
Shatin to Central Link

Project Profile for Optimized SCL Conforming Scheme (East West Railway Corridor)

April 2004



沙田至中環線
Shatin to Central Link



**ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (CAP499)S.5(1)(A)
PROJECT PROFILE FOR OPTIMIZED SCL CONFORMING SCHEME (EAST WEST RAILWAY
CORRIDOR)**

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1 BASIC INFORMATION

1.1 PROJECT TITLE

Optimized Shatin to Central Link (SCL) Conforming Scheme - East West Railway Corridor (Tai Wai to Hung Hom).

1.2 PURPOSE AND NATURE OF THE PROJECT

Construction and operation of SCL was awarded to Kowloon-Canton Railway Corporation (hereinafter, the Corporation) in June 2002. Submission of SCL project profile for the application of EIA study brief was made to EPD on 7 October 2002. The study brief for the SCL conforming scheme was issued by EPD on 19 November 2002 (ESB-106/2002).

Throughout the design development of the conforming SCL scheme, engineering feasibility and site investigation work was undertaken to determine all the technical parameters for the construction of the conforming scheme. In parallel, the Corporation has also studied alternative proposals to enhance the overall rail network for the benefit of the travelling public and the local community and by taking account of all interfacing projects and constraints. Subsequent to this study, the conforming scheme was optimised and developed into two railway corridors, namely the East West Railway Corridor and the North South Railway Corridor. This project profile covers only the East West Railway Corridor of Optimised SCL Conforming Scheme and two Automated People Mover Systems (hereinafter, the Project).

The Project consists of a similar alignment to SCL conforming scheme from Tai Wai to Hung Hom, except for the proposed Tsz Wan Shan station which has been replaced by an automated people mover (APM) system and the To Kwa Wan and Ma Tau Wai stations which have been combined. The section south of Hung Hom will form part of the proposed North South Railway Corridor which is covered under a separate project profile.

The East West Railway Corridor will connect Ma On Shan (MOS) Rail to its north, and provide a connection to the West Rail (WR) through the East Rail Extension (ERE) and the Kowloon Southern Link (KSL) to form a strategic rail corridor running between Wu Kai Sha and Tuen Mun. In addition to the proposed APM system connecting to Whampoa area, a separate APM system has been proposed to connect Diamond Hill Station with Tsz Wan Shan.

This new strategic railway corridor will maintain the commitment made to the residents of the Ma On Shan area for the provision of a through connection to the main urban area. It will also provide an additional rail corridor from North East New Territories to Kowloon to relieve the East Rail bottleneck at Beacon Hill Tunnel and increase significantly the West Rail patronage by redistributing passenger flows and relieving the existing congested railway corridors in Kowloon.

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1.3 NAME OF THE PROJECT PROPONENT

Kowloon-Canton Railway Corporation (KCRC).

1.4 LOCATION AND SCALE OF PROJECT AND HISTORY OF THE SITE

The Project comprises a new railway running from Tai Wai to Hung Hom enabling the extension of Ma On Shan Railway (MOSR) to Kowloon and to provide a through service with West Rail. Major components of the project include the following: -

- a) Separate modifications to KCRC's Ma On Shan Railway (MOSR) in Tai Wai which is currently under construction
- b) Running line from Tai Wai station (TAW) through to the Diamond Hill station (DIH) with a tunnel ventilation building at Hin Keng;
- c) An automatic people mover system of about 1.1km long to provide a link between Tsz Wan Shan area and DIH (TWS APM);
- d) A running line between Diamond Hill to Hung Hom, with an underground station at Kai Tak (KTA) within the South East Kowloon Development (SEKD) area, two underground stations at Ma Tau Wai (MTW) and Ho Man Tin (HMT), and a Mass Transportation Centre (MTC) at Hung Hom (HUH) with an approach tunnel connection for West Rail Diversion;
- e) A people mover system of about 1.2km to connect Whampoa area and the HUH MTC (WAPM);
- f) An at-grade maintenance centre at the former Kai Tak Airport Passenger Terminal site for stabling and casual maintenance of the rolling stock;
- g) An aboveground depot adjacent to the SCL DIH station for the support and stabling of the TWS APM system; and
- h) An at-grade depot situated within a vacated residential R(A) site in the junction at Tai Wan Road for the support and stabling of the WAPM system.

The locations of the alignment are shown on Drawing Nos. SCL002/CD/S0566 to SCL002/CD/S0568.

Running Line from Tai Wai to Diamond Hill

The first 1.3km adjacent to the Tai Wai Maintenance Centre (TMC) will be constructed on a retained embankment. The railway then moves onto a 350m long

viaduct followed by 280m of cutting leading to the Hin Keng tunnel portal where a tunnel ventilation building will be located.

The 3.8km tunnel between the Hin Keng Portal and the DIH station is located beneath the Lion Rock Country Park and the WSD High Island Water Tunnel and will be constructed using drill and blast techniques through the hard rock sections. The length of tunnel approaching Diamond Hill will be bored in mixed ground mainly requiring the use of a tunnel boring machine (TBM) and, depending on the exact ground condition, some stabilization pre-treatment.

Tsz Wan Shan Automated People Mover System (TWS APM)

For the Tsz Wan Shan area, an automated people mover system (APM) will be constructed to link the area with Diamond Hill Station. The APM is a driverless system with a route length of about 1.1km which is predominantly on viaduct. There will be two stations: one above the future KCRC Diamond Hill Station and another at the terminus at Tsz Lok Estate in Wan Wah Street.

