Enviromental Report 2010

Highways Department

同心展關懷 2010/11
caringorganisation
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香港社會服務聯會頒發

Contents

Director's Message

2010 marked my first year as the Director of Highways and it is my pleasure to present to you our 2010 Environmental Report which summarised our efforts and harvests in environmental management.

As before, we continued to strategically plan every stage of our projects to demonstrate our commitment to environmental management. Taking the Hong Kong Boundary Crossing Facilities of Hong Kong-Zhuhai-Macao Bridge Hong Kong Project as an example, we strived to implement an unprecedented non-dredge reclamation scheme to minimize impacts to the environment as far as practicable despite that a partially dredge scheme would already satisfy the required environmental standards. In other capital works projects covered in later chapters of this report, such as Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling, Central Western By-pass and Island Eastern Corridor Link, you will see our efforts in due consideration on environmental aspects.

With the experience gained from the Olympic and Paralympics Equestrian Events and East Asian Games, we further extended our expertise in greening and streetscape beautification. To provide a scenic driving experience for drivers and a green environment for nearby residents, we adopted thematic planting on highways by growing different species of plantations which flourish in distinct colours in different seasons. Also, we continued to adopt aesthetic design of noise barriers. This year, we participated in the Hong Kong Flower Show 2010 and were awarded the Grand Award for Design Excellence.

Besides new initiatives, we pursed actively in excelling our existing technology and assets. We continued the researches and trials on environmentally friendly techniques, such as recycled asphalt pavement, paving blocks with recycled glass and synthetic gully grating. We also engaged our staff in environmental management by training, annual environmental audit for offices and promotion campaign in construction sites.

I am delighted that our efforts were recognised. In 2010, our construction sites received six Considerate Contractors Site Awards (CCSA) and three Outstanding Environmental Management and Performance Awards (OEMPA), including a gold prize for the CCSA and a gold prize for the OEMPA. These awards are presented in recognition of our good site safety, environmental performance and considerate attitude towards the neighbourhood and the public.

Looking into the future, we will endeavour to carry out our business in an environmentally responsible manner. With the joint efforts of my colleagues, we strive to make our community a better place to live in.

K.K. LAU
Director of Highways
June 2011

About Highways Department

The Highways Department is responsible for:

- implementation of highway projects in the Public Works Programme;
- maintenance of public roads, including road furniture, road drainage and roadside slopes, and co-ordination and control of utility openings on public roads;
- planning, monitoring and coordinating various activities associated with implementation of new railway projects;
- providing design input for road lighting, highway structures, roadside slope upgrading and landscape features associated with capital works projects and maintenance works;
- inspecting the safety provision on highway construction sites;
- researching into new materials, techniques and standards; and
- providing engineering, quantity surveying and landscaping technical services.

The Department's Headquarters are located in Ho Man Tin Government Offices (HTMGO), with sub-offices in North Point Government Offices (NPGO), Cheung Sha Wan Government Offices (CSWGO), Cheung Sha Wan Plaza, Skyline Tower and Nan Fung Commercial Centre in Kowloon Bay. We have an establishment of about 470 professional staff and 1,610 technical/common and general grades staff. We maintain about 2,076 km of roads and 13,083 roadside slopes within the territory. The total operating expenditure for the financial year 2010/11 is $2,185 million.

Vision and Mission

Our Vision

To develop and upkeep the road network as well as to plan and implement railway development to world class standards.

Our Mission

In order to enhance the long term prosperity and improve the living standards of the community, we are committed to :

- expand and improve the road network to meet the growth and change in transport needs, and development requirements;
- maintain the integrity of the road network;
- provide high quality technical support for the planning, design, construction and maintenance of the road network; and
- implement and update the Railway Development Strategy.

Environmental Goal

Our environmental goal is to accomplish public works efficiently and with due regard to the environment.

Environmental Policy

We incorporate quality and environmental considerations at all stages of our work in developing and up-keeping the road network as well as planning and implementing the railway system. In so doing, we are committed to :

