Environmental Management

We are committed to protecting the environmental as far as practicable. With our Environmental Management System, we ensure that all our activities are conducted in an environmentally responsible manner.

Use of Precast Method for Viaduct Construction

Hong Kong Link Road (HKLR) is one of the Hong Kong-Zhuhai-Macao Bridge (HZMB) local related projects. The viaduct section of HKLR is a 9.4km long dual 3-lane highway starting from the Hong Kong Special Administrative Region Boundary, passing through the Western Waters of Hong Kong, connecting with a 180m long span section over the headland between San Shek Wan and Sha Lo Wan, and meandering along the waters of the narrow Airport Channel before reaching the southern side of Hong Kong International Airport, which is then connected to the Scenic Hill Tunnel and the at-grade road at the reclamation area to the east of Airport Island.

Layout of HKLR

Aerial view of Marine Viaduct at Western Waters of Hong Kong

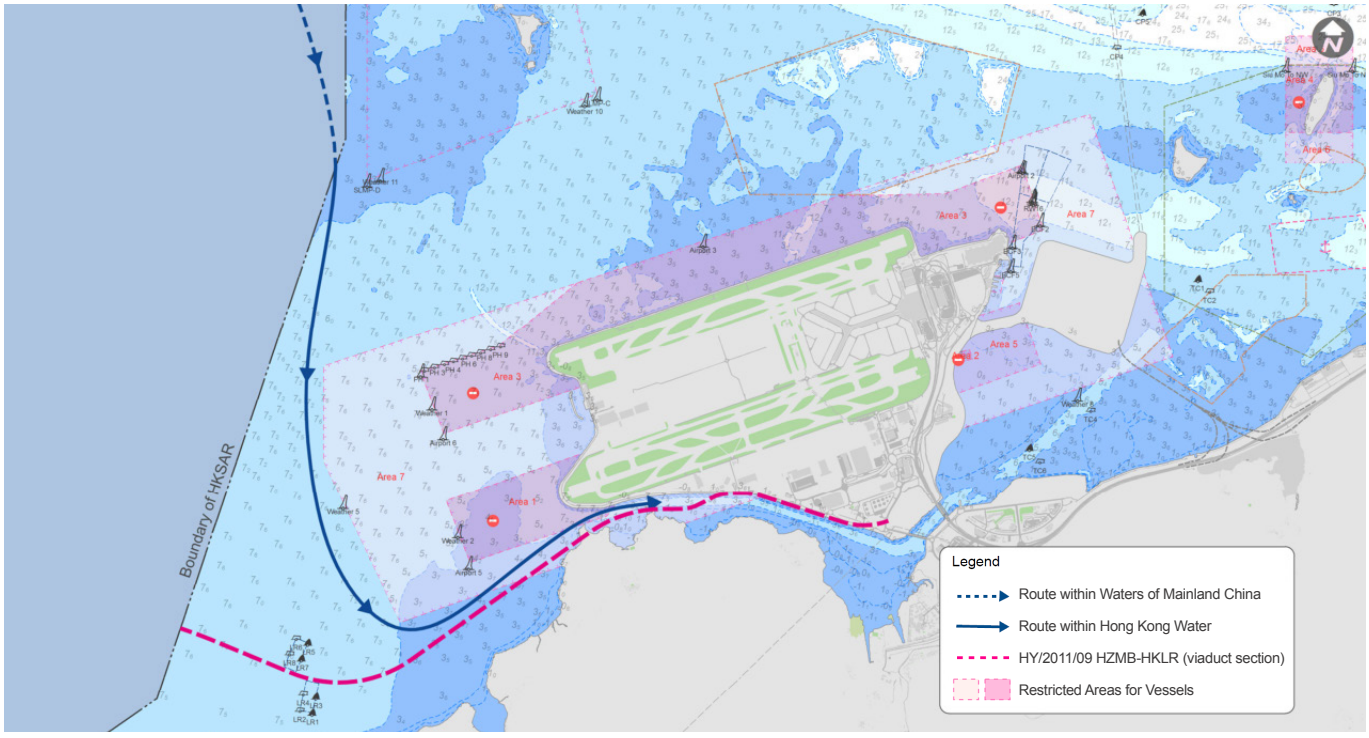
Aerial view of Land Viaduct on the Southern Side of Airport Island

Concrete pre-fabrication technique has been widely adopted for viaduct construction in this project where 148 numbers of precast pile cap shells serving as formwork and platform for in-situ concrete pile cap construction in the marine environment, 293 numbers of precast columns to reduce the amount of in-situ concrete construction and 5,714 numbers of precast bridge segments to ensure quality and speed of construction were prefabricated at Zhongshan and Panyu of Guangzhou in Mainland China. Only 187 numbers of steel moulds in total have been used and reused to cast a total of 23,972 numbers of pre-fabricated bridge components, including the pile cap shells, piers, deck segments, parapets, central dividers and roadside barriers. The considerable re-use of these 187 moulds in the project has tremendously reduced the volume of timber formwork and false work should in-situ construction method have been adopted.