Diamond Hill Station (DIH)

DIH is a five-level structure which will be located within the Diamond Hill Comprehensive Development Area on the site of the former Tai Hom Village. The station will be separated from the existing MTR Diamond Hill station by Lung Cheung Road. The concourse will be at about the same level as the MTR station and the concourses will be connected by adits. There will be shared entrances and new entrances. The station will be constructed by cut and cover methods.

Running Line from Diamond Hill to Kai Tak

The route falls within the former Tai Hom Village site at Diamond Hill and the former airport site at Kai Tak which is due for redevelopment under the South East Kowloon Development (SEKD). The tunnel section between Diamond Hill and Kai Tak will be constructed by the cut and cover methods.

Kai Tak Station (KTA)

KTA will be located on the former airport site and offset from the new Road D1 proposed as part of the SEKD. The station will have an underground platform but at-grade concourse which allows future integration with the SEKD.

The Approaches to Kai Tak Maintenance Centre

The approach tunnels will be constructed as a spur off the main running line to the Kai Tak Maintenance Centre (KMC). The tracks will emerge from a concrete box from the tunnel end to existing ground level just outside the track fan that will lead to the stabling area. The underground section of the approach tunnels will be built using the cut and cover methods.

Kai Tak Maintenance Centre (KMC)

KMC will be designed as an adjunct to the West Rail maintenance centre at Pat Heung and supplement the maintenance centre under construction at Tai Wai. The KMC is generally intended to be used for overnight stabling although tracks will be provided for maintenance to avoid the need to interrupt planned maintenance schedules at Pat Heung.

The stabling area will be about 400 metres long overall and will provide stabling for twelve 8-car trains and two heavy cleansing tracks at Day One operation and increasing to eighteen 8-car trains by 2031. The tracks within the maintenance centre will be at ground level and workshops, offices, plant-rooms and rest areas will be located in a building in the northeast quadrant of the maintenance centre between Prince Edward Road East and the stabling tracks.

Running Line between Kai Tak and Shansi Street

The tunnels will be bored from a temporary launching shaft adjacent to KTA within the SEKD area to Shansi Street using TBM. The shaft will be constructed of in-situ or diaphragm walls. The section of tunnel between the shaft and KTA will be built using cut and cover methods and will be integrated into the SEKD drainage culvert works. The launching shaft will form the start of a continuous tunnel sequence which will extend to a portal located approximately 300m north of Hung Hom. The TBM will pass through the SEKD, along To Kwa Wan Road, Chatham Road North to an extraction shaft at Shansi Street.

Ma Tau Wai Station (MTW)

MTW will be located within an area of established development. Situated under To Kwa Wan Road, the station will be positioned to the south of the Ma Tau Kok Gas Production Plant. The station box will be constructed by the cut and cover methods using diaphragm walls or pipe-piles.

Running Line between Shansi Street and Hung Hom Mass Transportation Centre (HUHMTC)

The tunnels from the Shansi Street shaft to Ho Man Tin station will be located within rock and will be constructed by drill and blast methods. The tunnel from Ho Man Tin station and the portal north of HUHMTC will pass through mixed ground requiring the use of a tunnelling shield and advanced ground stabilisation or by TBM. The tunnelling shield or TBM will be removed at the portal. Spoil removal will utilise the facilities and systems established for the Ho Man Tin station construction. The section of line between the tunnel portal and HUHMTC will be constructed by the cut and cover methods. The elements will be formed by diaphragm or in-situ concrete walls.

Ho Man Tin Station (HMT)

HMT will be adjacent to the redevelopments at Valley Road Estate. It will be located underneath Yan Fung Street, Fat Kwong Street and Shun Yung Street. The majority of the cavern will be underneath an existing slope. The northern end is under an abandoned quarry. The platform and concourse will be constructed within a cavern connected by adits to entrances. The cavern will be mined, by drill and blast methods, from two shafts located at each end of the cavern.

Hung Hom Mass Transportation Centre (MTC)

Construction works at Hung Hom will largely be undertaken under the existing podium. The key features of the two-way interchange at the Hung Hom MTC being the follows:

- West Rail tracks realigned to new at-grade platforms located within the new MTC with a diversion passing through the site after relocation of the International Mail Centre building;
- MOSR tracks extended into the through running West Rail platform;
- East Rail tracks laid directly beneath the re-aligned West Rail platform;
- Whampoa APM System integrated into the north end of the station;
- Through running services for East Rail and West Rail being established; and,
- Convenient links to the public transport interchange being provided.

Whampoa Automated People Mover System (WAPM)

For the Whampoa area, an APM system will be constructed to link with Hung Hom MTC. The WAPM will be a driverless people mover system with a route length of about 1.2km. The proposed alignment of the PMS runs north of Hung Hom station and across the KCRC's freight yard before passing beneath the piers of Hung Hom Bypass. Constructed on viaduct it then follows Hung Hom South Road to the Hung Hom Road junction before descending into tunnel to approach a station at the junction of Tak Man Street, Hung Hom Road and Whampoa station (WHA). Thereafter rising to continue at grade adjacent to the Hung Hom Road to the terminal station at the junction of Man Yue Street and Hung Hom Road, Whampoa North station (WHN).

1.5 NUMBER AND TYPES OF DESIGNATED PROJECTS

The proposed project is a single project comprising a railway and its associated stations and depots as defined under Schedule 2, Part I, Categories A.2, A.4, A.7 and A.8 of the Environmental Impact Assessment Ordinance.