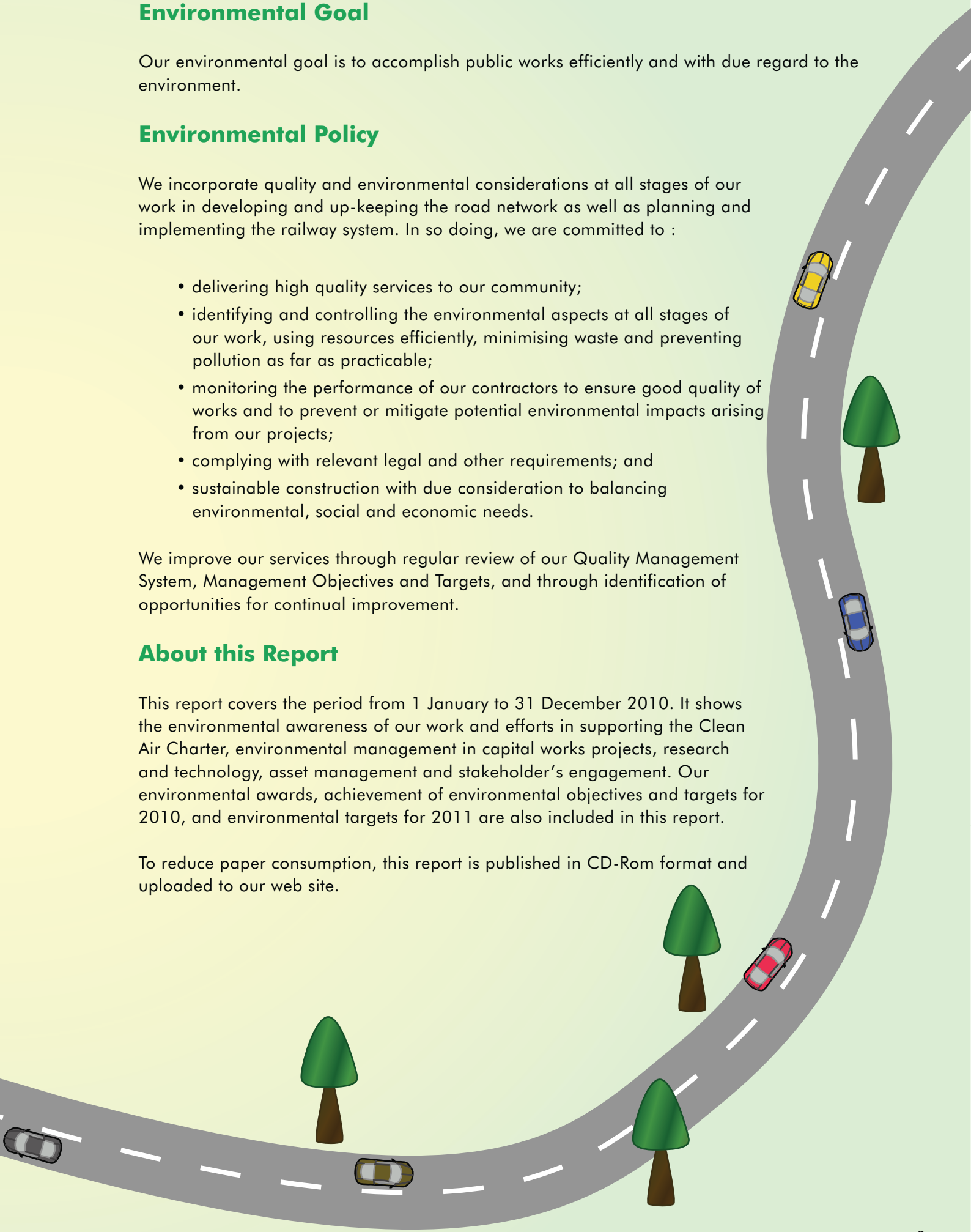
- delivering high quality services to our community;
- identifying and controlling the environmental aspects at all stages of our work, using resources efficiently, minimising waste and preventing pollution as far as practicable;
- monitoring the performance of our contractors to ensure good quality of works and to prevent or mitigate potential environmental impacts arising from our projects;
- complying with relevant legal and other requirements; and
- sustainable construction with due consideration to balancing environmental, social and economic needs.

We improve our services through regular review of our Quality Management System, Management Objectives and Targets, and through identification of opportunities for continual improvement.

About this Report

This report covers the period from 1 January to 31 December 2010. It shows the environmental awareness of our work and efforts in supporting the Clean Air Charter, environmental management in capital works projects, research and technology, asset management and stakeholder's engagement. Our environmental awards, achievement of environmental objectives and targets for 2010, and environmental targets for 2011 are also included in this report.

To reduce paper consumption, this report is published in CD-Rom format and uploaded to our web site.



Clean Air Charter

“The Government signed the Clear Air Charter launched by the Hong Kong General Chamber of Commerce and the Business Coalition. We are committed to improve air quality and strictly follow all relevant guidelines for the implementation of the principles and spirit of the Charter.”

The Energy and Emission Management (EEM) Team

In September 2007, an EEM Team was set up to design and implement measures to reduce emissions and to minimise energy consumption in offices. In the past years, a series of measures was implemented to strive for achieving our environmental targets.

