annual average conc.: 40 µg/m<sup>3</sup></li> </ul> <p><u>RSP</u></p> <ul style="list-style-type: none"> <li>24-hr average conc.: 100 µg/m<sup>3</sup> (Number of exceedances allowed: 9)</li> <li>Annual average conc.: 50 µg/m<sup>3</sup></li> </ul> <p><u>FSP</u></p> <ul style="list-style-type: none"> <li>24-hr average conc.: 75 µg/m<sup>3</sup> (Number of exceedances allowed: 9)</li> <li>Annual average conc.: 35 µg/m<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>Annual average conc.: Exceedances of AQO up to 13 µg/m<sup>3</sup></li> <li>Decrease in annual average conc. at ASRs with exceedances of AQO due to this Project: up to 0.29834 µg/m<sup>3</sup></li> </ul> <p><u>RSP and FSP</u></p> <ul style="list-style-type: none"> <li>No exceedance was predicted</li> </ul>	<p>elevated levels with AQO compliance and provision of air purification filters have been considered due to the high background level of NO<sub>2</sub>. For the existing ASRs, planned ASRs under construction and planned ASRs with detailed design, these mitigation measures were considered not feasible in time as the designs have already been completed or in some cases even physical buildings have been completed. For the planned ASRs without detailed design, the future WKCD project owner(s) within the Study Area would be notified of the findings under this air quality impact assessment in EIA of Revised Austin Road Flyover for consideration so that the relevant mitigation measures could be implemented as far as practicable.</p>	

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
<b>Noise Impact</b>					
<b>Construction Impact</b>					
Representative existing residential developments within 300m from the boundary of the Project Site	<ul style="list-style-type: none"> <li>59 – 75 dB(A)</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 5 and 13 of the EIAO-TM</li> <li>Leq<sub>(30 min)</sub> 75dB(A) at 1m from the façade of residential dwellings</li> </ul>	<ul style="list-style-type: none"> <li>No exceedance was predicted</li> </ul>	Good site practices <ul style="list-style-type: none"> <li>Only well-maintained plant should be operated on site and plant should be serviced regularly.</li> <li>Silencers or mufflers on construction plant should be utilized and should be properly maintained.</li> <li>Mobile plant should be sited as far away from sensitive uses as possible.</li> <li>Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum.</li> <li>Plant known to emit noise strongly in one direction should, where possible, be orientated so that noise is directed away from the nearby sensitive uses.</li> <li>Material stockpiles and other structures should be effectively utilized to screen noise from on-site construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>No adverse residual impacts anticipated</li> </ul>



Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
<b>Operation Impact</b>					
Representative existing and planned residential developments within 300m from the boundary of the Project Site	<ul style="list-style-type: none"> <li>Predicted overall noise levels: 68 – 81 dB(A)</li> <li>Predicted noise levels of the Project roads: 33 – 61 dB(A)</li> <li>Contribution from Project roads: 0.0 – 0.1 dB(A)</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 5 and 13 of the EIAO-TM</li> <li>L<sub>10(1 hour)</sub> 70dB(A) at 1m from the façade of residential dwellings,</li> </ul>	<ul style="list-style-type: none"> <li>Exceedance of the noise criteria by up to 11 dB(A)</li> <li>The exceedances are dominantly contributed by the other existing roads.</li> </ul>	<ul style="list-style-type: none"> <li>No mitigation measures to be provided as the contribution by Project roads is insignificant</li> </ul>	<ul style="list-style-type: none"> <li>No adverse residual impacts anticipated</li> </ul>
<b>Water Quality Impact</b>					
<b>Construction Impact</b>					
<ul style="list-style-type: none"> <li>New Yau Ma Tei Typhoon Shelter;</li> <li>Kowloon South Flushing Water Intake;</li> <li>Yau Ma Tei Flushing Water Intake;</li> <li>MTRC Kowloon Station Cooling Water Intake;</li> <li>MTRC Kowloon Station Flushing Water Intake;</li> <li>Proposed Cooling Water Intake for Mega Performance Venue/Exhibition Center &amp; Hotel;</li> <li>The Elements Cooling Water Intake; and</li> <li>West Kowloon Cultural</li> </ul>	<p>General construction works for the Project would be land-based only. The potential sources of water quality impact associated with the land-based works include:</p> <ul style="list-style-type: none"> <li>General construction activities;</li> <li>Construction site run-off;</li> <li>Sewage effluent from construction workforce; and</li> <li>Accidental spillage of chemicals</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 6 and 14 of the EIAO-TM</li> <li>Water Quality Objectives for the Victoria Harbour (Phase Two) Water Control Zone (WCZ)</li> <li>Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS)</li> <li>Practical Note for Professional Persons (ProPECC) PN 1/94</li> <li>WSD's Water Quality Criteria for Flushing Water Intakes</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Mitigation measures and good site practices in ProPECCPN 1/94 "Construction Site Drainage"</li> <li>Waste Disposal Regulation</li> <li>Provision of interim treatment facilities, such as chemical toilets, for construction workforce</li> </ul>	<ul style="list-style-type: none"> <li>No adverse residual impacts anticipated</li> </ul>

