






# MTR Corporation

## Contract No. NEX/2207 Kwun Tong Line Extension Environmental Impact Assessment (EIA) Study for KTE

### EIA Report Executive Summary

Meinhardt Infrastructure and Environment Ltd

Document Rev: 1  
Document Status: Final  
Document Ref.: 91135/015

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## **1. INTRODUCTION**

- 1.1.1.1 The Kwun Tong Line Extension (KTE), otherwise referred to as ‘the Project’, is the proposed extension of the existing Kwun Tong Line (KTL) from Yau Ma Tei (YMT) Station to a new Whampoa (WHA) Station with an interchange with the Shatin to Central Link (SCL) at the proposed Ho Man Tin (HOM) Station.
- 1.1.1.2 The MTR Corporation has completed feasibility studies for the proposed extension and submitted a proposal to Government in February 2004. The proposed scheme was subsequently modified to incorporate improved interchange arrangements with the proposed SCL and a revised proposal was submitted to Government in July 2005. Positive responses from the public, relevant stakeholders and the Government have been received for the KTE and Government has requested the MTR Corporation to proceed with further planning and implementation of the extension. The target completion date is 2015, subject to obtaining government and statutory approvals.
- 1.1.1.3 This Executive Summary highlights the key findings of the Environmental Impact Assessment (EIA) for the Project to comply with the EIA Ordinance (EIAO).

## **2. PROJECT DESCRIPTION**

### **2.1 Scope and Nature of the Project**

- 2.1.1.1 The Project comprises the following key elements:
- Running tunnels from YMT Station (existing overrun tunnels) to HOM Station;
  - Running tunnels from HOM Station to WHA Station;
  - HOM Station with associated structures and provisions including station structures and provisions for interchange with the SCL;
  - WHA Station with associated structures and provisions;
  - The Wylie Road Ancillary Building (WAB) and ventilation structure at Club de Recreio; and
  - A purpose designed and built temporary explosives storage magazine at Tseung Kwan O Area 137 (The decommissioning of the temporary explosives storage magazine will not be part of the KTE project).
- 2.1.1.2 The KTE is a single project and as an extension of the MTR Corporation’s KTL it is a Designated Project under the EIAO falling into the following categories:
- A railway and its associated stations (Item A.2 of Part 1 of Schedule 2 of the EIAO);
  - A railway tunnel more than 800m in length between portals (Item A.7 of Part 1 of Schedule 2 of the EIAO);

- Underground rock caverns (Item Q.2 of Part 1 of Schedule 2 of the EIAO). (Referred to in this report as Station Platform);
- Rock crushing equipment which is a facility for the treatment of construction waste (a) with a designed capacity of not less than 500 tonnes per day; and (b) a boundary of which is less than 200m from an existing or planned (i) residential area; (ii) place of worship; (iii) educational institution; or (iv) health care institution (Item G.5 of Part 1 of Schedule 2 of the EIAO); and
- An explosives depot in a stand-alone, purpose built building (Item K.10, Part 1 of Schedule 2 of the EIAO). (Referred to in this report as an explosives storage magazine). Given that this explosives storage magazine is a temporary structure it will need to be decommissioned. The decommissioning will itself be a designated project (under Item 11, Part II – Decommissioning Projects of Schedule 2 of the EIAO). The date of the decommissioning is uncertain at this stage but the decommissioning of the temporary explosives storage magazine will not be part of the KTE project.

## 2.2 Selection of the Project Scheme

2.2.1.1 The KTE alignment options as shown in **Figure 2.1** included:

- The Base Scheme: developed in the previous Feasibility Study. This was the originally proposed KTE alignment as shown in the EIA Study Brief;
- Option A: the YMT Station to HOM Station to Wuhu Street with a WHA Station at Dyer Avenue option; and
- Option B: the YMT Station to HOM Station to Wuhu Street with a WHA Station at Tak On Street option.

2.2.1.2 The Base Scheme incorporated the preferred Tak On Street Alignment for WHA Station but also includes less favourable design elements, namely the longer tunnel alignment (with associated greater usage of materials, resources and energy), with a crossover further away from the HOM Station, the joint longest construction programme and affects the greatest number of private land lots.

2.2.1.3 Option A incorporated the shorter tunnel alignment and the closer crossover location (to HOM Station) but also incorporates the Dyer Avenue Alignment which is not preferred for reasons such as, a deeper WHA Station with greater associated excavation, spoil arisings, materials usage, inconvenience to the passengers and the joint longest construction programme. The Option A alignment was also considered slightly less favourable than Option B in terms of its effects on private land lots.

2.2.1.4 Option B was determined to have minimised environmental effects and provides overall environmental benefits over the other two options such as, a shorter tunnel alignment, shortest construction program, and reduced impacts associated with a shallower WHA Station. It presents the optimum scheme from an operational and environmental perspective. As such, Option B was selected as the preferred alignment.

2.2.1.5 Since the selection of the preferred alignment option (Option B), the alignment design has continued to be modified in order to avoid potential problems and to improve the alignment. This process has involved relatively small modifications to the alignment and the associated facilities. This Revised Preferred Scheme is shown in **Figure 2.2**. The EAP / Ventilation Building is henceforth referred to as the Wylie Road Ancillary Building (WAB).