Energy Consumption in 2010

Energy Consumption for Public Lighting

The territory-wide public lighting electricity consumption in 2010 was 136,429,437 kWh, the corresponding indirect emission was 260,580 kg of sulphur dioxide (SO_2), 158,258 kg of nitrogen oxides (NO_X) and 8,186 kg of respirable suspended particulates (RSP). As affected by the weather condition which govern the burning hours in the year, there was a slightly increase in 1.4% in public lighting electricity consumption in 2010 as compared with 2009.

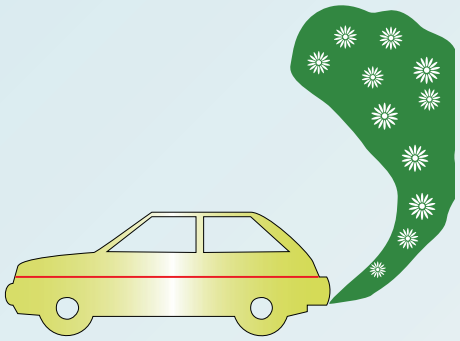
Energy Consumption in Office

The total energy consumption of our offices in HMTGO for the period from January to December 2010 was 5,471,737 kWh. The corresponding indirect gas emissions were 10,451 kg of SO_2, 6,347 kg of NO_X and 328 kg of RSP. There was an increase of 7.3% in consumption as compared with 2009. In order to identify the source of electricity consumption for further saving measures, seperate meters were installed in each floor of HMTGO for close monitoring of the electricity consumption.

Energy / Emission Reducing Measure

Environmental-Friendly Contract Cars: Reduce Pollutant Emission

Measures have been adopted in reducing air emission of vehicles in our contracts, including the introduction of environmentally friendly government and contract vehicles. We have adopted environmentally friendly contract cars extensively in our term contracts which are of the type approved by Environmental Protection Department as environment-friendly petrol private cars. Furthermore, some of our contracts adopted vehicles equipped with "hybrid system" engines. A hybrid system engine allows the vehicle to switch between petrol and battery power automatically with equivalent performance and output to the vehicle.



Reducing the use of Volatile Organic Compounds (VOC)

With the implementation of the Air Pollution Control (Volatile Organic Compound) Regulation (CAP311W) on 1 January 2010, we have correspondingly amended the Register of Environmental-related Legal and Other Requirement under the departmental operation procedure (OP) HyD-EM-003 to enhance staff's awareness towards the latest statutory requirement when performing their duties.

Green Office Management

In support of the Government's drive to save natural resources, we are committed to make every endeavor to make our green office management a greater success.

- Energy Saving

The following measures have been promulgated to enhance energy saving in offices -

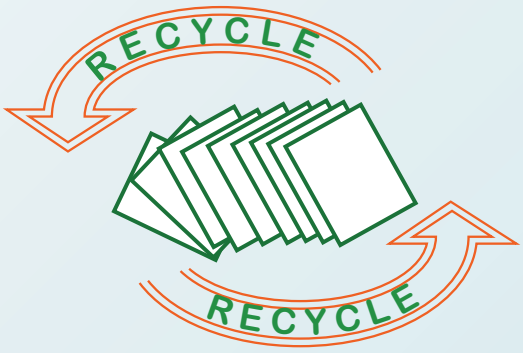
- Appoint Energy Wardens in every office/ division to monitor the usage of light and to keep the lumination level to acceptable minimum level.
- Review the lumination level arising from the change of room use.
- Maintain air-conditioning not lower than 25.5°C in hot seasons.
- Switch off lights during lunch or when staff are away for long hours.
- Switch off computer equipment and electric appliances when not in use.

- Encourage the use of staircase for inter-floor traffic.
- Use automatic low flow water taps in toilets.
- Monitor the electricity consumption of different floors by individual meters installed on each floor of HMTGO.

- Paper Saving

In 2010, we consumed 19,159 reams of paper and 94.82% of them were recycled paper. With the concerted effort of our staff, we achieved a saving of 4.04% in paper consumption as compared with 2009. 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 blank side of used paper for drafting/ photocopying for internal document/ correspondences/fax documents.
- Use electronic means extensively for communication (for instance, use electronic files and keep the use of hard copies to minimum).
- Reuse envelopes and files covers.
- Encourage the use of recycled paper.



- Waste Recycling

We treasure waste with recycle value by –

- Putting up green boxes to collect reusable envelopes and papers;
- Collecting computer printer toners and ink cartridges for refilling and recycling;
- Putting up recycling boxes to collect used paper, CDs, plastic bottles and aluminum cans for recycling.