1.6 NAME AND TELEPHONE NUMBER OF CONTACT PERSONS

The contact person is Mr Richard Kwan, Environmental Manager, Kowloon-Canton Railway Corporation, telephone no. 2684 8382.

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 PROJECT PLANNING AND IMPLEMENTATION

The whole project will be planned and implemented by KCRC in-house departments together with external consultants and contractors. The works contracts will be procured by a combination of “Design and Build” and “Engineer’s Design” contract arrangement, under the management of KCRC.

2.2 PROJECT PROGRAMME

The design contracts were awarded in early 2003 and the works contracts are scheduled to be awarded after Exco Approval is obtained, which is envisaged in the last quarter of 2005. The Project will have a phased completion for each of the extensions. It is anticipated that the MOS extension Tai Wai to Diamond Hill link will be completed in 2010, and the full MOS extension to HUH by 2011.

2.3 PROJECT INTERFACE

The railway alignment will be constructed predominantly in tunnel, apart from the section between Tai Wai and Hin Keng, the KMC and part of the approach track, a portion of the section between Hung Hom station and the portal to its north, and some sections of the two APM systems. No insurmountable impacts on any existing or planned projects have been identified. Committed and planned projects that may interface with the project are listed in the table below.

Stations/ Running Lines	Potential Interface Project
Tai Wai to Hin Keng	<ul style="list-style-type: none"> • Trunk Road T4 • Route 9 • Planned Development above TAW Maintenance Centre
Diamond Hill Station	<ul style="list-style-type: none"> • Planned HKHA Development at former Tai Hom Village
Diamond Hill to Kai Tak	<ul style="list-style-type: none"> • South East Kowloon Development
Kai Tak Station	<ul style="list-style-type: none"> • South East Kowloon Development
Kai Tak Maintenance Centre	<ul style="list-style-type: none"> • South East Kowloon Development
Kai Tak to Ma Tau Wai	<ul style="list-style-type: none"> • South East Kowloon Development • Planned Central Kowloon Route
Ho Man Tin Station	<ul style="list-style-type: none"> • Redevelopment of Valley Road Estate • Planned MTRC Kwun Tong Line Extension
Hung Hom Mass Transportation Centre	<ul style="list-style-type: none"> • Kowloon Southern Link • Planned Relocation of International Mail Centre • Planned Fifth Rail Harbour Crossing

3 POSSIBLE IMPACTS ON THE ENVIRONMENT

3.1 OUTLINE OF PROCESSES INVOLVED

A summary of processes involved in construction of the project and the associated environmental impacts during construction and operational phases is provided below.

Whilst electrified rail is considered an environmental friendly mode of transport, construction of the project will inevitably lead to certain levels of environmental impacts, but state of the art mitigation measures will be designed in consultation with the authorities, and diligently applied in order to mitigate the impact to an acceptable level.

3.1.1 Worksites

Worksites and works areas will be proposed at suitable locations along the alignment to support the railway construction works.

3.1.2 Cut and Cover Construction

Cut and cover methods will likely be adopted for the construction of the running tunnel from DIH to KTA, KTA to TBM launching shaft at Kai Tak, all stations except HMT, TBM launching and reception shafts (at Wong Tai Sin, Kai Tak, Shansi Street and Ho Man Tin) and parts of the APM between Hung Hom and Whampoa. Either “bottom-up” or “top-down” sequences may be selected in the cut and cover works. These methods rely on forming a cofferdam (by the installation of pipe pile walls, diaphragm walls, sheet pile wall, or contiguous bored pile walls) and excavating from within the cofferdam. The cofferdam will be suitably anchored or propped laterally to allow safe excavation and construction.

3.1.3 TBM Construction

TBMs will likely be used for the construction of the tunnels between Wong Tai Sin and north of DIH and between Kai Tak and Shansi Street, and between HMT and the portal north of Hung Hom stations.

3.1.4 Drill and Blast /Cavern Construction

Drill and blast methods will be adopted in construction of the tunnel section from Hin Keng to north of DIH, and between Shansi Street and HMT station.

HMT station will be constructed using drill and blast methods. The rock caverns are self standing structures with support provided by rock bolts or anchors to strengthen the rock where jointings or fissuring are evident at the rock surface. A permanent lining will also be provided which will improve the stability and durability of the cavern structure.

3.1.5 Demolition

Some existing structures will be demolished to enable the construction of the railway infrastructure. The demolition will be carried out using traditional methods and the demolition waste disposed as designated disposal areas.

3.2 POTENTIAL ENVIRONMENTAL IMPACTS: CONSTRUCTION PHASE

The following sections describe the potential environmental impacts during construction phase, which will be alleviated by effective and pragmatic mitigation measures designed according to the assessed levels of impact.

3.2.1 Air Quality

Potential air quality impacts may arise from fugitive dust emissions generated by construction activities such as excavation, cutting, filling, concrete batching, rock crushing, stockpiling and construction vehicle movements as well as demolition works such as that of the International Mail Centre (IMC).

3.2.2 Noise & Vibration

Airborne noise will be generated during construction of the Project. Airborne noise will be generated from cut and cover activities, diaphragm wall construction, excavation, backfilling, road reinstatement and construction of above ground structures. Groundborne vibration may be generated due to TBM tunnelling during construction of the Project.

3.2.3 Water Quality

Water quality impacts may arise due to the following potential sources during construction of the Project:

- Run off due to erosion of exposed surfaces, accidental spillage from plant maintenance etc, materials handling and other works areas;
- Wash out from concrete batching plants;
- Wastewater due to diaphragm wall construction;
- Groundwater extracted during underground construction; and
- Construction workforce sewage.

