MTR Corporation Limited

SCL - NEX/2206 EIA Study for Stabling Sidings at Hung Hom Freight Yard

Executive Summary

25445

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1 Introduction

1.1 Background

The Shatin to Central Link (SCL) is one of the ten large-scale infrastructure projects announced by the Chief Executive in his 2007-2008 Policy Address. MTR Corporation Limited has been entrusted to plan and design for this project.

For the purposes of the Environmental Impact Assessment (EIA), five EIA Studies have been conducted to cover different sections of the SCL. They include:

- SCL – Tai Wai to Hung Hom Section [SCL (TAW-HUH)] – the extension of Ma On Shan Line from Tai Wai Station via Hin Keng, Diamond Hill, Kai Tak, To Kwa Wan, Ma Tau Wai and Ho Man Tin to Hung Hom, and link up with the existing West Rail Line, along with a proposed stabling sidings option in Diamond Hill (DHS);
- SCL – Stabling Sidings at Hung Hom Freight Yard [SCL (HHS)] (hereinafter referred to as "the Project", being considered in this EIA) – another stabling sidings option for SCL (TAW – HUH) proposed at the former freight yard in Hung Hom;
- SCL – Mong Kok East to Hung Hom Section [SCL (MKK-HUH)] – the realignment work for the existing East Rail Line tracks from the tunnel portal near Oi Man Estate (Portal 1A) to the proposed North Ventilation Building (NOV) in Hung Hom;
- SCL – Hung Hom to Admiralty Section [SCL (HUH-ADM)] – the section from NOV, Plant Rooms and Emergency Access in Hung Hom across the harbour to the Causeway Bay Typhoon Shelter (CBTS), Exhibition Station (EXH) and then to ADM; and
- SCL Protection works at Causeway Bay Typhoon Shelter – the section of approximately 160m long of the SCL tunnel protection works at the crossing over Central-Wan Chai Bypass (CWB) tunnels, which would be constructed under the CWB project.

An application (No. ESB-191/2008) for an EIA Study Brief under Section 5(1)(a) of the EIAO was submitted by MTR Corporation in June 2008 with a project profile (No. PP-356/2008). A Study Brief was issued by EPD in July 2008 to provide the scope and requirements of the EIA study for SCL (TAW-HUH). In that Study Brief, the rail alignment of the SCL (TAW-HUH), 7 stations, namely Hin Keng Station (HIK), Diamond Hill Station (DIH), Kai Tak Station (KAT), To Kwa Wan Station (TKW), Ma Tau Wai Station (MTW), Ho Man Tin Station (HOM) and Hung Hom Station (HUH), along with other supporting facilities and the proposed stabling sidings in Diamond Hill (DHS) were covered.

Following the cessation of the operations of various freight facilities at Hung Hom in April 2011, MTR Corporation Limited has started a detailed study to investigate the feasibility and environmental acceptability of utilizing the former freight yard to accommodate the train stabling requirements for SCL (TAW-HUH).

To make the former Hung Hom Freight Yard feasible for the use of train stabling, in addition to providing siding tracks underneath the existing podium structure covering the freight yard, and launching/retrieval and emergency tracks and shunt neck extending outside the podium, it would be necessary to make appropriate changes to the design of SCL (TAW-HUH) and SCL (MKK-HUH) at HUH, KAT and DIH and its associated alignment and facilities. These works are collectively referred to as the Project in this EIA (**Figure 1.1)**.

1.2 EIA Study Brief

The Project is a Designated Project (DP) under the EIAO falling into the following categories:

- A railway and its associated stations under Item A.2, Part I of Schedule 2 of the EIAO

- A railway siding under Item A.4, Part I of Schedule 2 of the EIAO

An application (Application No. ESB-233/2011) for an EIAO Study Brief under Section 5(1)(a) of the EIAO was submitted by MTR Corporation on 30 June 2011. A Study Brief was issued by EPD on 10 August 2011 to provide the scope and requirements of the EIA study for the Project.

1.3 Need for the Project

The entire SCL is to form a strategic rail corridor from Shatin to Central which will bring about various benefits to the community, including:

- Redistribution of railway passenger flows to relieve the existing railway lines in urban Kowloon and on Hong Kong Island;
- Providing public transport service for Kai Tak Development;
- Relieving road-based public transport in the existing developed areas, and alleviation of the traffic congestion and environmental nuisance on existing road networks, including the demand on the Hung Hom Cross Harbour Tunnel; and
- Stimulation of the redevelopment of To Kwa Wan and Kowloon City areas.

The HHS covered in this Project or DHS covered in the SCL (TAW-HUH) would be an essential element for the operation of SCL (TAW-HUH). Either option would be needed to accommodate trains for deployment to meet the demand during morning peak hours. In non-operational hours, the sidings would be used for train stabling. Maintenance works such as regular cleaning and inspection, but not for major repairing works, would be conducted during non-operational hours as well. Without the support of the stabling sidings, the SCL (TAW-HUH) would not be functional.

2 Consideration of Alternative Options

2.1 Introduction

During the design process, a number of alternatives for stabling sidings have been identified and their suitability has been investigated. This section presents factors including operational requirements, engineering factors, views from the public as well as also environmental benefits and impacts that have been considered during the development of alternatives in the design process.