- Water Saving

In 2010, a toilet renovation project was commenced in HMTGO. To align with the water conservation initiative, we have adopted the use of dual-flush toilets, automatic low flow water taps, low flow showers and sensor type urinals. These new components could effectively control the duration of water flow and also keep the water flow at low level. We aim to complete the renovation project by late 2011.

Renovated Toilet

Low Flow Taps

Auditing and Reporting

Annual Environmental Audit

To maintain the impetus of green measures in housekeeping, we conduct annual environmental audits in all 15 offices located in different premises. The objectives of conducting annual environmental audits are:

(i) to assess compliance with the green housekeeping guidelines;

(ii) to identify non-compliance and recommend remedial actions;

(iii) to promote good environmental management; and

(iv) to increase staff awareness of green management and occupational safety and health initiatives.

Carbon Audit

Two carbon audits were conducted for HMTGO by the Building Management Office (BMO) in 2010 to track the effectiveness of Green House Gas reduction efforts. The relevant data are being studied by the BMO.

Energy Audit

To upkeep our effort in energy saving, an Energy Audit for HMTGO was conducted by Government Property Agency in 2010 and three energy management opportunities were identified :

1. Replacement of the T8 fluorescent lighting fittings with T5 ones in areas which have not been covered yet;

2. Installation of motion sensors in carparking area so that lighting would be switched off when no motion is detected; and

3. Replacement of the existing fluorescent lighting fixtures by dual lights fixtures complete with motion sensors in staircases.

We have incorporated part of the above mentioned opportunities in our environmental targets and would target to commence installation / replacement work in 2011.

T5 Fluorescent Light Tube

Dual Light Fixture

Benchmarking

Accredited Environmental Management System

The Environmental Management System (EMS) of Highways Department has been accredited to ISO14001 standard since 2003.

Indoor Air Quality Certification

The indoor air quality of HMTGO has fully compiled with the Good Class of the Indoor Air Quality Objectives since 2003.

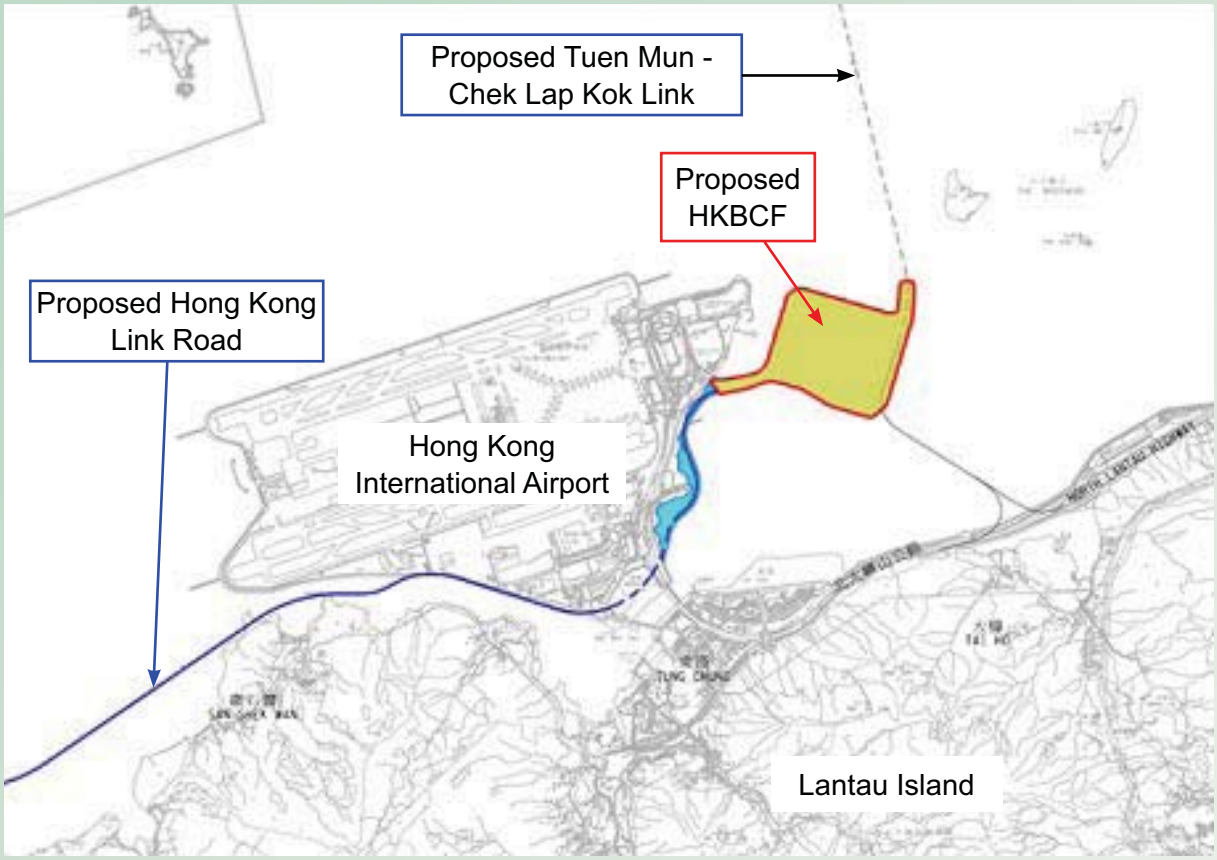
Environmental Management in Highways Projects