Upon completion, the precast elements are transported from the precast yards in Mainland China directly to the marine and land receiving sites of HKLR via barges. In comparison to the traditional cast in-situ method, adopting off-site pre-fabrication technique can achieve sustainability objectives by reducing wastage of materials and the use of temporary works which helps control the cost, progress, quality and improve efficiency. At the same time, off-site pre-fabrication reduces not only the exhaust gas emission arising from the less use of ro-ro barges and lorry mixers for concrete delivery, but also the time of on-site operation, thus addressing the environmental concerns like minimization of noise, air and water pollution. Overall speaking, it helps to promote green construction.

Furthermore, during the delivery of the pre-fabricated components, designated marine travel routes are assigned for the barges travelling to / from the works sites at a safe speed so as to reduce the impacts on the marine ecology such as Chinese White Dolphin as well as the seabed disturbance caused by the vessel anchorage. Less vessels will be involved with the use of precast construction, thus less impact on the environment.

To avoid conflict with the landing point of the Airport Southern Runway, HKLR was aligned to pass over the Sha Lo Wan Headland, a site of archaeological value. A 180m viaduct span length reaching the limit of precast segmental concrete construction has been adopted to avoid touching any ground of the Headland during and after construction. Viaducts of long spans of 165m were adopted across the Sha Lo Wan bay area to reduce ecological and visual impact to the environment.



Designated marine travel route to reduce the impacts on the marine ecology

Fabrication of precast moulds for bridge deck segment at Zhongshan

Bridge pier segments casting yard at Zhongshan

Casting of pile cap shells at Panyu, Guangzhou

Installation of pile cap shell at Airport Channel

Construction of bridge piers at Western Waters of Hong Kong

Installation of precast bridge deck segments at Western Waters of Hong Kong

Central Kowloon Route (CKR)

CKR is a 4.7km long dual 3-lane trunk road, including a 3.9km long tunnel connecting Yau Ma Tei Interchange in West Kowloon to the road network of Kai Tak Development Area and Kowloon Bay in East Kowloon. CKR will not only help relieve traffic congestion currently experienced on major east-west corridors across Central Kowloon but also meet future traffic demands of planned developments, enhancing linkages between districts in Kowloon. To maintain the air quality, an air purification system will be installed in the tunnels. The system is to reduce at least 80% of Respirable Suspended Particulates (RSP) and 80% of Nitrogen Dioxide (NO_2) in the tunnel exhaust.

Alignment of Central Kowloon Route

Enhancement of Greening and Landscaping

We will make use of the opportunity of constructing CKR to improve the surrounding environment. The project will include planting of about 1,800 trees and 685,000 shrubs, covering a planting area of about 54,600 m^2.

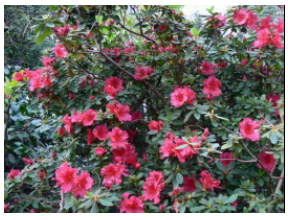
Yau Ma Tei Landscaped Deck

A landscaped deck of about 20,000 m^2 (i.e. equivalent to about 3 full-size soccer pitches) will be constructed at the western tunnel portal of the CKR tunnel. Recreation facilities such as jogging tracks, playground, Tai Chi court etc. would be provided.

Landscaped deck at Yau Ma Tei

In designing the landscape soft work for the landscaped deck, planting species have been carefully selected taking into account the local environment and characteristics of the area. Feature trees, like Cinnamomum Burmannii, Grevilla Robusta and scented trees, like Plumeria Rubra, Magnolia Grandiflora will be arranged in an east-west orientation to create a wind corridor effect. Colour foliage and flowering shrubs, like Ixora Chinensis, Rhododendron Simsii, Allamanda Schotti, Melastoma Candidum, etc. will be adopted for bloom display.