3.2.4 Waste Management

Construction activities will result in the generation of a variety of surplus materials that may include:

- Excavated materials;

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- Construction and demolition (C&D) materials and wastes;
- Site clearance waste;
- Chemical waste of residual oil and lubricating fluid from construction plant and machinery; and
- General refuse from worksites.

It is estimated that approximately 3Mm³ of spoil will need to be disposed from the Project construction works. Additionally, there will be hard rock and dredged marine sediments generated from the excavation process. Inert excavated materials and construction and demolition materials will be properly segregated and will either be reused on site, or disposed of at available designated public filling areas in accordance with the guidance from Fill Management Committee.

3.2.5 Hazard

Potential hazard may be generated during construction work within the consultation zones of the Shatin Water Treatment Works chlorine storage facilities and the Ma Tau Kok Gas Production Plant, which are classified as Potentially Hazardous Installations (PHIs). In addition, magazine(s) may be required to provide overnight storage of explosives for drill and blast construction. Other facilities are of relatively less hazardous potential and include the Beacon Hill Gas Off take Station and a Towngas pipeline at To Kwa Wan.

3.2.6 Ecology

Ecological impact associated with this project is expected to be confined to the Hin Keng tunnel portal work sites due to potential disturbance of secondary woodland and other plantation and a lower section of Tei Lung Hau freshwater stream.

3.2.7 Historical and Cultural Impacts

Potential impacts on historical and cultural heritage resources during the construction phase may arise due to activities associated with plant operation, temporary and permanent landtake, excavation, change of the sites' setting, and vibration impact during construction with mechanised or blasting methods. Whilst it is not expected any declared monument will be affected by the Project, a number of sites of historical and cultural heritage significance have been identified within or in close proximity to the proposed alignment as follows:

Location	Description
Running line between Tai Wai & Hin Keng Portal	<ul style="list-style-type: none"> • The historical village of Tin Sam • The historical village of Ha Keng Hau • The historical village of Hin Tin village • The historical village of Hin Tin
Running line between Hin Keng Portal & Diamond Hill (DIH)	<ul style="list-style-type: none"> • Wong Tai Sin Temple
Diamond Hill Station	<ul style="list-style-type: none"> • The Chi Lin Nunnery

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Location	Description
	<ul style="list-style-type: none"> • Archaeological interest area at the former Tai Hom Village • Stone house at No.4 Tai Koon Yuen • Former aircraft hanger at the former Tai Hom Tsuen • Underground military structure at the former Tai Hom Tsuen
Kai Tak Station (KTA) and Kai Tak Maintenance Centre (KMC)	<ul style="list-style-type: none"> • Kai Tak Archaeological Site • Kowloon Fort Archaeological Site • Longjin Bridge Archaeological Site • Holy Trinity Church • Song Wong Toi Garden
Running line between Kai Tak & Hung Hom	<ul style="list-style-type: none"> • Ma Tau Kok Animal Quarantine Depot • Tin Hau Temple • Pak Tai Temple on Ma Tau Wai Road • Kwun Yum Temple on Station Lane at Ho Man Tin • Disused Air Raid Precaution Tunnel at Valley Road • Fok Tak Temple at the junction of Dock Street and Bulkeley Street
Whampoa Automated People Mover	<ul style="list-style-type: none"> • Kwun Yum Temple

3.2.8 Land Contamination

A review of historical maps and selected historical aerial photographs has indicated the proposed alignment and stations which are to be developed are on land which has primarily been heavily developed for residential, commercial and recreational uses or on reclaimed land. There is little available information to indicate that there has been any major industrial uses along the alignment and the potentially contaminated areas are:

- The fuel storage and aircraft maintenance workshops at the former Kai Tak Airport, where decontamination measures are being implemented under the Kai Tak Airport North Apron Decommissioning;
- Former flatted factories at Tai Hom Village;
- Ma Tau Kok Gas Production Plant;
- Petrol Station at To Kwa Wan Road;
- Marine mud underlying reclamation in Hung Hom Wan;
- Former dockyards located between Baker Street and Hung Hom South Road;
- Former gas works located on the Green Wood residential estate adjacent to Hutchinson Park and north of Dyer Avenue; and

- Former power station located on the Laguna Verde residential estate, situated adjacent to the Green Wood and north of Dyer Avenue.

3.2.9 Landscape and Visual Impact

The proposed route alignment involves construction through a well-developed urban environment. The cut and cover tunnel construction and excavation, temporary noise barriers for the works sites and illumination within the construction sites may create short-term visual impacts.

3.3 POTENTIAL ENVIRONMENTAL IMPACTS: OPERATIONAL PHASE

3.3.1 Air Quality

Trains to be operated on the Project will be electrically powered so there will be minimal dust and gaseous emissions. Tunnel ventilation exhausts and smoke extraction facilities will be carefully positioned to avoid adverse air quality impacts. Air quality impact during the operational phase of the proposed railway is envisaged to be insignificant.

3.3.2 Noise & Vibration

Operational rail noise may give rise to potential impacts at residential dwellings adjacent to the viaduct at Hin Keng, particularly due to early morning and night-time train movements. The above ground sections of the approach tracks to the KMC and the APMs may also give rise to potential impacts at sensitive receivers in the vicinity.

Potential stationary noise sources include stabling and casual maintenance at the depots (KMC and depots for the APMs), tunnel ventilation shafts, tunnel ventilation fans and environmental control systems.