## 2.3 Construction Works

2.3.1.1 As the Project is an underground railway, major construction works are tunnelling works and cut-and-cover works at shafts, WAB, HOM and WHA Stations. Drill-and-blast, cut-and-cover, and mechanical breaking construction method will be adopted for rock tunnels and mixed soft ground tunnels. There would be no marine works and dredging works in the Project.

## 2.4 Preliminary Construction Programme

2.4.1.1 The construction works would be scheduled to commence in early 2011 for completion in 2015.

## 3. ENVIRONMENTAL IMPACT ASSESSMENT

3.1.1.1 The EIA Study was conducted in accordance with the EIAO Study Brief No. ESB-188/2008, following the guidelines on assessment methodologies in the Technical Memorandum on Environmental Impact Assessment (EIAO-TM). The major findings of the EIA study are summarised below and an impact summary is shown in **Table 3.1**.

### 3.2 Cultural Heritage

3.2.1.1 There are no Declared Monuments within the KTE project study area. No impacts on Sites of Cultural Heritage are expected during the construction or operational phases under the EIAO and no specific mitigation measures for archaeological resources will be required.

### 3.3 Landscape and Visual

#### Construction Phase

3.3.1.1 Approximately 1,000 existing trees will be affected by the proposed works, of which 69 trees (6%) are intended to be transplanted and 931 proposed to be felled. None of these are Registered Old and Valuable Trees.

3.3.1.2 Open cut excavation at HOM Station will create the most significant impacts, most importantly with the loss of mature mixed and plantation woodland including almost 800 trees on the *Slopes adjacent to Chatham Road North* (LDR-3.2). The area impacted is further extended by the difficulty in gaining vehicle access roads to the slopes and installing construction platforms. It is recognised that this area is a valuable resource and should not be impacted if possible, however, suitable alternatives cannot be found and construction of the HOM station cannot be constructed without a large degree of disruption.

Impacts here are considered *Significant Adverse* through construction and will be mostly Irreversible, with mitigation measures having little bearing on the significance threshold for the site.

- 3.3.1.3 The large works site at HOM Station will be particularly visually prominent in the surrounding areas and large enough to modify the nature of the existing landscape framework (LCA06), low in quality as it is. Mitigation measures will have little effect and in fact the existing character of the site is one that is undergoing change. Impacts are considered *Moderate* and *Reversible*.
- 3.3.1.4 The most significantly affected visual receivers will be those residents in close proximity to the works at HOM station and WHA station. These include *Residents on the south side of Chatham Road North (VSR-R4)*, *Residents grouped at Wuhu Street and Gillies Avenue (VSR-R5)*, *Residents at Ka Wai Chuen (VSR-R6)*, *Residents at Shun Yung Street (VSR-R8)*, *Future Residents of HK PolyU Planned Student Dormitory (SVR-R9)* and *Residents at Valley Road (VSR-R10)* These VSRs are immediately adjacent and view directly over the works. Despite mitigation the visual impact of the works during construction will remain *Significant Adverse* due to their generally high viewing point and immediate proximity to the works
- 3.3.1.5 Construction of the WAB, whilst a small structure, will occupy a reasonably large construction space during the works. It is relatively overlooked and close by receivers will not be suitably mitigated during the construction. *Members and Visitors of Club de Recreio (VSR-L4)* and *Visitors of Chinese Civil Servants Recreation Club and Philipino Club (VSR-L6)* will be adversely affected *Significantly*.

### **Operational Phase**

- 3.3.1.6 Compensatory tree planting and greening shall be provided to compensate for felled trees and loss of visual amenity with reference to the requirement in ETWB TCW No. 3/2006. A minimum of 224 heavy standard trees will be provided within the site areas of the project and 1,800 seedling trees planted on slopes surrounding HOM Station. Furthermore an approximate total of 55m<sup>2</sup> of vertical greening / climbers shall be provided at the WAB and HOM Station.
- 3.3.1.7 No long term *Significant Adverse* Landscape Impacts are anticipated at Operation Stage. New tree planting proposals for the HOM Station will include some 150 new trees of various size and go some way to mitigating against the loss to the vegetated areas of this extensive green urban lung. The establishment of other slope greening measures including the planting of 1800 seedling trees along with the potential for invasive tree seeding should see an ongoing reduction in the net loss of landscape resources. Whilst at Day 1 of Operation *Significant* residual impacts will occur at *Slopes adjacent to Chatham Road North (LDR-3.2)*, in the longer term residual impacts will continue to reduce and some of the original size and scale of trees in the area may be achieved by year 30, however at year 10 impacts to landscape resources are considered to remain *Moderate Adverse*.
- 3.3.1.8 LCA-06 is an area currently exhibiting qualities of transition. With the implementation of the project along with other scheduled redevelopments within

the Character Area the underlying character may be said to have actually changed and the area may need to be redefined to one showing a more defined and valued urban characteristic. The project itself will be largely responsible for this change and the residual impacts of the project on the Character Area can be considered to be *Slight Beneficial* by Year 10.