“Our management philosophy puts the environment in the front of all project activities. We systematically manage impacts that our works may have on the environment for the benefit of community.”

Non-dredge Reclamation Design for "Hong Kong-Zhuhai-Macao Bridge Related Projects – Hong Kong Boundary Crossing Facilities"

The Hong Kong – Zhuhai – Macao Bridge (HZMB) is an unprecedented important strategic road corridor which links up three regions viz Hong Kong, Zhuhai and Macao in the Pearl River Delta of China. It provides opportunities for significant social and economic development in these areas for coming decades. The HZMB related projects within Hong Kong include the Hong Kong Link Road (HKLR), Hong Kong Boundary Crossing Facilities (HKBCF) and the Tuen Mun - Chek Lap Kok Link (TM-CLKL). It is envisaged that the HZMB related projects will start construction within similar timeframe in 2011 for completion in 2016.

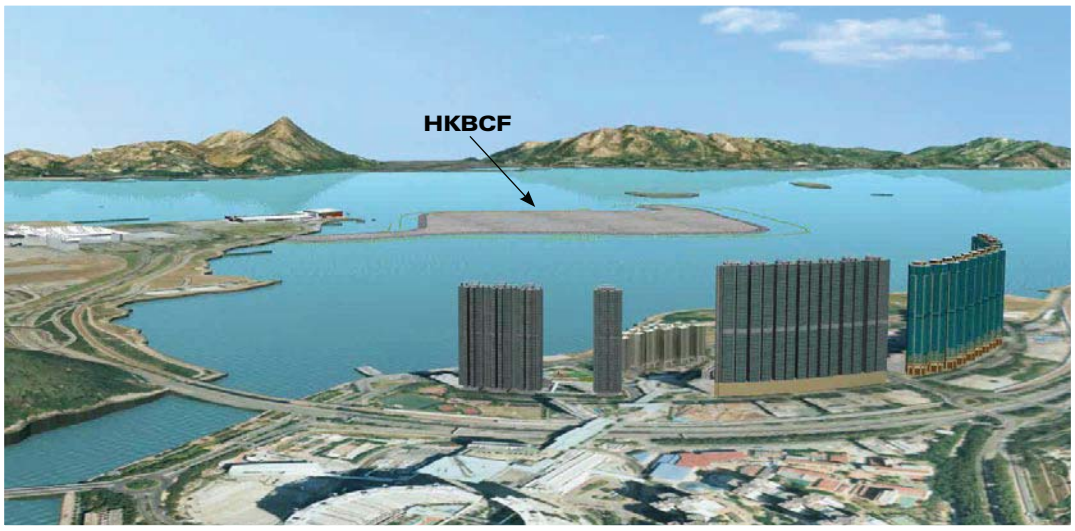
The Hong Kong Boundary Crossing Facilities (HKBCF) reclamation works involve the construction of an artificial island to the northeast of the Hong Kong International Airport to provide 130 ha of land for the HKBCF development and 19 ha of land for the southern landfall of the Tuen Mun-Chek Lap Kok Link respectively.



Location plan of Hong Kong Boundary Crossing Facilities

Non-dredge Reclamation Scheme

The preliminary reclamation design for the HKBCF proposed a partially dredge scheme (i.e. marine mud underneath seawalls will be dredged completely whilst the main reclamation will be non-dredged with band drains installed to accelerate consolidation). While the partially dredge scheme satisfies all the environmental requirements and standards, the project team strives for a more environmentally friendly and sustainable design. Eventually, an unprecedented non-dredge reclamation scheme in Hong Kong (both seawall and main reclamation are not dredged) using steel sheet pile cellular seawall structures is developed.