2.2 Consideration of Alternative Sites for Stabling Sidings

In order to meet the train stabling requirements, it has been established with the Railways Development Office (RDO) that additional stabling facilities would be required. Some operational requirements for allowing proper function of the stabling sidings are listed below:

- Location requirement to allow efficient train launching to meet the service requirement;
- Sufficient stabling capacity to support operation of SCL (TAW-HUH);
- Allow for routine maintenance works such as regular cleaning and inspections but not for major repairing works;
- To achieve adequate length and width (including allowance for EVA, access roads, turn outs, staff accommodation, plant rooms, but excluding structures)
- To provide sidings at intervals that would allow disabled trains to be removed from the running line to enable service requirements to be restored within a reasonable period.

It is essential to have separate stabling sidings for SCL (TAW-HUH). To meet the SCL operational needs, there are no existing depots that could be adopted and it is also difficult to identify other appropriate sites or alternatives. Among the possible sites, the Diamond Hill CDA Site (i.e. the former Tai Hom Village) and the former Hung Hom Freight Yard Site are considered as feasible locations for train stabling sidings having considered operational requirements and engineering factors mentioned above.

Further to the selection of preferred sites for train stabling sidings, investigation was conducted to identify different options to make the best use of the two preferred sites in order to maximize the efficiency of stabling sidings and minimize the adverse views from the public and environmental impacts. As such, three different options have been developed, including using only the Diamond Hill CDA Site (i.e. DHS), only the Hung Hom Freight Yard (i.e. HHS) and combination of HHS and DHS, for operation of SCL (TAW-HUH). The option of having stabling sidings at both Diamond Hill CDA Site and former Hung Hom Freight Yard could help to share the need of providing a stabling sidings at either one of the possible sites therefore reducing the capacity of stabling sidings required at either one of the possible sites. However, a reduction in the stabling facilities at the former Hung Hom Freight Yard site would still result in constraining the remainder of the former Hung Hom freight yard being utilised for other uses due to operational constraints. Similarly even with a reduction of stabling facilities at the Diamond Hill CDA Site, the stabling sidings would still occupy a significant portion of the Diamond Hill CDA Site and would pose a constraint to the future use of this site. Therefore, the option of providing stabling sidings at both Diamond Hill CDA Site and former Hung Hom Freight Yard was found to be not preferred during the design process, and was not pursued further.

The option of using DHS for train stabling is assessed under SCL (TAW-HUH) EIA Report, while the option of using HHS is assessed in this EIA Report.

2.3 Public Consultation

As one of the SCL Project Objective, an extensive series of meetings/ consultations with public has been conducted during the preliminary design stage of the Project, with an objective to formulate a final scheme which meets the needs of the local community and is fully supported by the general public.

After the Executive Council approved the further planning and preliminary design of SCL by the MTR in March 2008, the Government and the MTR subsequently visited the District Councils and consulted local communities on the SCL project. Extensive public consultation, including roving exhibitions and public forums, was conducted in collaboration with various District Councils and the local community to further collect views from the public on the new links.

Following the termination of freight services in the former Hung Hom Freight Yard in June 2010 and cessation of container cargo operation in April 2011, the Government and MTR visited the District Councils on the option of HHS for operation of SCL in July 2011.

The public generally welcomes and looks forward to the implementation of SCL as early as possible. However, the public also have concern on the environmental impacts induced by operation of a stabling sidings. In response to comments received, some modifications have been made on the design of the DHS and HHS to address their concerns.

2.4 Selection of Preferred Option of Stabling Sidings Arrangement

As concluded in the EIA reports for SCL(TAW-HUH) and this Project, the environmental impacts of both DHS and HHS options would comply with the respective criteria stipulated in the TM-EIAO, and would be considered as acceptable with implementation of appropriate mitigation measures. For this reason, both options of using only the DHS and only the HHS would be considered as environmentally acceptable and could be adopted to support the operation of SCL (TAW-HUH).

It should be noted that the HHS would affect less trees, archaeological site and built heritages. The train stabling sidings at Former Hung Hom Freight Yard is mostly within the footprint of existing railway facilities. Even including the necessary modification works at Hung Hom Station and construction works at Kai Tak Station and Diamond Hill Station, it would still affect less trees. All the siding tracks would also be accommodated underneath the existing deck of Hung Hom Station to minimise noise and visual impact as much as possible. Although the new fan area to the north of the HHS would inevitably generate additional noise and visual impacts, direct noise mitigation measures including semi-enclosure and vertical noise barriers with appropriate aesthetic design would be implemented to alleviate any impacts that may be generated. It is therefore considered that the HHS option would be slightly preferred from an environmental perspective. However, train stabling, launching and retrieval requirements are complex. In addition to environmental factors, it is important to consider other factors such as engineering, operational requirements and safety aspects in determining the preferred scheme. The ultimate suitability of using either the DHS or HHS for train stabling would be subject to the findings of both detailed EIA and engineering studies.

3 Project Description and Construction Methodology

3.1 General

The HHS will be located underneath the existing podium structure covering the former Hung Hom Freight Yard at Hung Hom, except its shunt neck, launching/ retrieval and emergency tracks which will extend outside the podium as they connect to the tracks to be constructed for the SCL (TAW to HUH) section. It is also necessary to make appropriate changes in the design of Hung Hom, Kai Tak and Diamond Hill Stations and its associated alignment and facilities proposed in SCL (TAW-HUH) and SCL (MKK-HUH) EIA Reports to suit this operational arrangement. This chapter presents the key design elements and the associated construction methodology of the Project. The indicative location of the Project is shown in **Figure 1.1.**

3.2 Key Design Elements

A summary of the general design of various components of the Project is given below:

Table 3.1: Summary of Key Elements of SCL (HHS)