Apart from airborne noise, the passage of trains in the tunnel may give rise to potential groundborne noise and vibration, which can be sufficiently mitigated by special track forms.

3.3.3 Water Quality

Limited quantities of oils and lubricants will be used on the trains and rail lubricators may be deposited on the tracks by passing trains. Iron dust will also be left on the tracks by the maintenance grinding of the rail. Small quantities of oil & grease and suspended solids may be contained in the runoff. Wastewater containing cleaning agents, discharge from air conditioning systems and sewage generated at the stations may also contribute to water quality impacts. These minor impacts will be dealt with in accordance with the WPCO requirements.

3.3.4 Waste Management

Municipal waste, including litter, foodstuffs, plastics, wood, office waste and cleaning materials, will be generated during the operation of the proposed railway.

3.3.5 Hazard

Potential hazard may be generated by railway operation within the consultation zones of the Shatin Water Treatment Works chlorine storage facilities and the Ma Tau Kok Gas Production Plant, which are classified as PHIs. The train operation will increase the transient population within the consultation zones which may impact on current societal levels of risk.

3.3.6 Ecology

No ecological impacts are anticipated during operation of the proposed railway.

3.3.7 Historical and Cultural Impacts

No historical and cultural impacts are expected during operation of the proposed railway.

3.3.8 Land Contamination

No land contamination impacts are expected during operation of the proposed railway.

3.3.9 Landscape and Visual

Potential landscape impacts would result from the permanent loss of trees arising from the construction phase. Whilst the majority of the proposed alignment will be underground, there will be some above ground structures such as station entrances and adits, ventilation shafts and buildings which may impact the physical landscape and visual amenity of surrounding areas.

4 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

4.1 EXISTING AND PLANNED SENSITIVE RECEIVERS

4.1.1 Noise

Potential Noise Sensitive Receivers (NSRs) have been identified under the Technical Memorandum on Environmental Impact Assessment Process. Representative NSRs are described below.

Location of Noise Sensitive Receivers in Construction Phase

Area	Location
Running Line between Tai Wai & Hin Keng Portal	<ul style="list-style-type: none"> • Hin Keng Estate • Village House along Keng Hau Road • WSD staff quarters
Running Line between Hin Keng Portal & Diamond Hill	<ul style="list-style-type: none"> • FSD quarters • Lung Poon Court • Chuk Yuen Heung • Wong Tai Sin Temple
Tze Wan Shan Automated People Mover Systems & its associated stations	<ul style="list-style-type: none"> • Tsz Ching Estate • Residential buildings along Po Kwong Village Road and Lung Cheung Road • Residential buildings, school and hospital along Sheung Fung Street and Shung Wah Street
Diamond Hill station	<ul style="list-style-type: none"> • Lung Poon Court • Tropicana Garden • Galaxia Tower
Running Line between Diamond Hill & Kai Tak	<ul style="list-style-type: none"> • Galaxia Tower • Rhythm Garden • Choi Hung Estate • Chi Lin Nunnery
Kai Tak station	<ul style="list-style-type: none"> • Rhythm Garden • Residential buildings & school along Prince Edward Road East • San Po Kong Magistracy, Kowloon • Cognitio College
Kai Tak Maintenance Centre	<ul style="list-style-type: none"> • Residential buildings and school along Prince Edward Road West • Residential buildings, church and school along Sung Wong Toi Road • Further residential developments in SEKD
Ma Tau Wai station	<ul style="list-style-type: none"> • Residential buildings along both sides of To Kwa Wan Road (e.g. Honour Building)
Running line between Ma Tau Wai and Ho Man Tin	<ul style="list-style-type: none"> • Residential buildings along Ko Shan Road and Shun Yung Street

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Area	Location
	<ul style="list-style-type: none"> • Ko Shan Theatre
Ho Man Tin station	<ul style="list-style-type: none"> • Residential buildings along Valley Road, Shun Yung Street and Chung Hau Street • Future property development adjacent to the station
Whampoa Automated People Mover System	<ul style="list-style-type: none"> • Residential buildings, school, institutions along both sides of Hung Hom Road South, Hung Hom Road (e.g. Whampoa Garden)
Hung Hom Mass Transportation Centre	<ul style="list-style-type: none"> • Hong Kong Coliseum • School, residential buildings along both sides of Hung Hom south Road

Location of Noise Sensitive Receivers in Operational Phase

As most of the SCL operates underground, the main source of operational phase noise is from vent shaft and chiller plants, which are relatively minor. The potential noise sources and sensitive receivers locations are tabulated below:

Area	Location	Noise Source
Running Line between Tai Wai & Hin Keng Portal	<ul style="list-style-type: none"> • Hin Keng Estate • Village House along Keng Hau Road • WSD staff quarters 	Train operation
Running Line between Hin Keng Portal & Diamond Hill	<ul style="list-style-type: none"> • FSD quarters • Lung Poon Court • Chuk Yuen Heung • Wong Tai Sin Temple 	Vent shaft
Tze Wan Shan Automated People Mover Systems & its associated stations	<ul style="list-style-type: none"> • Tsz Ching Estate • Residential buildings along Po Kwong Village Road and Lung Cheung Road • Residential buildings, school and hospital along Sheung Fung Street and Shung Wah Street 	Train operation
Diamond Hill station	<ul style="list-style-type: none"> • Lung Poon Court • Tropicana Garden • Galaxia Tower 	Vent shaft
Kai Tak station	<ul style="list-style-type: none"> • Residential buildings & school along Prince Edward Road East • San Po Kong Magistracy, Kowloon • Cognitio College 	Vent shaft