Photomontage of Hong Kong Boundary Crossing Facilities (HKBCF)

Large diameter (about 26 and 31m) steel sheet pile cells will be sunk through the marine deposits to form the perimeter seawall. The cells will then be backfilled with sand or inert construction and demolition materials to form a stable massive structure to retain the bulk reclamation behind. The non-dredge reclamation scheme is more environmentally friendly and sustainable because it:

Reduces

- the amount of dredging and disposal of marine deposits by 97%;
- the release of marine suspended particles during construction by 70%;
- the demand of natural sandfill for backfilling by 50%;
- the marine traffic during construction by 50%;

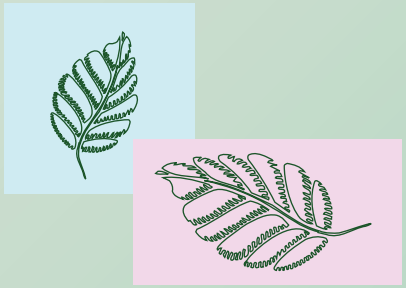
Increases

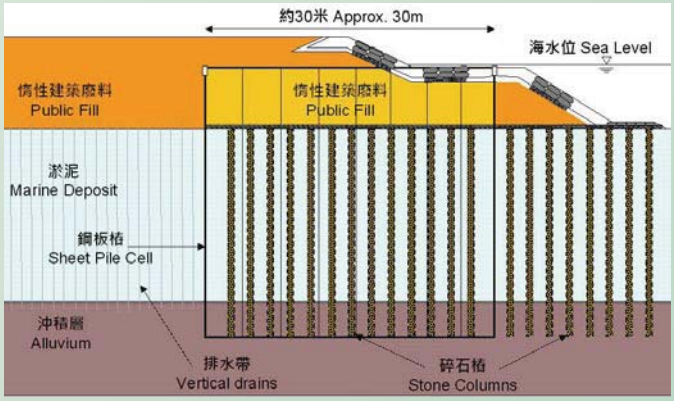
- the use of inert construction and demolition materials by 25%; and

Minimises

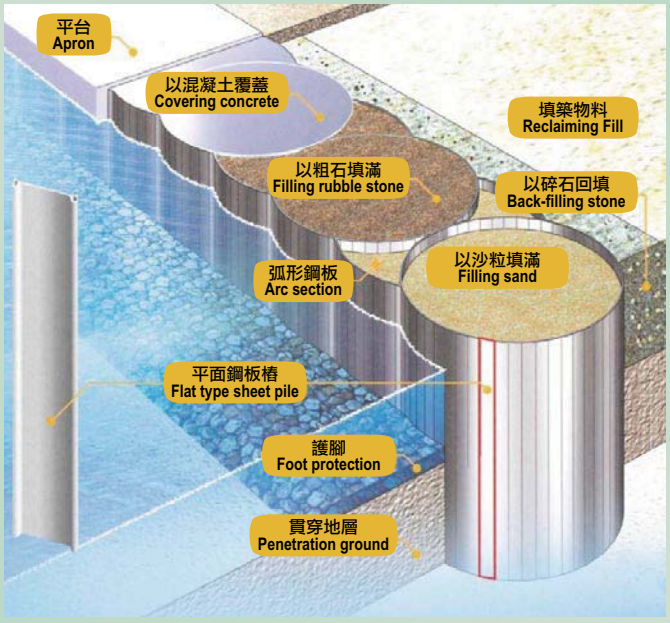
- the disturbance to marine ecology, Chinese White Dolphins and fishery.

The non-dredge reclamation scheme was welcomed by Hong Kong's prominent green groups during various discussion sessions in September 2010.





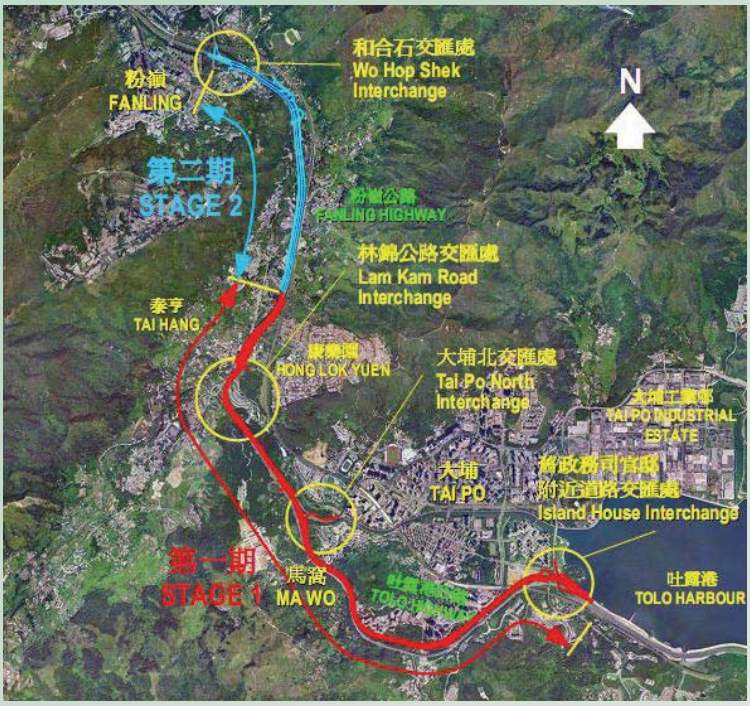
Typical cross section of non-dredge reclamation scheme