- 3.3.1.9 With the removal of the visual impacts caused by construction works the majority of adverse visual impacts from the project are significantly reduced. No Significant Adverse Visual Impacts are anticipated at Operation Stage. Potential residual adverse impacts will result primarily from the permanent loss of open space and greening at both HOM and WHA Stations (LDR3.2 and LDR4.2) as well as the above-ground structures developed under the project. These include the new station at HOM, the ventilation structures at WHA Station, new walls, slopes, and entrances as well as the WAB at Club de Recreio. The final appearance if these is critical in ensuring minimal visual impacts in the Operation Stage. At Year 10 of Operation worst case situation has *Residents with north views on the south side of Chatham Road North (VSR-R4)* still experiencing Moderate Adverse Residual Visual Impacts due to loss of greening. The mitigation planting measures in particular will have matured significantly and as they continue to develop the adverse residual impact will continue to diminish. Some impacts could be determined to be beneficial to a number of receivers due to the poor visual environment endured currently at Ho Man Tin. *Users of Yan Fung Street Rest Garden (VSR-L10)* and *Road users on Yan Fung Street (VSR-T9)* will see Slight Beneficial and Moderate Beneficial Residual Visual Impacts at Year 10.

## 3.4 Air Quality

### Construction Phase

- 3.4.1.1 Potential air quality impacts from the construction works for the Project would mainly be due to construction dust, which would be anticipated to be generated from activities, such as soil excavation, backfilling, wind erosion, transportation/handling of C&D materials, loading and unloading of excavated materials at the barging point, construction of access shafts and tunnel mucking out areas, rock crushing equipment, etc.
- 3.4.1.2 Mitigation measures specified in the Air Pollution Control (Construction Dust) Regulation have been recommended, such as regular watering of the exposed spoil and covering dusty material storage areas. With the implementation of the dust mitigation measures, the dust impacts can be generally reduced to acceptable levels, which are less than the AQO criteria, except some exceedances for the annual dust results at the areas adjacent to the HOM Station works site and Finger Pier works area. However, the exceedances are marginal, short-term and in most cases transient and have been based upon worst case assumptions. It is, also considered that the maximum practicable mitigation measures have been applied to reduce the residual impacts to a minimum. Based upon these factors, the residual impacts associated with the annual dust exceedances for the KTE project within the study area would be considered minor and acceptable.



### **Operation Phase**

- 3.4.1.3 As KTE trains are electrically powered, there would be minimal dust emissions. Tunnel ventilation exhausts and emergency smoke extraction facilities would be carefully positioned to avoid adverse air quality impacts. Air quality impacts during operational phase are, therefore, envisaged to be insignificant.

## **3.5 Air-borne Noise**

### **Construction Phase**

- 3.5.1.1 The potential source of noise impact during the construction phase of the Project would mainly be the use of powered mechanical equipment (PME) for various construction activities, including site establishment, excavation, station construction, tunnel construction, backfilling and reinstatement works. As the area is densely populated at WHA Station, in the absence of any control measures, construction noise levels exceeding the EIAO-TM air-borne construction noise criteria would be expected at a number of noise sensitive receivers (NSRs) in the vicinity of the works areas.
- 3.5.1.2 Construction noise control measures have been incorporated into the construction method design, such as use of quieter construction methods and equipment, movable and temporary noise barriers, full enclosure, noise insulating fabric, silencer for ventilation fans and decking over excavation areas. With these measures in place, there would be compliance with the noise criteria at most NSRs.
- 3.5.1.3 There would nevertheless be some exceedance of the noise criteria at some NSRs in close proximity to the works areas for WHA Station, and some institutional NSRs in close proximity to the works areas for HOM and WHA Stations. Residual impacts range from 2-8dB(A) for residential NSRs. For institutional NSRs, residual impact of up to 8dB(A) during normal periods would be expected. Careful planning of the construction schedule would be able to reduce the noise impact at these NSRs.
- 3.5.1.4 Noise enclosures are proposed to be installed for all rock crushers to mitigate the noise generation during the construction phase. It is anticipated that the enclosure would perform in a similar manner to the noise closure suggested for the PMEs and would be capable of a 15dB(A) reduction in noise.

### **Operation Phase**

- 3.5.1.5 The main source of operational air-borne noise impact would be the fixed plant used for tunnel ventilation and cooling systems for stations and adits. The maximum allowable Sound Power Levels (SWLs) have been incorporated into the fixed plant design specification to comply with the SWL criteria. No adverse operational noise impact at NSRs would therefore be envisaged.

### **3.6 Ground-borne Noise**

#### **Construction Phase**

- 3.6.1.1 During construction, ground-borne noise could mainly arise from hydraulic breakers, pipe pile rigs and drilling rigs during excavation. No exceedances of the relevant ground-borne noise criteria are predicted and no further mitigation measures are required.

#### **Operation Phase**

- 3.6.1.2 Representative NSRs have been identified to assess ground-borne noise and the levels of operational ground-borne noise predicted. Operational ground-borne noise levels have been predicted at representative NSRs along the route with no exceedances of the relevant ground-borne noise criteria. No noise mitigation is necessary.

### **3.7 Water Quality**

#### **Construction Phase**

- 3.7.1.1 Potential water pollution sources have been identified as construction runoff, sewage from workforce, wastewater discharge from tunnelling and excavation, change of the groundwater table, and groundwater contamination. Mitigation measures including covering of excavated construction materials and provision of sedimentation tanks etc., are recommended to mitigate any adverse water quality impacts. The sites should be regularly inspected and audited.