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Area	Location	Noise Source
Kai Tak Maintenance Centre	<ul style="list-style-type: none"> Residential buildings and school along Prince Edward Road West Residential buildings, church and school along Sung Wong Toi Road Further residential developments in SEKD 	Vent Shaft/ Mechanical Noise
Ma Tau Wai station	<ul style="list-style-type: none"> Residential buildings along both sides of To Kwa Wan Road (e.g. Honour Building) 	Vent shaft
Running line between Ma Tau Wai and Ho Man Tin	<ul style="list-style-type: none"> Residential buildings along Ko Shan Road and Shun Yung Street Ko Shan Theatre 	Vent shaft
Ho Man Tin station	<ul style="list-style-type: none"> Residential buildings along Valley Road, Shun Yung Street and Chung Hau Street Future property development adjacent to the station 	Vent shaft
Whampoa Automated People Mover System	<ul style="list-style-type: none"> Residential buildings, school, institutions along both sides of Hung Hom Road South, Hung Hom Road (e.g. Whampoa Garden) 	Train operation Vent shaft
Hung Hom Mass Transportation Centre	<ul style="list-style-type: none"> Hong Kong Coliseum School, residential buildings along both sides of Hung Hom south Road 	Vent shaft

Detail identification of existing and planned NSRs and representative assessment locations would be made in the EIA report with reference to the prevailing situation and relevant planned uses proposed in the most up to date/available plans prepared under the TPO or any other land use plans published by the Government.

4.1.2 Air Quality

Potential Air Sensitive Receivers (ASRs) have been identified under the Technical Memorandum on Environmental Impact Assessment Process. Representative ASRs are described below:

Area	Location of Potential Air Sensitive Receivers
Running Line between Tai Wai and Hin Keng Portal	<ul style="list-style-type: none"> Residential buildings along Che Kung Miu Road j/o Mei Tin Road and Keng Hau Road, Tai Po Road (Shatin Heights), Keng Hau Road (e.g. Hin Keng Estate, Tin Sum Village)

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Area	Location of Potential Air Sensitive Receivers
	<ul style="list-style-type: none"> • Hin Keng Indoor Recreation Centre • Hin Keng Neighbour Community Centre • Tin Sum Village
Running Line between Hin Keng Portal & Diamond Hill station	<ul style="list-style-type: none"> • Residential buildings and worship places in northern Wong Tai Sin region (e.g. Wong Tai Sin FSD Quarters, Tropicana Garden)
Diamond Hill station	<ul style="list-style-type: none"> • Residential buildings Lung Cheung Road near former Tai Hom Village (e.g. Galaxia Towers) • The Chi Lin Nunnery • Industrial Buildings along Choi Hung Road
Tze Wan Shan Automated People Mover Systems and its associated stations	<ul style="list-style-type: none"> • Residential buildings, church & schools along Po Kong Village Road and Lung Cheung Road near former Tai Hom Village (e.g. Lung Poon Court, Fung Chuen Court) • Residential buildings, school and hospitals along Sheung Fung Street and Shung Wah Street • Community Centre on Po Tze Lane
Running Line between Diamond Hill & Kai Tak	<ul style="list-style-type: none"> • Residential buildings along Choi Hung Road j/o Hammer Hill Road and Prince Edward Road East (e.g. Rhythm Garden, Choi Hung Estate)
Kai Tak Maintenance Centre	<ul style="list-style-type: none"> • Residential buildings and school along Prince Edward Road West • Residential buildings, church and school along Sung Wong Toi Road • Further residential developments in SEKD
Kai Tak station	<ul style="list-style-type: none"> • Residential buildings, law Court & school along Prince Edward Road East (e.g. San Po Kong Magistracy, Kowloon Cognitio College, Rhythm Garden) • Future residential developments and schools in SEKD
Ma Tau Wai station	<ul style="list-style-type: none"> • Residential, industrial and commercial buildings, along both sides of To Kwa Wan Road (e.g. Honour Buildings, Wyler Garden)
Running line between Ma Tau Wai and Ho Man Tin station	<ul style="list-style-type: none"> • Residential buildings along Ko Shan Road and Shun Yung Street • Ko Shan Theatre
Ho Man Tin station	<ul style="list-style-type: none"> • Residential buildings along Valley Road, Shun Yung Street and Chung Hau Street • Future property development adjacent to the station
Whampoa Automated People Mover System	<ul style="list-style-type: none"> • Residential buildings, school, institutions along both sides of Hung Hom Road South, Hung Hom Road (e.g. Whampoa Garden) • Commercial buildings on Hung Hom Road

**ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (CAP499)S.5(1)(A)
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Area	Location of Potential Air Sensitive Receivers
	<ul style="list-style-type: none"> • Hutchison Park
Hung Hom Mass Transportation Centre	<ul style="list-style-type: none"> • Hong Kong Coliseum • School, residential buildings along both sides of Hung Hom south Road (e.g. The Metropolis)

4.1.3 Water Quality

The Tei Lung Hau freshwater stream at Hin Keng and the drainage around the work sites have been identified as potential Water Sensitive Receivers (WSR).

4.1.4 Cultural Heritage

Historical and cultural heritage resources in the vicinity of the alignment are listed in Section 3.2.7. It is expected that the Project will have direct impact on the historical structures at the former Tai Hom Village site.