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
District District Cooling System Water Intake		<ul style="list-style-type: none"> <li>MTRC cooling water intake criteria</li> </ul>			
<b>Operation Impact</b>					
<ul style="list-style-type: none"> <li>New Yau Ma Tei Typhoon Shelter;</li> <li>Kowloon South Flushing Water Intake;</li> <li>Yau Ma Tei Flushing Water Intake;</li> <li>MTRC Kowloon Station Cooling Water Intake;</li> <li>MTRC Kowloon Station Flushing Water Intake;</li> <li>Proposed Cooling Water Intake for Mega Performance Venue/Exhibition Center &amp; Hotel;</li> <li>The Elements Cooling Water Intake; and</li> <li>West Kowloon Cultural District District Cooling System Water Intake</li> </ul>	<p>Potential water quality impacts associated with the operation phase include:</p> <ul style="list-style-type: none"> <li>Non-point source surface runoff from new impervious areas</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 6 and 14 of the EIAO-TM</li> <li>Water Quality Objectives for the Victoria Harbour (Phase Two) WCZ</li> <li>Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS)</li> <li>ProPECC PN 5/93</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Adequate design in silt trap for the new road drainage which take into account the guidelines in ProPECC PN 5/93.</li> <li>Best Storm Water Management Practices and Storm Water Pollution Control Plan to reduce non-point source pollution.</li> </ul>	<ul style="list-style-type: none"> <li>No adverse residual impacts anticipated</li> </ul>
<b>Waste Management Implications</b>					
<b>Construction Impact</b>					
C&D materials, chemical wastes and general refuse	<ul style="list-style-type: none"> <li>Around 300 m<sup>3</sup> of non-inert C&amp;D materials and 14,000 m<sup>3</sup> of inert C&amp;D materials will be generated from demolition of</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 7 and 15 of the EIAO-TM</li> <li>Waste Disposal Ordinance (Cap. 354)</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Implementation of good site practices, waste reduction measures and proper storage, collection</li> </ul>	<ul style="list-style-type: none"> <li>No adverse residual impact anticipated</li> </ul>

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<p>the existing carriageways, site clearance/set-up/plant mobilization, underground utilities protection and diversion works, piling works, pile cap/pier/abutment construction, falsework/deck construction, and drainage and pavement construction.</p> <ul style="list-style-type: none"> <li>• Small quantity of chemical wastes in the order of a few hundred litres per month</li> <li>• Around 39 kg per day of general refuse will be generated from construction works and on-site staff and workers</li> </ul>	<ul style="list-style-type: none"> <li>• Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)</li> <li>• Land (Miscellaneous Provisions) Ordinance (Cap. 28)</li> <li>• Public Health and Municipal Services Ordinance – Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK)</li> </ul>		and transport of waste	
<b>Operation Impact</b>					
N/A	<ul style="list-style-type: none"> <li>• It is expected that no waste will be generated during the operation phase of the Project.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• No mitigation measures to be provided as the Project would not cause adverse impacts.</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse residual impact anticipated</li> </ul>
<b>Land Contamination</b>					
Onsite construction workers and future occupants	<ul style="list-style-type: none"> <li>• Adverse land contamination impact arising from the Project is not anticipated</li> </ul>	<ul style="list-style-type: none"> <li>• Annex 19 of the EIAO-TM</li> <li>• Guidance Note for Contaminated Land Assessment and Remediation (EPD, 2007)</li> <li>• Practice Guide for</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• As adverse land contamination impact arising from the Project is not anticipated, no mitigation measures were considered necessary.</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse residual impact anticipated</li> </ul>