#### **Operation Phase**

- 3.7.1.2 During the operational phase, there would be no direct discharge of wastewater into Victoria Harbour anticipated. Potential water pollution sources during the operational phase would include the runoff from rail track and operational tunnel drainage, station runoff, and sewage from the stations' operation. No adverse operational water quality impact would be anticipated, provided that mitigation measures have been incorporated in the design.

### **3.8 Waste Management**

#### **Construction Phase**

- 3.8.1.1 Construction waste of the Project would include construction and demolition (C&D) materials including excavated C&D materials suitable for public fill, C&D waste including cleared vegetation which is not suitable for public fill, chemical waste, and general refuse.
- 3.8.1.2 Measures have been adopted to minimise the generation of C&D materials at the outset during the design stage. As excavation cannot be avoided, only a few measures can be taken to minimise the quantity of C&D materials. Owing to the urban setting constraints, the available schemes for construction of railway facilities and tunnels are limited, hindering the minimisation of waste generation. Alternative methods for construction and measures to minimise the generation of

C&D materials at the preliminary design stage have been investigated for the key works sites.

- 3.8.1.3 Opportunities to re-use materials have also been fully considered. Approximately 930,000m<sup>3</sup> of C&D materials will be considered for the reuse/recycling in other projects/facilities, e.g. Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities, etc. There would be approximately 5,900m<sup>3</sup> of C&D waste that needs to be disposed of at landfills.

### **Operation Phase**

- 3.8.1.4 The main types of waste generated during the operation of the Project would be the general refuse from the public, station employees and commercial operators within the HOM and WHA Stations, industrial waste from maintenance activities and chemical waste from operational activities. The handling, collection, transportation and disposal practices of the identified waste generated will follow the current practices at other operating railway lines.

## **3.9 Land Contamination**

- 3.9.1.1 The land contamination assessment examined the potential contaminated landuse within the Project boundary and their potential impacts to the future landuse in the Project. A Contamination Assessment Plan (CAP) (and a Supplementary CAP) and Contamination Assessment Report (CAR) were prepared in accordance with Section 3.4.5 of the EIA Study Brief No: ESB-188/2008.
- 3.9.1.2 The findings of the land contamination assessment indicated that there was no exceedance of the relevant Risk-based Remediation Goals (RBRGs) of the soil and groundwater samples collected in this study.
- 3.9.1.3 As there is an existing kerosene store at Chung Hau Street this would be a potential hotspot of land contamination. It was recommended that when the permission for access is granted at the time when the land is resumed, a reconnaissance site visit should be carried out to review whether further site investigations would be required.

## **3.10 Hazard to Life**

- 3.10.1.1 It is recognised that, from a risk point of view, blasting is not a desirable construction method. However, due to foreseen ground conditions and the impracticability in using other techniques, drill and blasting for rock excavation is required for some sections along the alignment. To enable a timely delivery of explosives to site and in order to meet the proposed construction work programme, a temporary Explosives Storage Magazine (Magazine) is required.
- 3.10.1.2 A Quantitative Risk Assessment (QRA) for the storage and transport of explosives has been carried out as per the EIA Study Brief No. ESB-188/2008 (EIA Study Brief). A robust site selection process has been undertaken for the proposed temporary magazine and Tseung Kwan O (TKO) Area 137 has been identified as the only practicable site. The criterion of the EIAO-TM for Individual Risk has been met. The assessment results show that the societal risk lies within the As

Low As Reasonably Practicable (ALARP) region when compared to the criteria stipulated in Annex 4 of the EIAO-TM. An ALARP assessment has been carried out by identifying all practicable mitigation measures and assessing the cost effectiveness of each measure in terms of the risk reduction achieved and the cost of implementing the measures. As part of the ALARP assessment, TKO Area 137 has been confirmed as the only practicable site.

#### **4. ENVIRONMENTAL MONITORING AND AUDIT**

4.1.1.1 An environmental monitoring and audit (EM&A) programme will be implemented during the construction and operation of the Project, to check effectiveness of the recommended mitigation measures and compliance with relevant statutory criteria.

#### **5. CONCLUSION**

5.1.1.1 This EIA study has identified and assessed potential environmental impacts of the Project, in accordance with the EIA study brief and EIAO-TM guidelines. Overall, the EIA study has concluded that the Project would be environmentally acceptable, in compliance with environmental legislation and standards. With the implementation of environmental control measures during construction and operation phases, there would be no adverse residual impacts from the Project. This will be checked by a comprehensive environmental monitoring and audit programme.