4.1.5 Landscape and Visual

Landscape Impacts

Potential landscape impacts caused by the Project including existing trees/vegetations and landscape characters at:

- **Tai Wai** - East Rail Corridor (east of tracks) in Shatin (Tai Wai to Hin Keng portal) and Che Kung Miu Road.
- **Wong Tai Sin, Diamond Hill, San Po Kong** – Wong Tai Sin Road, Shatin Pass Road, Po Kong Village Road, Lung Cheung Road, Ching Tak Street, Fung Tak Park, Choi Hong playground, Hammer Hill Road swimming pool and Diamond Hill CDA site.
- **Kowloon City** - Convoir Drive, Prince Edward Road East, Kowloon City Road, Sung Wong Toi Road and Olympic Avenue & Park.
- **To Kwa Wan, Ho Man Tin** - To Kwa Wan Road, Ho Man Tin East Service Reservoir and above Shun Yung Street, Valley Road, Chung Hau Street, Yan Fung Street, Princess Margaret Road and Oi Man Estate/Oi Seng Path.
- **Hung Hom** - Chatham Road South, Cheong Wan Road, Winslow Street, Hung Ling Street, Hung Hom South Road and Hung Hom Road.

Visual Impacts

Potential visual impacts to the following representative Visual Sensitive Receivers (VSRs) have been identified in the vicinity to the alignment:

- **Running line Between Tai Wai and Diamond Hill** - along Che Kung Mui Road, Keng Hau Road, Tai Po Road, northern Wong Tai Sin region, Lung Cheung Road, a key established developed area with residential premises, school, playground, places of worship and community centre.

- ***Tze Wan Shan APM*** – along Po Kong Village Road, Tsz Lok Estate, Shung Wah Street and Shung Fung Street, a key urbanised area with residential premises, school, playground, community and hospitals.
- ***Running line between Diamond Hill and Hung Hom*** – along Impacts on Lung Cheung Road, Fat Kwong Street, Valley Road Estate, Sun Wong Toi Road, To Kwa Wan Road, Hong Chong Road, Winslow Street, Cheong Hang Road and Chatham Road North, a key urbanised area with residential premises, playground and basketball court, parks, active recreational facility, swimming pool and walking trail.
- ***Whampoa APM*** - along Hung Hom Road, Hung Hom South Road, Ma Tau Chung Road, a key urbanized area with residential premises and garden GIC facilities.

4.2 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT AND EXISTING AND/OR PAST LAND USERS ON SITE WHICH MIGHT AFFECT THE AREA IN WHICH THE PROJECT IS LOCATED

Areas where land contamination may occur along the proposed alignment have been identified through a review of historical survey maps and relevant environmental assessment reports. Areas which may potentially be contaminated include the fuel storage and aircraft maintenance workshops at the former Kai Tak Airport, flatted factories at the former Tai Hom Village, Ma Tau Kok Gas Production Plant as well as any petrol filling stations along the alignment.

5 ENVIRONMENTAL PROTECTION MEASURES AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

5.1 POTENTIAL MEASURES TO MINIMIZE ENVIRONMENTAL IMPACTS

Potential measures have been proposed to minimize environmental impacts, as outlined below. These measures will be further reviewed during the EIA process.

5.1.1 Construction Phase

Air Quality

Standard dust suppression techniques, set out in the Air Pollution Control (Construction Dust) Regulations, would be sufficient to control the dust impacts on the nearby ASRs. These include on-site vehicle speed restrictions and wheel-washing facilities at all site access points, careful handling and the containment or damping of dusty materials, and frequent watering or covering of exposed areas of ground and prompt site restoration. These measures will be specified as general practice to all construction sites to ensure that potential dust emissions are controlled and impacts upon sensitive receivers are minimised.

Noise & Vibration

A package of mitigation measures will be designed to control construction noise & vibration impacts. General good site practices will help to control the noise impacts. These include:

- i) Care in the placement and orientation of noisy plant away from sensitive receivers;
- ii) The use and correct fitting of silencers, mufflers and acoustic shields; and
- iii) Regular maintenance of plant and equipment.

Further mitigation measures such as the use of quiet plant, noise barriers and reducing the number of plant in use at any one time would help to control daytime noise impacts to within the noise criterion specified under the Technical Memorandum on Environmental Impact Assessment Process and Noise Control Ordinance. In circumstances where it would not be feasible to meet the noise criteria, Indirect Technical Remedies may be proposed.

Water Quality

For land based construction, water quality impact mitigation measures will include the use of sand traps, wheel washing facilities for vehicles leaving the site, adequate maintenance of drainage systems to prevent flooding and overflow, sewage collection and treatment, and comprehensive waste management (collection, handling, transportation, disposal) procedures in accordance with the Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN 1/94).

As the Lion Rock Tunnel will be located at a level below the WSD's High Island Water Tunnel which operates under positive pressure, contamination of the water supply during construction phase is not envisaged.

Waste Management

Waste management measures will be formulated to minimise potentially adverse impacts associated with handling, collection and disposal of waste arising from the construction and operation of the proposed railway. Waste management measures will include:

- i) General good housekeeping practices;
- ii) Sorting and segregation of wastes for reuse and disposal;
- iii) Observing the requirements of the waste disposal licenses; and,
- iv) Meeting the requirements of the Waste Disposal Ordinance.

In addition, both on site and off site re use of excavated inert materials will be considered. Useful contents in the C&D materials will be recycled where practicable and disposal at landfill sites will be considered as a last resort. Waste management

hierarchy will be implemented to minimize waste generation and maximize waste recovery and recycling.