Key Elements	Location	Key Works Required
Stabling Sidings	HHS	• Construction of a train stabling sidings under the existing deck of Hung Hom Station • Construction of a fan area to the north of the train stabling sidings • Construction of tracks to the north and south of the stabling sidings to enable manoeuvring of trains to and from the stabling to the SCL (TAW-HUH) alignment • Construction of noise mitigation over the fan area and near the shunt neck.
Stations and its associated alignment and facilities	HUH Modification	• Construction of underground platforms • Modification work of HUH podium • Construction of plant rooms underneath HUH podium • Construction of ventilation shafts/plant and CLP transformer plant • Others such as utility diversion
	KAT	• Construction of Kai Tak Station and associated tunnels • Construction of a underground refuge sidings of about 300m in length as part of the Kai Tak Station construction
	DIH	• Construction of the interchange station with existing Kwun Tong Line at Diamond Hill • Site formation to connect station to adjacent existing ground. • Construction of SCL (TAW-HUH) tunnel section approaching to Diamond Hill Station to suit the DIH location without DHS. • Others such as utility diversion in Diamond Hill CDA site arising from the deletion of DHS.

3.3 Consideration of Alternative Construction Methods

HHS and HUH are located within the densely built up area in Hung Hom. The lack of space available at the surface for locating HHS and HUH and the need of connecting to future SCL (TAW-HUH) alignment poses constraint on the location and design of HHS and HUH and thereby limited the options of construction methods available.

The tentative construction methodologies for the HHS and HUH are summarized below.

Table 3.2: Tentative Construction Methods for HHS and HUH

Key Design Elements	Tentative Construction Methodologies
HHS	<u>Train stabling sidings under the existing deck of Hung Hom Station</u> • Piling for underpinning of existing structure • General concreting work • At-grade track laying • General utilities <u>Fan area to the north of the train stabling sidings</u> • At-grade track laying within a trough structure • Installation of semi-enclosures with piled support (see **Section 8.6)** • General utilities <u>Shunt neck to the north of the train stabling sidings</u> • At-grade track laying within a trough structure • Construction of tunnel box under Chatham Road North • Installation of vertical noise barriers (see **Section 8.6)** • General utilities <u>Launching and retrieval tracks to the south of the train stabling sidings</u> • At-grade track laying within a trough structure • General utilities
HUH Modification	<u>Hung Hom Station and Associated Plant Rooms</u> • D-wall, Pre-bored H-piles and barrettes for foundation • Underpinning Scheme • General concreting works <u>Ventilation shafts and plant rooms</u> • Pre-bored H-piles for foundation • Relocation of facilities displaced by HHS <u>Others such as utility diversion</u> • Typical smaller scale excavation, concreting etc

Both the stabling sidings and HUH will be located underneath the existing podium. Two construction methods were considered appropriate for further investigation for the areas under the existing podium, which are:

- Temporary Open Deck Scheme; or
- Underpinning Scheme.

The benefits and constraints of the two construction methods are compared in **Table 3.3**.

Table 3.3: Benefits and Constraints of the Proposed Construction Methods

Station Works Construction Method	Benefits	Constraints
Temporary Open Deck Scheme	• Easier construction method and simple form of design. • No need for long term continuous inspection and maintenance of	• A staged construction scheme has to be developed to minimise as much as possible the duration and extent of podium deck to be removed at any one

Station Works Construction Method	Benefits	Constraints
	permanent bearings. • Shorter construction programme.	time. • Temporary reprovisioning of the affected Hong Kong Coliseum facilities would also be required which will have concern from Hong Kong Coliseum due to the potential interference on activities. • Since part of the deck needs to be demolished and some of the construction activities will be exposed. Relatively higher construction noise and dust will be anticipated. Additional mitigation measures would be required to minimize the impact.
Underpinning Scheme	• This method in general is favoured by stakeholders, such as Hong Kong Coliseum due to minimal interference with their activities. • Less environmental impacts, through reduction in construction noise, dust and waste. • Less impacts on community through reduction in construction noise and dust; • Existing evacuation route and emergency vehicular access for the Hong Kong Coliseum would not be affected. • This method can be modified to minimize the engineering difficulties.	• More difficult construction method and very complex in design. • Continuous inspection and maintenance of permanent left in place bearing in future are required. • Longer programme is expected for underpinning due to the complexity of works.

Since the temporary open deck scheme requires demolition of part of the deck and resulting in exposure of major construction activities, nearby sensitive receivers would experience adverse construction noise and dust impact and require additional mitigation measures. Therefore the underpinning option has been selected as the preferred construction method for HHS and HUH.

As constrained by the existing geographical condition and engineering factors, the approach tracks in north fan area, shunt neck and launching/retrieval and emergency tracks are located at grade level. Therefore, it is considered appropriate to adopt traditional construction methodology as described in **Table 3.2** and it would be futile to seek out alternative construction methods.

Both DIH and KAT would be underground. Their tentative construction methodologies and associated entrances are summarized in **Table 3.4**.

Table 3.4: Tentative Construction Methods for DIH and KAT

Key Design Elements	Tentative Construction Methodologies
KAT	Underground Station • Foundation is constructed by open-cut method. Underground Refuge Sidings • The refuge sidings would be within the temporary works areas of KAT. Typical open cut for tunnel construction as part of the KAT Station construction would be required. KAT Associated Tunnel • Cut and cover
DIH	Underground Station • Station foundation would employ either bored piles or D-walls and the underground structure will be constructed by in-situ concreting • SCL (TAW-HUH) tunnel section approaching to Diamond Hill Station by bored tunnelling. Others such as utility diversion • Typical smaller scale excavation, concreting etc

A cavern station could be constructed by drill-and-blast method to minimise disturbance to surrounding areas, only if it situates within hard rock zone with sufficient rock cover to the station crown. However, DIH and KAT will situate in soft ground, drill-and-blast method would not be applicable and DIH and KAT will adopt cut-&-cover and open cut method respectively.