**Table 3.1: Impact Summary**

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
<b>Cultural Heritage</b>				
There are no Sites of Cultural Heritage in the study area of the Project	The assessment followed the EIAO-TM.	No identified impacts to Sites of Cultural Heritage would be predicted.	No mitigation would be required.	Not applicable.
<b>Landscape and Visual</b>				
<p><u>LANDSCAPE RESOURCES</u>                      Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Garden, Ping Chi Street Sitting Out Area, Lee Kung Street Garden, Ko Shan Road Park, Hutchison Park, The Whampoa Garden, Whampoa Garden Amenity Areas, Sports Pitches in the vicinity of Wylie Road, Wuhu Street Temporary Playground, Fat Kwong Street Playground, King’s Park High Level Service Reservoir Playground, Ho Man Tin Park and Leisure Centre, Ho Man Tin East Service Reservoir Playground, Whampoa Garden Podium Recreation Areas, Primary School Play Areas on Tak On Street, Tai Wan Shan Swimming Pool, Slopes in the area of Chinese Methodist College, Slopes adjacent to Chatham Road North, Slopes surrounding King’s Park High Level Service Reservoir, Slopes surrounding Ho Man Tin East</p>	<p>The assessment followed the EIAO-TM and EIAO Guidance Note No. 8/2002</p> <p><u>LANDSCAPE RESOURCES</u>                      During both the Construction and Operational Phases <b>Significant</b> Adverse Landscape Impacts are anticipated at <i>Slopes adjacent to Chatham Road North (LDR-3.2)</i></p> <p><u>LANDSCAPE CHARACTER</u>                      Approximately 1,000 existing trees affected. During both the Construction and Operational Phases <b>Moderate</b> Adverse Impacts to Landscape Character are anticipated at <i>Ho Man Tin - Valley Road Estate (LCA-6)</i>.</p> <p><u>VISUALLY SENSITIVE RECEIVERS</u>                      A total of 77 VSRs are identified within the project. During the Construction Phase <b>Significant</b> Visual Impacts are anticipated to 22 of these VSR's. During Operational Phase <b>Significant</b></p>	N/A	<p><u>Construction Phase</u>                      Reuse of Existing Topsoil;                      Tree Transplantation;                      Control of night-time lighting glare, however, currently no night-time working is proposed and                      Decoration of Hoarding.</p> <p><u>Operation Phase</u>                      Re-provision of Public Open Spaces;                      Compensatory Tree Planting of approximately 224 trees;                      Vertical Greening;                      Horizontal and Slope Greening;                      Design Aesthetics for Above-Ground Structures for the WAB at Club de Recreio;                      Design Aesthetics for Above-Ground Structures at HOM Station;                      Design Aesthetics for</p>	<p><u>LANDSCAPE RESOURCES</u>  <b>Significant</b> Adverse Residual Landscape Impacts are anticipated at <i>Slopes adjacent to Chatham Road North (LDR-3.2)</i> during Construction Phase.</p> <p><b>Significant</b> Adverse Residual Impacts are recorded at: <i>Slopes adjacent to Chatham Road North (LDR-3.2)</i> at Day 1 of Operation. <b>Moderate</b> Adverse Residual Impacts are recorded at: <i>Slopes adjacent to Chatham Road North (LDR-3.2)</i> at Year 10 of Operation.</p> <p><u>LANDSCAPE CHARACTER</u>  <b>Moderate</b> Adverse Impacts to Landscape Character at <i>Ho Man Tin - Valley Road Estate (LCA-06)</i> are anticipated .</p> <p>At Day 1 of Operation <b>Negligible</b> Character Impacts prevail at <i>Ho Man Tin - Valley Road Estate (LCA-06)</i>. By Year 10 of</p>

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
<p>Service Reservoir, Slopes surrounding Fat Kwong Street Playground, Street Planting at Gascoigne Road, Street planting in the vicinity of Hung Hom Road, Tree planting on Tak Man / Tak On Streets, Street planting in the vicinity of Hung Luen Road, Roadside planting in the Princess Margaret Road Interchange, Planting at Recreation Clubs around Gascoigne / Wylie Roads, Edge landscape at Harbour Front Landmark, Landscape Gardens at Harbour Front Horizon, Slopes adjacent to Yan Fung Street, Slopes surrounding Chung Hau Street, Slopes surrounding Ho Man West Service Reservoir, Slopes surrounding Ho Man Tin East Service Reservoir, Site formation levels for use by HOM Station, Future Poly U site formation area, Residual Valley Road Estate site formations, Formation levels at King's Park High Level Service Reservoir, Open Space sites at Hung Hom Bay (Works Areas), Reclaimed land at TKO, Hung Hom Finger Pier, Future Promenade at Hung Hom Reclamation Areas,</p>	<p>Impacts would remain only to <i>Residents on the south side of Chatham Road North (VSR-R4)</i> and <i>Residents at Valley Road (VSR-R10)</i>.</p>		<p>Above-Ground Structures at WHA Station;</p>	<p>Operation <b>Slight Beneficial</b> Landscape Character Impacts will be evidenced.</p> <p><u>VISUALLY SENSITIVE RECEIVERS</u>  <b>Significant</b> Adverse Residual Visual Impacts are anticipated during Construction Phase to <i>Residents on the south side of Chatham Road North (VSR-R4)</i>, <i>Residents grouped at Wuhu Street and Gillies Avenue (VSR-R5)</i>, <i>Residents at Ka Wai Chuen (VSR-R6)</i>, <i>Residents at Shun Yung Street (VSR-R8)</i>, <i>Future Residents of HK PolyU Planned Student Dormitory (SVR-R9)</i>; <i>Residents at Valley Road (VSR-R10)</i>; <i>Residents of Whampoa Garden (VSR-R13) Members and Visitors of Club de Recreio (VSR-L4)</i>, <i>Visitors of Chinese Civil Servants Recreation Club and Philipino Club (VSR-L6)</i> and <i>Shoppers in Whampoa Garden (VSR-L14)</i>.</p> <p>At Day 1 of Operation no Significant Impacts prevail. By Year 10 of Operation the most significant visual impacts envisaged are <b>Moderate</b> Adverse at <i>Residents on the south side of Chatham Road North (VSR-R4)</i>,</p>