Chemical wastes will be handled according to EPD's guidelines and in case temporary storage becomes necessary for the chemical waste, this would be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste.

Potential impacts associated with the exposure to and disposal of land-based sediments could be mitigated by the following measures:

- i) Contaminated sediment dredged would be quickly removed from the site.
- ii) During transportation of contaminated sediment, the loading of barges and hoppers, would be controlled to prevent splashing of contaminated material to the surrounding water, and barges or hoppers would not be filled to a level which may cause overflowing of materials or polluted water during loading and transportation.

Hazard

Potential hazard associated with construction activities within the consultation zones of the Shatin Water Treatment Works chlorine storage facilities and the Ma Tau Kok Gas Production Plant will be controlled by limiting the number of workers on site during peak periods, adjustment of construction sequence to limit the amount of exposure, and the provision of emergency measures such as toxic refuge for the workforce.

Potential hazards associated with the overnight storage of explosives will be minimised through proper site selection by allowing sufficient buffer distance between the magazines and the nearby sensitive receivers, as well as proper design of the storage facilities.

Ecology

Champion, protected and mature trees will be preserved as far as possible. Transplantation would be recommended where unavoidable. Tree felling will be taken as a last resort option.

Woodland plantation would be provided at Hin Keng to compensate a potential loss of the secondary woodland which could not otherwise be avoided by the construction works. Properly designed channels with suitable gradient would be provided at Tei Lung Hau stream where disturbance could not be avoided.

Historical and Cultural Heritage

Historical, cultural heritage resources and recognised monuments will be avoided or preserved insitu as far as practicable. If avoidance of the resource is not possible, mitigation measures such as physical relocation or a rescue programme would be undertaken.

Land Contamination

The extent of special handling and treatment required prior to disposal would be based on the results of site investigation available during the EIA stage. Licensed waste haulers will be used to collect and transport contaminated materials for disposal, and vehicles will be suitably covered to limit dust emissions, and truck bodies and tailgates sealed to prevent any spillage.

Landscape and Visual Impact

Potential landscape and visual impact mitigation measures to be implemented during construction phase would include:

- i) Avoidance of impacts on adjacent landscape by minimizing temporary works areas;
- ii) Avoidance of impacts on existing mature trees;
- iii) Temporary re-provision of open space for any public open spaces affected by construction works;
- iv) Control of night-time lighting; and,
- v) Erection of decorative screen hoarding.

5.1.2 Operational Phase

Air Quality

No mitigation is likely to be required since adverse impact is considered unlikely.

Noise & Vibration

Airborne train noise from the above ground section is expected to comply with the stipulated noise criteria after provision of noise barriers and enclosures. Mitigation of ground borne noise will be by means of appropriate track design including the use of Floating Slab Track (FST) or Low Vibration Track (LVT). For fixed plant noise, adequate noise control treatment such as silencers, acoustic louvres, quiet plant and an increase in the plantroom wall thickness will be adopted.

Water Quality

At locations where elevated levels of silt and oil are expected, surface runoff will be diverted through sedimentation basins and oil interceptors before being discharged into the stormwater drainage system. Effluent arising from the operational phase will be discharged into the communal foul sewerage system where connections can be made.

Waste Management

Chemical waste generated during the operational phase will be handled according to EPD's guidelines. In case temporary storage becomes necessary for chemical waste,

it will be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Waste.

Implementation of good housekeeping practices and the observation of the requirements of the Waste Disposal Ordinance will prevent adverse impacts.

Hazard

Potential hazard would be minimised through the provision of practicable means such as barriers and implementation of an emergency plan. Potential hazard associated with the operation within the consultation zone of the Ma Tau Kok Gas Production Plant is expected to be minimal as both the railway and Ma Tau Kok station will be built underground.

Cultural Heritage

Vibration impacts on the nearby historical and cultural resources will be mitigated by appropriate railway track design.

Landscape and Visual

Landscape impact mitigation measures to be incorporated within the permanent landscape design may include the following:

- i) Disturbance to planted slopes will be avoided where possible; and, if necessary reinstalled.
- ii) Compensatory tree planting will be incorporated along roadside, public open spaces, amenity areas affected by the project;
- iii) Permanent off-site reprovision of open space will be considered for permanent loss of public open space; and,
- iv) Sensitive architectural design of all visible structures such as ventilation structures, plant buildings and station entrances.

5.2 POTENTIAL SEVERITY, DISTRIBUTION AND DURATION OF ENVIRONMENTAL EFFECTS

It is anticipated that the construction work will commence in 2005 with completion targeted by 2011. Air, noise and vibration, water, waste, ecology, cultural heritage, and landscape and visual impacts are potential issues for the duration of construction. Their severity and distribution are outlined in Sections 3 and 4.

It is expected that proven means of mitigation in most instances will be sufficient to control adverse environmental impacts. However, where this is not possible or would likely cause greater disturbance to the travelling public or utilities, residual impacts may be likely.

5.3 FURTHER IMPLICATIONS

Public interest in the Project is likely to be moderate in view of the fact that the alignment will be passing through such a dense population urban areas with temporary disruption caused to various business and residential properties in the area. The railway, however, is for the benefit of the public and will potentially create job opportunities.

6 USE OF PREVIOUSLY APPROVED EIA REPORTS

No previously approved EIA report exists for the proposed project. However, reference may be made within the study area from KCRC East Rail Extension – Hung Hom to Tsim Sha Tsui which has been approved with conditions by the EPD. Reference will also be made to approved EIA reports on the EIAO register for other developments that potentially interface with the Project.