3.4 Implementation Programme

According to the latest programme, the construction works for the Project would commence in 2012 with completion in 2018.

4 Summary of Key Findings in EIA Study

4.1 General

The EIA Study has been conducted in accordance to the EIA Study Brief No. ESB – 233/2011 and the TM-EIAO. Cumulative impacts with other concurrent projects have been taken into account in the assessment. This Executive Summary highlights the key identified impacts, potential sensitive receivers, proposed mitigation measures. A summary of the environmental impacts associated with the Project is presented in **Appendix A**. The main findings of the EIA Study are summarised below.

4.2 Cultural Heritage Impact

Built heritage survey and archaeological survey have been conducted within the study area of the SCL (HHS). Some archaeological sites and 3 historical buildings have been identified within the Study Area.

The archaeological survey at former Tai Hom Village has revealed the Tang/ Song Dynasty remains to be sparse and redeposited and hence of lesser archaeological significance. Assemblage of Tang/Song archaeological finds within urban setting is however considered rare in Hong Kong. A survey-cum-excavation is therefore recommended to be conducted at the former Tai Hom Village to recover any archaeological remains.

The Project has been designed to totally avoid Lung Tsun Stone Bridge within Kai Tak area. A horizontal buffer zone would be maintained for the Lung Tsun Stone Bridge and Former Kowloon City Pier.

The built heritage within 50m of the Project has also been studied. Two historical structures including former RAF hangar and Old Pillbox are located within the temporary at-grade works sites at the former Tai Hom Village, which would be used for the construction of DIH.

A conservation plan would be separately submitted to agree on the most appropriate approach to preserve these 2 historical buildings. Depending on the recommendations in the conservation plan, part of the hangar together with a model would be displayed and the old pill box would be reinstated within the CDA Site.

Other recorded built heritage items have been surveyed and the impacts to the majority during SCL (TAW-HUH) construction and operation will be minimal.

4.3 Ecological Impact

The ecological baseline has been updated by reviewing available information and the results of ecological surveys of at least 5 months covering both dry and wet seasons. The ecological survey covers 500m of the Project for sections of temporary at-grade works sites.

The Project has avoided impacts on recognized sites of conservation importance (e.g. SSSIs and Country Parks), and other ecological sensitive areas. Literature reviews of existing information with supplement findings from recent field surveys identified that most of the terrestrial within the Study Area are generally of low ecological value.

Terrestrial habitats within the Study Areas are largely Urban/ Residential Areas with high disturbance and low ecological value. Habitats affected will include 0.44 ha of channelised watercourse, 1.35 ha grassland, 1.62 ha plantation and 40.08 ha urban/residential area.

Some plantation trees will be affected at these above-ground works sites. The affected trees are mostly non-native plantation species with little ecological value. Nevertheless, compensatory planting and tree transplantation are required for landscape and visual amenity reasons.

Direct and indirect ecological impacts arising from the Project during the construction and operational phase have been identified and evaluated. Impacts are considered to be of low significance. Other indirect impacts arising from the Project would be temporary and considered as negligible in nature.

Indirect impacts arising from the Project would be temporary and considered as negligible in nature. Overall, no significant and unacceptable ecological impacts to terrestrial resources were anticipated.

4.4 Landscape and Visual Impact Assessment

The proposed works will inevitably result in some landscape and visual impacts during construction and operation phases. These impacts have been minimized through careful consideration of alternatives, minimization of works sites, incorporation of aesthetic external designs and landscape treatments of proposed aboveground structures which include ventilation shafts, CLP transformer plant, noise semi enclosure and vertical noise barriers at Hung Hom, as well as entrances and ventilation shafts at Kai Tak and Diamond Hill Stations..

Having reviewed the Outline Zoning Plans within the Study Area, it is considered that the proposed Project would fit in well with the current and future planning settings and would not conflict with statutory town plans of the areas.

Approximately 405 existing trees will be affected by the proposed works, of which approximately 45 trees will be transplanted and approximately 360 trees will be felled. The affected trees vary from small to mature size. None of these are Registered Old and Valuable Trees. There are no rare species or endangered species but only common species. Under the proposed scheme for the Project, opportunities for tree compensation within the Project boundary has been fully explored and incorporated in the proposed mitigation measures as much as practicable. Tree removal application and compensatory planting proposal will be prepared and submitted to seek approval from relevant authorities in accordance with ETWBTC 3/2006 requirements, prior to construction of the Project.

There would not be any temporary and permanent loss of existing open space due to the Project. All landscape areas that will be temporarily alienated will be reinstated on a like to like basis after completion of temporary works. Meanwhile, in addition to the compensated trees, new landscape resources such as green roof and climbers are proposed as far as practicable to optimize greening opportunities within the Project boundary. It is considered that with the proposed compensated trees and the proposed new landscape resources, the overall residual impact on existing trees and greenery would be reduced to an acceptable level.

The proposed works are within Transport Corridor at Hung Hom, City Centre of Kai Tak Development and CDA site in Diamond Hill. During construction phase, there would be moderate to insubstantial residual impact. The residual impact would be further reduced to slight to insubstantial in Day 1 and Year 10 of Operation.