Ixora Chinensis

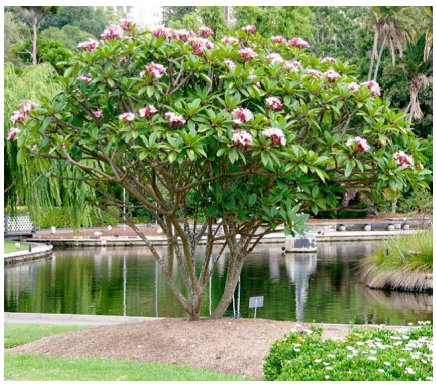


Rhododendron Simsii

Allamanda Schotti

Melastoma Candidum

Proposed shrub species on the landscaped deck



Plumeria Rubra

Cinnamomum Burmannii

Grevilla Robusta

Proposed tree species on the landscaped deck

Ma Tau Kok Waterfront Promenade

An approximately 160m long and 40m wide waterfront promenade will be constructed along the waterfront area fronting the Kowloon City Ferry Pier Public Transport Interchange to provide multi-functional amenity and recreational facilities such as pavilions and Tai Chi area. The planting along the waterfront promenade will be of natural style to soften the water edge and to provide shading for leisure walking. Feature trees, like Pongamia Pinnata and Tabebuia Chrysantha, and flowering shrubs, like Michelia Figo, Nandina Domestica and Pittosporum Tobira etc. will be planted at the promenade .

Ma Tau Kok Waterfront Promenade

Typical Environmental Measures Taken on Construction Sites

Air Quality Control

Water curtain system to prevent dust leaving the tunnel during spraying thermal barrier

Monitor suspended particle content on site

Test diesel fuel quality to ensure no exceedance in sulphur content

Noise Mitigation

Wrap the breaker with sound absorption material

Erect plastic screen

Water Pollution Control

Use cage type silt curtain to mitigate impacts on water quality

Wastewater treatment on site before discharge

Waste Management

Recycle damaged water-filled barriers

Recycle damaged/expired safety helmets

Site Cleanliness

Prevent mosquito breeding at nearby residents

Pest control on site

Organize regular site cleaning activity to promote good housekeeping on site

Sustainable Measures

Plant with abandoned water-filled barriers

Reuse old concrete blocks from other contractors for hoarding erection

Development of Environmentally Friendly Railway System

The overall aim of the Government is to develop an affordable, accessible, efficient and environmentally friendly public transport system providing diverse choices for the travelling public. We will continue to develop a passenger transport system centred on public transport with railway as the backbone. HyD strives to carry out planning and implementing railway system to world-class standards.

Environmentally Friendly Measures for Shatin-to-Central Link

The Shatin-to-Central Link (SCL) is a 17km strategic rail line connecting several existing lines to form two railway corridors, namely the "East West Corridor" and the "North South Corridor".

Since the commencement of construction works for the SCL in 2012, the project team has continued to implement good practices on site in order to comply with statutory environmental requirements and minimise potential environmental impacts to the community. Effective mitigation measures and initiatives have been put in place to protect the environment in different aspects with enhancements for continuous improvement.

Cultural Heritage

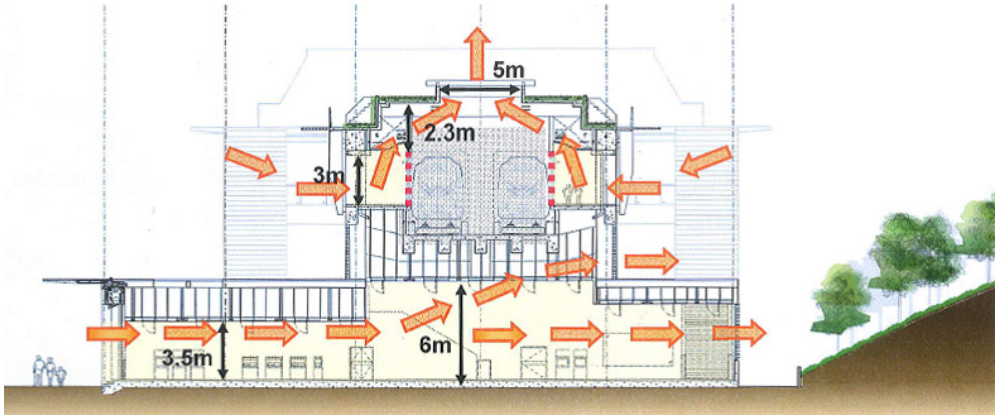
Following the completion of the archaeological field surveys in the whole area of the To Kwa Wan Station and part of the associated adit area at the end of September 2014, the post-excavation works such as artefacts processing and recording of archaeological finds have also been substantially completed. Regular inspection and monitoring is being carried out to prevent the archaeological discoveries including wells, building remains and stone structures that have been preserved and backfilled in-situ, from being disturbed by the SCL works. This is a good practice whereby the archaeological finds are well protected while progress of works related to the railway development could be maintained.