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
		Investigation and Remediation of Contaminated Land (EPD, 2011) <ul style="list-style-type: none"> <li>Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (EPD, 2007)</li> </ul>			
<b>Landscape and Visual Impacts</b>					
<b>Construction Impact</b>					
Landscape Resources (LRs)	<ul style="list-style-type: none"> <li>Slight landscape impact on roadside planting areas along Museum Drive and West Kowloon Transportation Corridor</li> <li>No discernible change in other LR's identified within the study boundary of the Project</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 10 and 18 of the EIAO-TM</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Preservation of Existing Vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Slight residual impact on roadside planting areas along Museum Drive and West Kowloon Transportation Corridor</li> </ul>
Landscape Character Areas (LCAs)	<ul style="list-style-type: none"> <li>Slight landscape impact on Western Kowloon Transportation Corridor</li> <li>No discernible change in other LCAs identified within the study boundary of the Project</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 10 and 18 of the EIAO-TM</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Preservation of Existing Vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Slight residual impact on West Kowloon Transportation Corridor</li> </ul>
Visually Sensitive Receivers (VSRs)	<ul style="list-style-type: none"> <li>Moderate visual impact on immediately adjacent VSRs who have full overview of the project</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 10 and 18 of the EIAO-TM</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Preservation of Existing Vegetation</li> <li>Compensatory Tree Planting</li> </ul>	<ul style="list-style-type: none"> <li>Moderate residual impact on immediately adjacent VSRs who have full overview of</li> </ul>

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
	<ul style="list-style-type: none"> <li>Slight visual impact on VSRs further away</li> <li>Insubstantial visual impact on long distant VSRs</li> </ul>			<ul style="list-style-type: none"> <li>Control of Night-time Lighting Glare</li> <li>Erection of Decorative Screen Hoarding</li> <li>Management of Construction Activities and Facilities</li> <li>Reinstatement of Temporarily Disturbed Landscape Areas</li> </ul>	the project <ul style="list-style-type: none"> <li>Slight residual impact on VSRs further away</li> <li>Insubstantial residual visual impact on long distant VSRs</li> </ul>
<b>Operation Impact</b>					
Landscape Resources (LRs)	<ul style="list-style-type: none"> <li>Slight residual impact on roadside planting areas along Museum Drive and West Kowloon Transportation Corridor</li> <li>No discernible change in other LRAs identified within the study boundary of the Project</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 10 and 18 of the EIAO-TM</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Aesthetically pleasing design of Highways Structures</li> <li>Shade-tolerant Shrub Planting at the Project Site after Completion of Engineering Works</li> </ul>	<ul style="list-style-type: none"> <li>Slight residual impact during day 1 of operation and insubstantial residual impact during year 10 of operation on roadside planting areas along Museum Drive and West Kowloon Transportation Corridor</li> </ul>
Landscape Character Areas (LCAs)	<ul style="list-style-type: none"> <li>Slight residual impact on Western Kowloon Transportation Corridor</li> <li>No discernible change in other LCAs identified within the study boundary of the Project</li> </ul>	<ul style="list-style-type: none"> <li>Annexes 10 and 18 of the EIAO-TM</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Insubstantial residual impact during day 1 and year 10 of the operation on Western Kowloon Transportation Corridor</li> </ul>

Sensitive Receivers / Assessment Points	Impact Prediction Results (Without Mitigation)	Key Relevant Standards/Criteria	Extents of Exceedance (Without Mitigation)	Impact Avoidance Measures / Mitigation Measures	Residual Impacts (After Implementation of Mitigation Measures)
<p>Visually Sensitive Receivers (VSRs)</p>	<ul style="list-style-type: none"> <li>• Moderate residual impact on immediately adjacent VSRs who have full overview of the project</li> <li>• Slight residual impact on VSRs further away</li> <li>• Insubstantial residual visual impact on long distant VSRs</li> </ul>	<ul style="list-style-type: none"> <li>• Annexes 10 and 18 of the EIAO-TM</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• Aesthetically pleasing design of Highways Structures</li> <li>• Shade-tolerant Shrub Planting at the Project Site after Completion of Engineering Works</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate residual impact during day 1 of operation and slight residual impact during year 10 of operation on immediately adjacent VSRs who have full overview of the project</li> <li>• Slight residual impact during day 1 of operation and insubstantial residual impact during year 10 of operation on VSRs further away</li> <li>• Insubstantial residual visual impact during day 1 and year 10 of operation on long distant VSRs</li> </ul>