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
<p>Promenade at Whampoa Harbourfront, Victoria Harbour                      Joss House Bay (Tai Miu Wan),                      South Peninsula of Clearwater Bay Country Park.</p> <p><u>LANDSCAPE CHARACTER</u>                      Area surrounding Gascoigne Road, Reclamation Areas at Hung Hom Waterfront, King's Park                      West of Ma Tau Wai Road - Ho Man Tin, Hung Hom - Cross Harbour Links, Ho Man Tin - Valley Road Estate, Yau Ma Tei and Jordan, Hung Hom around Wuhu Street, Whampoa and Hung Hom Reclamations, Ho Man Tin Estate, Victoria Harbour                      Reclamation at TKO, Clearwater Bay Country Park, Joss House Bay.</p> <p><u>VISUALLY SENSITIVE RECEIVERS</u>                      Residents of towers on the west of Nathan Road, Residents of Parc Palais, East facing units of Wylie Court, Residents on the south side of Chatham Road North, Residents grouped at Wuhu Street and Gillies Avenue, Residents at Ka Wai Chuen, Residents at Tsing Chau</p>				<p><i>Future Residents of HK PolyU Planned Student Dormitory (VSR-R9), Residents at Valley Road (VSR-R10).</i></p>



Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
Street, Residents at Shun Yung Street, Future residents of HK PolyU planned student dormitory, Residents with surrounding views at Valley Road, Residents at Ho Man Tin Estate South, Residents at Ko Shan Road, Residents of Whampoa Estate, Residents of Harbourfront Landmark, Residents at Poly U Student Dormitory, Residents of Harbour Place, Residents of Royal Peninsula, Future residents of property development above HMT Station, Future residents of Valley Road Estate development site, Users of Gascoigne Road Rest Garden, Pedestrians and Shoppers in the vicinity of Gascoigne Road Rest Garden Members and Visitors of India Club and YMCA, Members and Visitors of Club de Recreio, Visitors of Kings Park Hockey Ground, Visitors of Chinese Civil Servants Recreation Club and Philipino Club, Recreation visitors at King's Park Fresh Water Service Reservoir, Recreation visitors at Ho Man Tin Park and Leisure Centre, Recreation users at Ho Man Tin East Service Reservoir				



Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
Playground, Users of Yan Fung Street Rest Garden, Pedestrians around Fat Kwong Street Playground and Sitting Out Area, Recreational users of Fat Kwong Street Playground, Pedestrians in and around Fat Kwong Street Garden, Pedestrians and Shoppers in Whampoa Garden, Pedestrians at Hong Kong Coliseum, Pedestrians on TST East Promenade, Hikers at Clear Water Bay Country Park, Workers in commercial buildings on Nathan Road, Staff and Guests of Eaton Hotel, Staff and students of Methodist College, Staff of Queen Elizabeth Hospital Buildings, Staff of India Club and YMCA, Staff of Club de Recreio Staff of Kings Park Hockey Ground, Staff of Chinese Civil Servants Recreation Club and Philipino Club, Staff and Students of future Primary School (under construction) at Wylie Road Staff of Ho Man Tin Leisure Centre, Staff of small businesses at Valley Road, Workers at short term tenancy on Fat Kwong Street (Planned dormitory of the Hong Kong				

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
<p>Polytechnic University), Staff at Hung Hom Fire Station, Staff and Students of Hung Hom Government Primary School, Staff at Caritas College of Careers and Businesses on Wuhu Street, Staff of businesses in Whampoa Garden, Staff and Students of S.K.H. Fung Kei Primary Schools, Staff and Students of GCEPSA Whampoa Primary School, Office workers at Two Harbourfront, Staff and Students at HK Poly U – Community College Campus, Staff and Guests at Harbour View Horizon Hotel, Staff and Guests at Harbour Front Horizon Hotel, Staff and Guests of Harbour Plaza Metropolis, Office workers at International Mail Centre, Office/Hotel workers and guests at TST East, Office workers at The Metropolis Tower, Staff and Students at HK Poly U Lee Shau Kee Building, Circulating Traffic on Nathan and Gascoigne Roads                      Fast moving vehicles on Gascoigne Road, Road users on Wylie Road and Wylie Path, Fast moving vehicles at Queen Margaret Road Interchange, Fast moving vehicles on</p>				