Song – Yuen artefact found in To Kwa Wan Station area

Energy Saving Initiatives

Different energy saving initiatives are implemented in various stations of the SCL. At Hin Keng Station, natural cross ventilation has been adopted in the design of the platform and concourse public area through gaps of architecture fins on the eastern and western side of building façade. Thermal comfort without air-conditioning is achieved by conducting computation fluid dynamics analysis. The architectural fins installed on the building façades will reduce solar gain. The fins are fabricated with recycle timbers, with its colour and texture compatible with the natural surrounding. Green roof, vertical climbers and hanging vines are also planted to soften the solid building mass. The provisions will also create an insulation layer to reduce heat gain in the internal area. In the building services design, energy efficient fluorescent light fittings, as well as light-emitting diode (LED) type lighting tubes and exit signs are adopted. As for the ventilation and air conditioning system, carbon dioxide sensors are installed at public area for automatic control of fresh air supply, energy saving control with variable speed chillers pump, variable speed drive chiller and fresh water-cooled oil-free chillers are implemented to achieve energy efficiency.

LED exit sign in Hin Keng Station



Natural ventilation for Hin Keng Station

For the design of the Exhibition Station, there are four aspects of energy saving initiatives. For site and building orientation, the station entrances are located in an east-west orientation, with at-grade entrance openings directed to the north and south. The amount of solar radiation to the entrances is therefore limited by shading effect. For station planning, operational efficiency has been optimised by minimising the floor area while meeting the functional requirements thus reducing energy consumption. For external building envelope, the types of stone cladding, glass curtain walling, metal panels and featured architectural louvre fins have been carefully selected for minimising the requirements for future replacement and repair works. For building services design, energy efficient fluorescent light fittings, LED type light fittings and exit signs, fresh water-cooled oil-free chillers and free-cooling mode operation of the air-conditioning system have been adopted.

Featured architectural cladding for Exhibition Station

Environmental Achievements

In line with the aim of the SCL project to minimise environmental impacts and protect the environment, recognition has been given to contractors for their environmental achievement and efforts. Two of the works contracts undertaken by contractors for Stations and Tunnels of Kowloon City Section and Hin Keng to Diamond Hill Tunnels won the Bronze Award under the Hong Kong Awards for Environmental Excellence (HKAEE) and the Outstanding Environmental Management & Performance Award (OEMPA) – Silver Award under the Considerate Contractors Site Award (CCSA) Scheme. The measures implemented include optimised design that reduces construction waste, high performance noise mitigation measures and good environmental management systems.

HKAEE Bronze Award

OEMPA – Silver Award under CCSA

Proactive Revitalization of HyD's Man-made Slopes Registered in the Database of Systematic Identification of Maintenance Responsibility of Man-made Slopes in Hong Kong Set up by the Lands Department (SIMAR Slopes) Covered by Senescent Acacia

The History of Acacia in Hong Kong

Over the past half century, the Hong Kong Government has carried out large-scale afforestation in the countryside to prevent soil erosion. Due to its fast growing nature, Acacia, chosen as the pioneer, was extensively planted in the rural areas and along the roadsides in Hong Kong to expedite greening of the environment.

Acacia exhibits deteriorating health and declined structural conditions

A collapsed Acacia tree (approximately 20 years old) caused blockage to the traffic. (Image source: Apple Daily)

Acacia Failure

With an average life expectancy of approximately 50 to 60 years only, the majority of the Acacia trees planted in Hong Kong over the past 50 years have now reached their senescent stage. Their senescence and deteriorating health problems and declined structural stability have been posing a potential threat to public safety.

According to the HyD's maintenance record, the number of Acacia trees with poor health and structure in need of removal by our department has been increasing steadily every year. Moreover, according to the report on tree failure cases from the Tree Management Office in November 2012, Acacia-related cases constituted 35% of the reported total.