Major components of non-dredge reclamation scheme

Thematic Planting for "Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling"

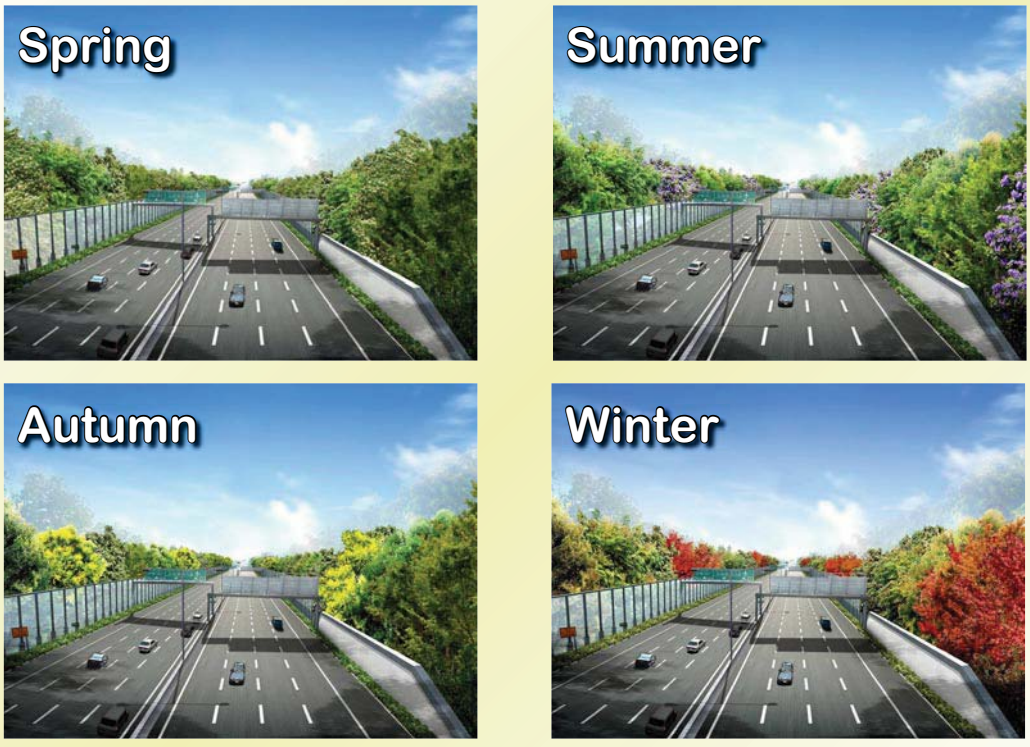
Tolo Highway and Fanling Highway are expressways forming a vital part of Route 9. In order to alleviate the existing congestion problem and cater for the future traffic demand, widening of the existing highways from dual 3-lane to dual 4-lane was proposed. The Project is divided into two stages. Stage 1 involves the widening works for a section of Tolo Highway between Island House Interchange and Tai Hang while Stage 2 involves the widening works for a section of Fanling Highway between Tai Hang and Wo Hop Shek Interchange. Stage 1 has commenced in 2009 for completion in 2013.



Key plan of the project

Thematic Planting

Trees on existing man-made slopes would need to be felled for the widening works. Compensatory planting along the widened corridor was proposed to compensate for the loss. In order to create a unique driving experience for the drivers as well as a nice scenery for residents living nearby, a seasonal theme in the highways by choosing four different species of trees was adopted. With this concept, the two sides of the widened highways would be lined up with tall green trees giving distinct flowers or changing leave colour in different seasons of the year.



Thematic planting for four seasons

Comprehensive Environmental Monitoring and Enhanced Liaison for "Central-Wan Chai Bypass and Island Eastern Corridor Link"

The Central - Wan Chai Bypass and Island Eastern Corridor Link (CWB) Project consists of the construction of 4.5 km dual three-lane trunk road with a 3.7 km long tunnel. It will link up the Rumsey Street Flyover at Central with the Island Eastern Corridor at North Point. The construction works commenced in end 2009 for commissioning in 2017.