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
<p>Chatham Road North, Road users on Chung Hau Street, Temporary parking users on future development site, Road users on Fat Kwong Street, Road users on Yan Fung Street, Road users on Tak Man / Tak On Street, Road users on Hung Hom Road (east section), Road users on Whampoa Estate side streets, Road users on Hung Lok Road and Yan Yung Street, Road users on Hung Hom Road (west section), Road users on Salisbury Road, Travellers on Victoria Harbour, Recreational boat traffic at Tai Mui Wan.</p>				
<b>Air Quality</b>				
<p>The ASRs included Tin Hau Temple, Tang's Mansion, Alhambra Building, Methodist College, Eaton Hotel, Diocesan Girls' Junior School, Diocesan Girls' School, Queen Elizabeth Hospital, Parc Palais, Filipino Club, Hong Kong Chinese Civil Servants' Association, Oi Man Estate, SKH Holy Trinity Church Secondary School, Carmel Secondary School, Yee Fu Building, 271-273 Chatham Road North, Caritas Bianchi College of Careers, Lok Ka House, Wing Fung Building, Marigold Mansion, Lok Do</p>	<p>The assessment followed the EIAO-TM. Potential dust impacts would be generated from the excavation activities, material handling, wind erosion, stockpiles, spoil removal, material delivery, and operation of the barging point during the construction phase.</p>	<p>The predicted maximum hourly and 24-hour average TSP levels at the representative ASRs would comply with the statutory requirement. However, some marginal exceedances for the annual average TSP levels at the areas adjacent to the HOM Station works site and Finger Pier works area are predicted.</p>	<p>Fugitive dust impacts would be controlled by the implementation of dust suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation, good site practices and proposed mitigation measures.</p>	<p>The residual impacts are assessed and concluded as marginal, short-term and in most cases transient and have been based upon worst case assumptions. It is, also considered that the maximum practicable mitigation measures have been applied to reduce the residual impacts to a minimum. Based upon these factors, the residual impacts associated with the annual dust exceedances for the KTE project within the study area would be considered minor and acceptable.</p>

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
Building, Hung Hom Government Primary School, Hung Hom Government Clinic, Whampoa Garden, Whampoa Estate, Fung Kei Millennium Primary School, Fung Kei Primary School, Alliance Primary School, GCEPSA Whampoa Primary School, Harbourfront Landmark, Harbourfront Horizon, Harbour Plaza Metropolis, Metropolis Residence, Hong Kong Coliseum, Fire Service Headquarters				
<b>Air-borne Noise</b>				
The NSRs included Alhambra Building, Methodist College, Queen Elizabeth Hospital – Specialist Clinic, Primary School at 10-12 Wylie Road (Planned Future NSR), Parc Palais, Carmel Secondary School, Yee Fu Building, Marigold Mansion, Caritas Bianchi College of Careers, Lok Ka House, Lok Do Building, Hung Hom Government Primary School, Ki Fu Building, On Wah Building, , Whampoa Garden, Fung Kei Millennium Primary School, GCEPSA Whampoa Primary School, Harbourfront Landmark, Harbourfront Horizon,	The assessment followed the EIAO-TM. Without mitigation, exceedances of the criteria were predicted at some NSRs for the construction air-borne noise due to the use of powered mechanical equipment. The predicted operational noise levels arising from the noisy fixed plant of the project such as ventilation building and shafts at the NSRs are carefully assessed to comply with the EIAO-TM criteria provided that the designed maximum allowable SWLs of the fixed plants are met.	Without mitigation, the construction air-borne noise levels would be anticipated to exceed the relevant criteria by up to about 22dB(A) at some NSRs.	Mitigation measures for the construction air-borne noise included provision of quieter plants, silencers, noise barriers, enclosures and insulating fabric and temporary road deck covers. After these mitigation measures are adopted, the noise levels at 17 NSRs (5 schools, 12 residential) would subject to residual impacts of between 1-8dB(A); while 1 additional NSR would be subject to potential exceedances during examination periods only. As such, all practicable noise mitigation measures will be exhausted as far as possible to minimise the residual impacts, e.g. good site practices such as	Residual impacts have been assessed and concluded to be temporary, reversible and unlikely to induce public health concern and as such, are considered to be acceptable.

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
Residential Building, Ho Man Tin Station Development (Planned Future NSR), Residential Building, Dormitory for The Hong Kong Polytechnic University (Planned Future NSR), Yue Sun Mansion, 211 Chatham Road North, Fung Kei Primary School, Wylie Court, Wing Fung Building and Queen Elizabeth Hospital – School of General Nursing			orientating the noisy plant away from the nearby NSRs, intermittent use of plant, proper fitting of silencers and mufflers on the construction equipment, avoidance of noisy construction works during the examination period etc.	
<b>Ground-borne Noise</b>				
The NSRs included Kam Wah Building, New King's Hotel, Tin Hau Temple, Tang's Mansion, Alhambra Building, Methodist College, Eaton Hotel, Labour Tribunal, Diocesan Girl's Junior School, School of General Nursing, Queen Elizabeth Hospital - Specialist Clinic, Primary School at 10-12 Wylie Road (Planned Future NSR), Parc Palais, Oi Man Estate, SKH Holy Trinity Church Secondary School, Yee Fu Building, Caritas Bianchi College of Careers, Lok Ka House, Top Growth Court, 36 Wuhu Street, Block R, Wing Fu Building, Whampoa Estate, Whampoa Garden, Fung Kei Millennium Primary School, GCEPSA Whampoa Primary	The assessment followed the EIAO-TM. No exceedance was predicted for the construction and operational ground-borne noise at all NSRs.	Not applicable.	No particular mitigation measures were recommended.	Not applicable.