Enhancement of Vegetated Slopes of HyD - Phased Replacement of Senescent Acacia

In order to better safeguard the public and promote the long-term sustainability of highways landscape, HyD acknowledged the importance of a well-planned Acacia replacement programme in Hong Kong by commencing related preparatory works a few years ago. Also, in March 2015, the Works and Maintenance Committee on Greening of the Development Bureau (DEVB) requested relevant government departments to formulate proactive tree management strategies for replacement of senescent Acacia trees for better safeguarding of public safety, enriching of biodiversity and promoting the long-term sustainability of highways landscape.

Consultations to 18 DCs

Consultations with the local DC member on survey findings.

A 4-Stage Enhancement Programme

Stage 1 aims at obtaining expert views from academia, overseas and local tree experts, the Tree Management Office, and community views and supports from District Councils (DCs).

Stage 2 involves carrying out a systematic survey with a scoring system to assess the current health, structure and habitat conditions of Acacia, and setting the order of work priority.

Stage 3 includes the replacement and establishment works. In order to strike a balance between public safety and social impacts, a replacement option will be carefully selected for each chosen site, with due consideration given to site sensitivity, traffic and visual impact.

The design for replacement planting is produced in accordance with the principle of "the Right Trees at the Right Place" promoted by the Greening, Landscape and Tree Management Section of the DEVB. Native species would be extensively used together with some localized species so as to establish an urban green pocket of higher ecological and aesthetic value, and to promote local district character with seasonal effects.

Establishment works will be undertaken to promote healthy growth of new plants.

Enrichment of biodiversity of HyD's SIMAR slopes.

Stage 4 includes exploring and implementing appropriate measures on recycling of wood logs to align with the Environment Bureau's directive on yard waste reduction and treatment strategy.

Recycling of Acacia logs as recreational furniture.

Mission

The main objective of the programme "Proactive Revitalization of HyD's SIMAR Slopes Covered by Senescent Acacia" is to better safeguard the safety of road users and the public proactively, and to align with our department's goal in "maintaining the integrity of the road network". Through replacement planting with the right species at the right place, a healthy, safe and more robust highways landscape is expected for us and next generations to enjoy.

Green Office Management

Resources Saving: Water, Paper and Waste Recycling

In support of the Government's drive to save natural resources, we are committed to making every endeavour to make our green office management a greater success. In addition to energy saving as mentioned in the previous chapter titled Clean Air Charter, we have been making our best efforts to save other resources.

Water Saving

To maximise water conservation, we have adopted the use of dual-flush toilets, automatic low flow water taps and sensor type urinals. These new components can effectively control the duration of water flow and keep the water flow at low level. We would continue to adopt these water saving measures in the forthcoming renovation works.

Waste Recycling

We treasure waste with recycle value by taking the following measures over the years:

- put up green boxes to collect reusable envelopes and papers;
- collect computer printer toners and ink cartridges for refilling and recycling; and
- put up recycling boxes to collect used paper, CDs, plastic bottles, aluminium cans and rechargeable batteries for recycling.

Paper Saving

To align with the green office initiative, we have promulgated and would continue with the following measures on paper saving:

- minimise photocopying paper consumption;
- use both sides of paper for printing and photocopying;
- use the blank side of used paper for drafting/ photocopying for internal document/ correspondence/fax document;
- use electronic means extensively for communication (for instance, use electronic files and keep the use of hard copies to the minimum);
- reuse envelopes and file covers;
- encourage the use of recycled paper; and
- exclude leader page for outgoing fax document.

In 2016, we consumed 17,422 reams of paper (representing a saving of 0.81% of that of 2015) of which 100% were recycled paper.

Auditing: Environmental and Carbon

Annual Environmental Audit

We conduct annual environmental audits in all 19 offices located in different premises with a view to maintaining the impetus of green measures in housekeeping. The objectives of conducting annual environmental audits are:

- to assess compliance with the green housekeeping guidelines;
- to identify non-compliance and recommend remedial actions;
- to promote good environmental management; and
- to increase staff awareness of green management and occupational safety and health initiatives.

Our offices have continued to comply with the green housekeeping guidelines. We have also taken the opportunity to share among the offices the green management best practices.

Carbon Audit

Carbon audit was conducted for HMTGO by the Building Management Office (BMO) in 2016 to monitor the effectiveness of Greenhouse Gas Emission reduction efforts. The relevant data are being studied by BMO.