Due to the large scale of construction works proposed in Hung Hom, Kai Tak and Diamond Hill, there would inevitably slight to substantial residual visual impact during construction phase. With the implementation of proposed mitigation measures, the residual impact in Day 1 and Year 10 of Operation will be reduced to slight to insubstantial.

Overall, it is considered that the residual landscape and visual impacts of the proposed project are considered acceptable with mitigation measures to be implemented during construction and operation phases.

4.5 Air Quality Impact

Potential dust impact would be generated from the soil excavation activities, backfilling, site erosion, storage of spoil on site, transportation of soil during the construction of SCL (HHS).

Quantitative fugitive dust assessments have been conducted, taking into account the cumulative impact caused by nearby concurrent projects. Effective dust control following the requirements given in the Air Pollution Control (Construction Dust) Regulation and in accordance with the EM&A programme during construction are recommended. Assessment results suggested that watering at construction sites once per hour would be required to control the fugitive dust impact to acceptable levels.

4.6 Airborne Noise Impact

4.6.1 Construction Noise

Potential construction noise impacts would be caused by various construction activities including excavation, backfilling and construction of superstructure etc.

Construction noise assessment has concluded that the unmitigated construction noise impacts would be high at some NSRs. Suitable noise mitigation measures have therefore been identified which could reduce the noise impacts at most of the NSRs. Careful selection of construction equipment and working methods including the use of quiet plant are adopted, where practicable. Other measures including good site practice, the use of site hoarding, installation of movable barriers, enclosure and acoustic mat have been recommended. The predicted noise levels contributed from the Project would all comply with the corresponding noise criteria, except for a few NSRs near the works areas of SCL(TAW-HUH) or SCL (MKK-HUH) where residual impacts would be resulted due to cumulative impacts. All practicable mitigation measures of the concurrent projects have been exhausted and the residual impacts have been minimised.

4.6.2 Operational Noise

Operational noise impacts associated with railways and fixed noise sources have also been investigated. The SCL (HHS) would be constructed underground for DIH and KAT and at-grade section at Hung Hom. Airborne noise associated with the operation of railway would be minimized by the underground design in DIH and KAT. Mitigation measures in the form of semi-enclosure and vertical barriers have been recommended for the section near HUH and HHS.

Fixed noise sources during the operational phase ventilation shafts and transformer plant in the station and stabling sidings. Operational noise impacts can be effectively mitigated by implementing noise control treatment (e.g. acoustic silencers and louvers) at source during the design stage to control the noise levels to be within the stipulated noise criterion.

4.7 Groundborne Noise

Potential construction groundborne noise impacts may arise from tunnel boring activities. Groundborne noise assessment has been conducted for the sensitive receiver along the bored tunnel in Diamond Hill. Predicted results suggested that construction groundborne noise level will be within the statutory requirements and mitigation measures are not required.

Operational groundborne noise impacts have been assessed at representative sensitive receivers for the Project. The predicted groundborne noise would be within the statutory requirements and mitigation measures would not be required.

4.8 Water Quality

Potential water pollution sources have been identified as construction runoff, sewage from site workforce, groundwater seepage and accidental spillage. Mitigation measures including covering excavated materials and providing sedimentation tanks on-site etc are recommended to control any potential water quality impacts.

The operational water quality impact for track run-off and tunnel seepage will have no adverse water quality impact provided that mitigation measures are incorporated in the design.

4.9 Waste Management

The quantity and timing for the generation of waste during the construction phase have been estimated.

Measures, including the opportunity for on-site sorting, reusing excavated fill materials etc, have been maximised in the construction methodology to minimise the surplus materials to be disposed off-site via barging facilities. The annual disposal quantities for C&D materials and their disposal methods have also been assessed. Surplus rock and spoil materials could be accepted by other projects.

General refuse, industrial waste and chemical waste generated during the operational phase have been assessed. Recommendations such as regular collection of general and industrial wastes by reputable waste collector, proper labelling and storage of chemical wastes have been made to ensure proper treatment and disposal of these wastes.

4.10 Land Contamination

A land contamination assessment has been conducted for the Project. A Contamination Assessment Plan (CAP) has also been prepared to present the review findings of previous site investigations and set out the requirements for a contamination evaluation of the Project. No adverse land contamination issue would be anticipated within or in close proximity to the Project site boundary.

4.11 Environmental Monitoring and Auditing Requirements

An EM&A programme will be implemented throughout the entire construction period to regularly monitor the environmental impacts on the neighbouring sensitive receivers. Any action required during the construction phase is also recommended for implementation.

The EM&A programme would include site inspection / audit and monitoring for construction dust, construction airborne noise, operation groundborne noise and updating changes as necessary. Details of the recommended mitigation measures, monitoring procedures and locations are presented in a standalone EM&A Manual.

5 Overall Conclusion

An EIA Report has been prepared to fulfil the requirements as specified in the EIA Study Brief No ESB-233/2011 and the TM-EIAO. All the latest design information has been incorporated into the EIA process. The aspects that have been considered in this EIA Report include:

- Consideration of alternative options;
- Description of construction and operational activities;
- Impact on cultural heritage;
- Ecological impact;
- Landscape and visual impact;
- Air quality impact;
- Airborne noise impact;
- Groundborne noise impact;
- Water quality impact;
- Waste management implications;
- Land contamination impact; and
- EM&A requirements

Overall, the EIA Report has predicted that the Project would be environmentally acceptable and individual impacts are minimized with the implementation of the proposed mitigation measures for construction and operational phases. An environmental monitoring and audit programme has been recommended to check the effectiveness of recommended mitigation measures.