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
School, Harbourfront Landmark, Residential Building, Ho Man Tin Station Development (Planned Future NSR), Residential Building, Dormitory for The Hong Kong Polytechnic University (Planned Future NSR), Yue Sun Mansion 191A Wuhu Street, 271-273 Chatham Road North and Wing Fung Building				
<b>Water Quality</b>				
The WSRs included East Rail Extension Cooling Water Intake, Tai Wan WSD Flushing Water Intake, Victoria Harbour Water Control Zone, To Kwa Wan Typhoon Shelter, King’s Park High Level Service Reservoir, Ho Man Tin East Service Reservoir	The assessment followed the EIAO-TM. Construction phase impacts would be generated from the construction run-off from general construction activities, wastewater discharge from tunnelling and excavation, potential impacts on groundwater hydrology, and sewage effluent from construction workforce. Operational phase impacts would include the run-off from rail track and operational tunnel drainage, station run-off, and sewage from the stations operation.	No exceedance would be predicted.	Water quality impacts from land-based construction activities would be controlled by implementing the recommended mitigation measures, e.g. control measures on site run-off and drainage from the works sites and barging points to minimise construction run-off, tunnelling wastewater, and particularly on-site treatment of any contaminated wastewater prior to discharge. During the operational phase, track run-off, tunnel seepage and effluent discharges from stations, ventilation buildings and maintenance activities would have no adverse water quality impact provided that mitigation measures are incorporated in the design.	Residual impacts are not anticipated, provided that the recommended mitigation measures are implemented.
<b>Waste Management</b>				

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
All works sites and works areas.	<p>Construction waste arisings have been identified based on the proposed construction activities and would comprise C&amp;D materials (including excavated materials, materials from demolition works and site formation), general refuse from workforce, chemical waste from maintenance of construction plant and equipment and sewage from on-site staff and workers.</p> <p>The types of waste generated during the operation of the KTE project would be general refuse from the passengers, staff and any commercial operators at HOM Station and WHA Station, general refuse from the ventilation building and ventilation shafts, industrial waste from the maintenance activities and chemical waste from operational activities. The handling, collection, transportation and disposal practices of the identified waste generated should follow the current practices at other operating railway lines and hence would pose no impact.</p> <p>Provided that the identified waste arisings are to be handled, transported and disposed of using</p>	No exceedance would be predicted.	Methods to minimise the generation of waste have been investigated which focus on the construction methods of tunnels, ventilation building and shafts, and stations. Under the condition of limited works sites approved for construction use of the project, delivery of soft materials for reuse and stockpiling on-site would be considered and used as far as practicable. The off-site reuse at other projects has also been explored, e.g. Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Boundary Crossing Facilities and Tuen Mun Chek Lap Kok Link, which would require a substantial amount of filling materials. With the implementation of the recommended mitigation measures in <b>Section 10</b> of this EIA Report, no adverse environment impacts would be expected.	Not applicable.

Assessment Points (e.g. ASRs, NSRs)	Results of Impact Predictions and Relevant Standards or Criteria	Extent of Exceedance Predicted	Impact Avoidance Measures Considered and Mitigation Measures Proposed	Residual Impacts after Mitigation
	approved methods and the recommended good site practices are to be followed, adverse environmental impacts would not be expected during the construction phase.			
<b>Land Contamination</b>				
Sampling points were located at the existing slope beneath Concord kerosene store at Chung Hau Street, pedestrian parts of Hung Hom Road at Whampoa Estate adjacent to Ka Fu Building, pedestrian area at Shung King Street adjacent to The Whampoa (the ship), and pedestrian area at the junction of Tak On Street and Tak Ting Street at Whampoa Garden.	The assessment followed the EIAO-TM. There was no exceedance of the RBRGs for all soil and groundwater samples tested. There is an existing Concord kerosene store located at Chung Hau Street. Based on the historic and existing landuse and geological information suggest that the operation of the kerosene store would be a potential hotspot of land contamination, as its location would interface with the footprint of the mucking out point of HOM Station and the future entrance at Chung Hau Street. It is recommended that when the permission for access is granted at the time when the land is resumed, a reconnaissance site visit should be carried out and a review undertaken of whether further SI would be required.	There was no exceedance of the RBRGs for all soil and groundwater samples tested.	No remedial action would be required.	Not applicable.
<b>Hazard to Life</b>				
N/A	The assessment followed the EIAO-TM. The criterion for Individual Risk has been met. The assessment	N/A	As part of the ALARP assessment, a list of 25 potential temporary magazine site candidates have been reviewed	N/A





<b>Assessment Points (e.g. ASRs, NSRs)</b>	<b>Results of Impact Predictions and Relevant Standards or Criteria</b>	<b>Extent of Exceedance Predicted</b>	<b>Impact Avoidance Measures Considered and Mitigation Measures Proposed</b>	<b>Residual Impacts after Mitigation</b>
	<p>results show that the societal risk lies within the As Low As Reasonably Practicable (ALARP) region when compared to the criteria stipulated in Annex 4 of the EIAO-TM. An ALARP assessment has been carried out by identifying all practicable mitigation measures.</p>		<p>and the TKO Area 137 has been confirmed as the only practicable site.</p>	