FIGURES

SCL (TAW-HUH)

Diamond Hill Station (DIH)

Kai Tak Station (KAT)

Kai Tak Refuge Siding

SCL (MKK-HUH)

Hung Hom Station (HUH)

Hung Hom Stabling Sidings (HHS)

SCL (HUH-ADM)

0 150 300 450 600 750

LEGEND :

- Proposed SCL Alignment (Under Separate EIAs)
- SCL (TAW-HUH) Alignment to be Modified under the Project
- Kai Tak Refuge Sidings & KAT Associated Tunnels
- HHS Tracks
- Proposed Station / Station Modification
- Hung Hom Stabling Sidings

PLOT DRV: $PLTDRVL$
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FILENAME: $FILE$
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REV	DESCRIPTION	BY	DATE	APPROVED
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SHATIN TO CENTRAL LINK

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CADD REF.

TITLE

NEX2206 – SCL(HHS)
STABLING SIDINGS AT HUNG HOM FREIGHT YARD
Overview of the Project

SCALE	DRAWING NO.	REV.
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APPENDIX A

Summary of Environmental Impacts Associated with the Project

Summary of Environmental Impacts Associated with the Project

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)
Cultural Heritage					
Construction Phase					
Archaeological Sites	Former Tai Hom Village • The presence of the sparse Tang/ Song Dynasty layer extends to the north-eastern part of the former Tai Hom Village site would be directly impacted by the construction of the proposed DIH at Diamond Hill Lung Tsun Stone Bridge and Former Kowloon City Pier • The remains of the Lung Tsun Stone Bridge and former Kowloon City Pier would not be affected by the construction of the proposed KAT and refuge sidings at Kai Tak	• Guidelines for Cultural Heritage Impact Assessment • EIAO-TM Annex 10 and Annex 19	• Not Applicable	Former Tai Hom Village • A survey-cum-excavation works to be conducted prior to the construction works at the former Tai Hom Village. An Archaeological Action Plan (AAP) following the Guideline for Archaeological Impact Assessment should be submitted to the Antiquities and Monuments Office (AMO) for agreement. Lung Tsun Stone Bridge and Former Kowloon City Pier • A buffer zone for Lung Tsun Stone Bridge and Former Kowloon City Pier would be maintained	• No adverse residual impacts would be anticipated.
Built Heritages	Former Royal Air Force Hangar • The entire structure of the Former Royal Air Force Hangar	• Guidelines for Cultural Heritage Impact Assessment	• Not Applicable	Former Royal Air Force Hangar • Documentation prior to disassembling, temporary	• No adverse residual impacts would be anticipated.

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)
	will be directly impacted by the construction of the DIH <u>Old Pillbox</u> • The proposed east end of the DIH station box will encroach onto the footprint of the Old Pillbox <u>Stone House</u> • There will not be any impact on the Stone House as it is located outside the temporary at-grade works sites	• EIAO-TM Annex 10 and Annex 19		storage of portions of historical interest • Display of retained portions and a model (as per the conservation plan) within CDA site <u>Old Pillbox</u> • Documentation prior to disassembling, temporary storage • Reinstatement (as per the conservation plan) within CDA site	
Operational Phase					
Archaeological Sites	<u>Former Tai Hom Village</u> • Recommended mitigation measures would be conducted prior to the construction and thus further mitigation measure during the operational phase is therefore not considered necessary <u>Lung Tsun Stone Bridge and Former Kowloon City Pier</u> • No impacts anticipated during	• Guidelines for Cultural Heritage Impact Assessment • EIAO-TM Annex 10 and Annex 19	• Not Applicable	<u>Former Tai Hom Village</u> • No mitigation measures are recommended during operational phase. <u>Lung Tsun Stone Bridge and Former Kowloon City Pier</u> • No mitigation measures are recommended during operational phase.	• No adverse residual impacts would be anticipated.

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)
	operation phase of the Project due to its considerable distance from proposed KAT and refuge sidings				
Built Heritages	<u>Former Royal Air Force Hangar</u> • As detailed photographic and cartographic records are recommended to document the Hangar prior to disassembling them, no further mitigation measure is required during the operational phase of the Project <u>Old Pillbox</u> • As detailed photographic and cartographic records are recommended to document the Pillbox prior to disassembling them, no further mitigation measure is required during the operational phase of the Project	• Guidelines for Cultural Heritage Impact Assessment • EIAO-TM Annex 10 and Annex 19	• Not Applicable	<u>Former Royal Air Force Hangar</u> • No mitigation measures will be required for the built heritage <u>Old Pillbox</u> • No mitigation measures will be required for the built heritage	• No adverse residual impacts would be anticipated.
<u>Ecology</u>					
Construction Phase					
Ecological resources	<u>Habitat Loss (Project Site)</u>	• EIAO-TM Annex 8 and	• Not Applicable	• Habitat loss restricted to areas	• Residual ecological

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)
within and in the vicinity of the Project area	• Habitats affected will include 0.44 ha of channelised watercourse, 1.35 ha grassland, 1.62 ha plantation and 40.08 ha urban/ residential area <u>Tree Felling</u> • Plantation trees (mostly non-native) will be affected (transplanted or felled) <u>Disturbance</u> Indirect impacts which cause local disturbance to habitats and fauna <u>Water Quality</u> • Indirect impact associated with construction site run-off to channelised watercourse and associated fauna.	Annex 16 • Forests and Countryside Ordinance (Cap. 96) • Wild Animals Protection Ordinance (Cap. 170) • Country Parks Ordinance (Cap. 208) • Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586) • IUCN Redlist		of low ecological value • Tree compensation will be made according to ETWB TCW No. 3/2006 as far as practicable • Good site practice	impacts resulting from the proposed works would largely be limited to the loss of relatively low ecological value habitats. Residual impacts on terrestrial ecology caused from the Project are considered as very minor and acceptable
Operational Phase					
Ecological resources within and in the vicinity of the Project area	<u>Flora and fauna</u> • Indirect	• EIAO-TM Annex 8 and Annex 16 • Forests and Countryside Ordinance (Cap. 96) • Wild Animals	• Not Applicable	• No mitigation would be required	• No adverse residual impacts would be anticipated.

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)
		Protection Ordinance (Cap. 170) • Country Parks Ordinance (Cap. 208) • Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586) • IUCN Redlist			
Landscape and Visual					
Construction Phase					
Landscape Resources (LRs), Landscape Character Areas (LCAs) within the Study Area Visually Sensitive Receivers (VSRs) within the Primary Zone of Visual Influence	• Substantial to insubstantial significance on LRs within the Study Area • Moderate to insubstantial significance on LCAs within the Study Area • Substantial to slight significance on VSRs within Primary Zone of Visual Influence	• EIAO (Cap. 499). • EIAO-TM Annex 10 and Annex 18 • ETWB TC(W) No. 2/2004 • ETWB TC(W) No. 3/2006	• Not Applicable	• CM1 - Decorative Hoarding • CM2 - Management of facilities on work sites • CM3 - Tree Transplanting	• Substantial to insubstantial significance on LRs within the Study Area • Moderate to insubstantial significance on LCAs within the Study Area • Substantial to slight significance on VSRs within Primary Zone of Visual Influence

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)
Operational Phase					
Landscape Resources (LRs), Landscape Character Areas (LCAs) within the Study Area Visually Sensitive Receivers (VSRs) within the Primary Zone of Visual Influence	• Substantial to insubstantial significance on LRs within the Study Area • Slight to insubstantial significance on LCAs within the Study Area • Moderate to slight significance on VSRs within Primary Zone of Visual Influence	• EIAO (Cap. 499). • EIAO-TM Annex 10 and Annex 18 • ETWB TC(W) No. 2/2004 • ETWB TC(W) No. 3/2006	• Not Applicable	• OM1 - Compensation Tree Planting • OM2a - Screen Planting • OM2b - Landscape Re-instatement • OM3 - Aesthetic landscape and architectural treatment on Station / Entrances/ Ventilation Shaft • OM5 - Re-instatement of excavated area • OM7 - Aesthetic landscape and architectural treatment for DIH • OM8 - Roof greening of large built structures • OM9 - Aesthetic design on Noise Barrier	• Slight to insubstantial significance on LRs within the Study Area in Year 10 of operation • Slight to insubstantial significance on LCAs within the Study Area in Year 10 of operation • Slight to insubstantial significance on VSRs within Primary Zone of Visual Influence in Year 10 of operation
<u>Construction Dust</u>					
Construction Phase					
Existing residential, premises, educational,	• 1-hour Average TSP Conc.:	• EIAO-TM and AQO	• Exceed EIAO-TM (1-hr) criterion by up to 2579	• Watering on the active works areas, exposed areas and	• The mitigated impact prediction results for 1-

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)
industrial, clinic/ home for the aged, worship, government, institution and community and performance art centres in Hung Hom, Kai Tak and Diamond Hill Future residential premises in Hung Hom and Kai Tak area 50 assessment points	294 – 3079 µg/m^3 • 24-hour Average TSP Conc.: 127 – 1102 µg/m^3 • Annual Average TSP Conc.: 75.5 – 83.3 µg/m^3	• 1-hr Average TSP Conc: 500 µg/m^3 • 24-hr Average TSP Conc: 260 µg/m^3 • Annual Average TSP Conc: 80 µg/m^3	µg/m^3 • Exceed AQO (24-hr) criterion by up to 842 µg/m^3 • Exceed AQO (Annual) criterion by up to 3.3 µg/m^3	paved haul roads to reduce dust emission • Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices would be carried out to further minimise construction dust impact.	hr, 24-hr and Annual Average TSP Conc. are as follows. • 1-hour Average TSP Conc.: 137 – 484 µg/m^3 • 24-hour Average TSP Conc.: 89 – 202 µg/m^3 • Annual Average TSP Conc.: 75.3 – 78.3 µg/m^3 • No adverse residual 1-hr, 24-hr and annual dust impacts would be anticipated.
Operational Phase					
As the train will be electrically operated, air quality impact is therefore not anticipated during operational phase.					
<u>Airborne Noise</u>					
Construction Phase					
Existing residential premises and educational institutions in Hung Hom and Diamond Hill	• Predicted noise levels would range from 62 to 90 dB(A)	• EIAO-TM Annex 5 for non-restricted hours for domestic premises: 75 dB(A), for educational institution is 70 dB(A) (65 dB(A) during	• Exceed the EIAO-TM noise criterion by up to 15 dB(A)	• Adoption of good site practices, optimisation of construction methodology, quieter plant, temporary movable noise barriers enclosure and acoustic	• The mitigated predicted noise levels for the Project alone would range from 55 to 75

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)
Future residential premises in Kai Tak and Diamond Hill 24 assessment points		examination period).		mat to minimise construction noise impact	dB(A) • Residual cumulative impact of 3 dB(A) for 1 month at NSR HUH-1-3 (Wing Fung Building) due to construction induced from the Project, SCL (TAW-HUH), SCL(MKK-HUH), SCL(HUH-ADM) and KTE. It is considered that all practicable measures have been exhausted to minimise the residual impact.
Operational Phase (Railway Noise)					
Existing residential premises in Hung Hom. 6 assessment points	Daytime($L_{eq\ 30mins,\ dB(A)}$) Predicted noise levels would be in the range of 38 to 53 dB(A) Night-time ($L_{eq\ 30mins,\ dB(A)}$) • Predicted noise levels would be in the range of 38 to 53 dB(A)	• EIAO-TM Annex 5: ANL	• No exceedance was anticipated.	• Implementation of noise barrier and semi-enclosure during the design stage	• No adverse residual impacts would be anticipated.
Operational Phase (Fixed Noise)					
Existing residential	• Maximum sound power level was	• EIAO-TM Annex 5:	• No exceedance was	• Louvers should be orientated	• No adverse residual

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)
premises in Hung Hom, Kai Tak and Diamond Hill 21 assessment points	predicted to meet the relevant noise criteria	ANL-5dB(A)	anticipated.	away from adjacent NSRs, preferably onto main roads which are less sensitive. • Direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosures should be allowed for in the design for the ventilation shafts, stations and stabling sidings. • The façade for these plant areas/ ventilation shafts should have adequate sound insulation properties to minimise the noise emanating through the building fabric.	impacts would be anticipated.
Groundborne Noise					
Construction Phase					
Existing residential premise in Diamond Hill. 1 assessment point	Daytime • 36 dB(A) for residential NSR	• TM-Places • Daytime: 65 dB(A) for residential premises	• No exceedance was predicted.	• No mitigation would be required.	• No adverse residual impacts would be anticipated.
Operational Phase					
Existing residential premises in Hung Hom and Diamond Hill	Daytime ($L_{eq\ 30mins,\ dB(A)}$) Predicted operation ground-borne	• TM-Places • Operational ground-	• No exceedance was predicted.	• No mitigation would be required.	• No adverse residual impacts would be

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)
Future residential premises in Kai Tak and Diamond Hill. 10 assessment points	noise levels would range from <20 to 43 dB(A) during daytime Nighttime ($L_{eq\ 30mins,\ dB(A)}$) • Predicted operation ground-borne noise levels would range from <20 to 40 dB(A) during nighttime.	borne noise criterion: 55 dB(A) during daytime, and 45 dB(A) during nighttime			anticipated.
Water Quality					
Construction Phase					

Kai Tak Nullah	• Water quality would be affected.	• EIAO-TM;
		• Water Pollution Control Ordinance (WPCO) (Cap. 358);
		• Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS);
		• Practice Note for Professional Persons (ProPECC) PN 1/94
			• No exceedance was predicted.	• Appropriate and practicable mitigation measures have been proposed to control the following:
				  • Construction Runoff and Site Drainage;
				  • Tunnelling Works and Underground Works;
				  • Sewage Effluent;
				  • Groundwater Seepage; and
				  • Accidental Spillage
					• No unacceptable water quality impacts would be anticipated.

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)
Operational Phase					
Kai Tak Nullah	• Water quality would be affected.	• Relevant standards/ criteria stipulated under the EIAO-TM, WPCO, TM-DDS and ProPECC 5/93	• No exceedance was predicted	• Appropriate and practicable mitigation measures have been proposed to control runoff from train stabling sidings	• No unacceptable water quality impacts would be anticipated.
Waste Management					
Construction Phase					
Not applicable	• Inert C&D Materials from construction and excavation works with a total volume of approximately 1,376,660m^3 • 36,930 m^3 of non-inert C&D material. • General refuse from workforce with a daily volume of 300 kg • Chemical waste from equipment cleansing and maintenance activities	• EIAO-TM Annex 7 and Annex 15 • Waste Disposal Ordinance (Cap. 354); • Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C); • Land (Miscellaneous Provisions) Ordinance (Cap. 28); • Public Health and Municipal Services Ordinance (Cap. 132) - Public Cleansing and Prevention of	• Not applicable.	• C&D wastes would be reused (i.e. within the site and other concurrent projects) as far as practicable before off-site disposal	• No adverse residual impacts would be anticipated.

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)
		Nuisances Regulation; • Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N); and • Dumping at Sea Ordinance (Cap. 466).			
Operational Phase					
Not applicable	• Insignificant amount of general refuse, industrial waste and chemical wastes to be generated from the cleansing and maintenance activities of the Project.	• Waste Disposal Ordinance (Cap. 354); and • Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C).	• Not applicable.	• Employ reputable waste collector to remove general refuse and industrial wastes from the stations on a daily basis. • Follow Code of Practice on the Packaging, Labelling and Storage of Chemical Waste in handling of chemical waste. • Employ licensed waste collector and trip-ticket system for the collection of chemical waste.	• No adverse residual impacts would be anticipated.
Land Contamination					
Construction Phase					

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)
Potential land contamination sites within the Project Area	• No soil or groundwater contamination was identified and therefore no remediation is required.	• Section 3 (Potential Contaminated Land Issues) of Annex 19 "Guidelines for Assessment of Impact on Sites of Cultural Heritage and Other Impacts" of the EIAO-TM. • Guidance Note for Contaminated Land Assessment and Remediation" • Practice Guide for Investigation and Remediation of Contaminated Land • Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management	• Not Applicable	• Not Applicable	• No adverse residual impacts would be anticipated.
Operational Phase					
Not Applicable					