Water Quality Monitoring

Water quality monitoring on Dissolved Oxygen, Turbidity and Suspended Solid had been conducted 3 times per week to ensure the dredging and filling operations would not result in unacceptable impacts on Victoria Harbour. In particular, silt curtains were deployed around dredging and filling area to protect the water quality in the proximity area and silt screens were installed around seawater intakes to protect the water quality thereat. Besides, in order to mitigate water quality impact arising from dredging works, maximum daily and hourly dredging rates had been specified in the Environmental Permit for compliance.

Deployment of silt curtain around dredging area

Installation of silt screen around seawater intake

Air Quality Monitoring

Air quality monitoring on Total Suspended Particulates had been conducted once per week to ensure dust generated from construction would not result in unacceptable impacts on the surrounding environment. Besides, odour patrol will be carried out by independent qualified person during construction in Summer time when the effect of odour is expected to be greater.

Noise Monitoring

Noise monitoring had been conducted once per week to ensure noise generated from construction would not result in unacceptable impacts on the surrounding environment. Besides, in order to closely monitor the noise impact to the residential area in North Point, real-time noise monitoring stations had been set up thereat for continuous monitoring.

Environmental Project Committee and Community Liaison Group

An Environmental Project Committee (ENPC) had been set up to oversee and facilitate effective control of the cumulative environmental impacts arising from the works under the CWB Project. Members of the ENPC included:-

- the environmental permit holder and further environmental permit holders for the whole Project;
- the Environmental Team; and
- the Independent Environmental Checker.

In addition, Community Liaison Groups (CLGs) had been set up for each of North Point, Causeway Bay and Central District. Each group comprised representatives from the relevant parties, including owners' corporation, management offices, local committees and schools of affected areas, to facilitate effective communication and prompt handling of environmental related enquiries and complaints.

Community Liaison Group Meeting

Community Liaison Group Meeting

Other Common Environmental Measures taken on Site

Dust Control

1. Covering by tarpaulin sheets to prevent fugitive dust and improve visual impact

Large scale covering by tarpaulin sheet on exposed slope

Small scale covering by tarpaulin sheet in work front

2. Spraying water to suppress dust generation

Installation of water sprinkler system to water temporary haul roads

Use of water lorry equipped with spray nozzles to suppress dust generation

Manual spraying of water to suppress dust generation

Paved area for the regular movement of vehicle

3. Wheel washing basin to prevent construction dust nuisance to public roads

Automatic wheel washing machine

Wheel washing basin

4. Use of mechanical cover in transfer of construction and demolition material

Side view of mechanical cover for dump truck

Top view of mechanical cover for dump truck

Waste Water Management

1. Installation of wastewater treatment facility to treat and/or recycle wasterwater from construction sites before discharge

On-site wastewater treatment facility

2. Inspect, maintain and clean the drain to prevent flooding.

Regular maintenance of drain

Noise Mitigation

1. Acoustic Screen / Panel / Enclosures to mitigate noise

Acoustic screens

Temporary acoustic enclosure on concrete breakers during concrete/rock breaking up works

2. Regular measurement of noise level

Sound level meter to measure the noise level

Waste Management

1. On-site sorting of construction and demolition material

On-site sorting facilities and waste storage area

On-site sorting of construction and demolition material

2. Encourage the recycle of material

Recycle bins in construction site

Sustainable Energy

1. Grass roofing of site office to reduce greenhouse effect

Grass roofing of site office

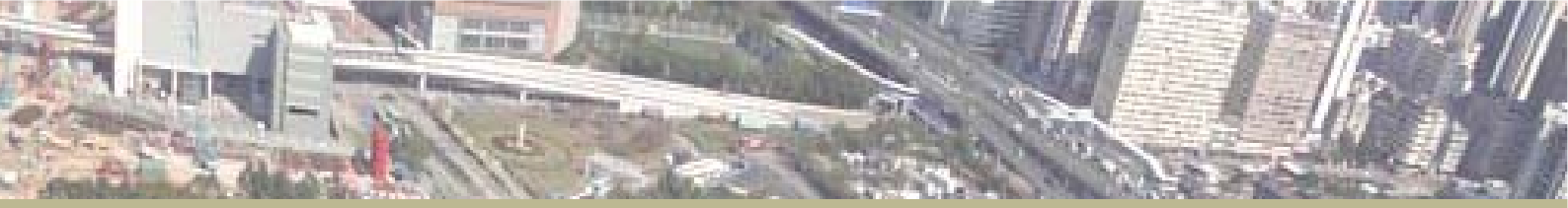
2. Use of energy generated by windmill to reduce consumption of non-renewable energy

Windmill

Tree Preservation

Trees are protected within the site area

Protection and preservation of important tree



Environmentally Friendly Railways Development

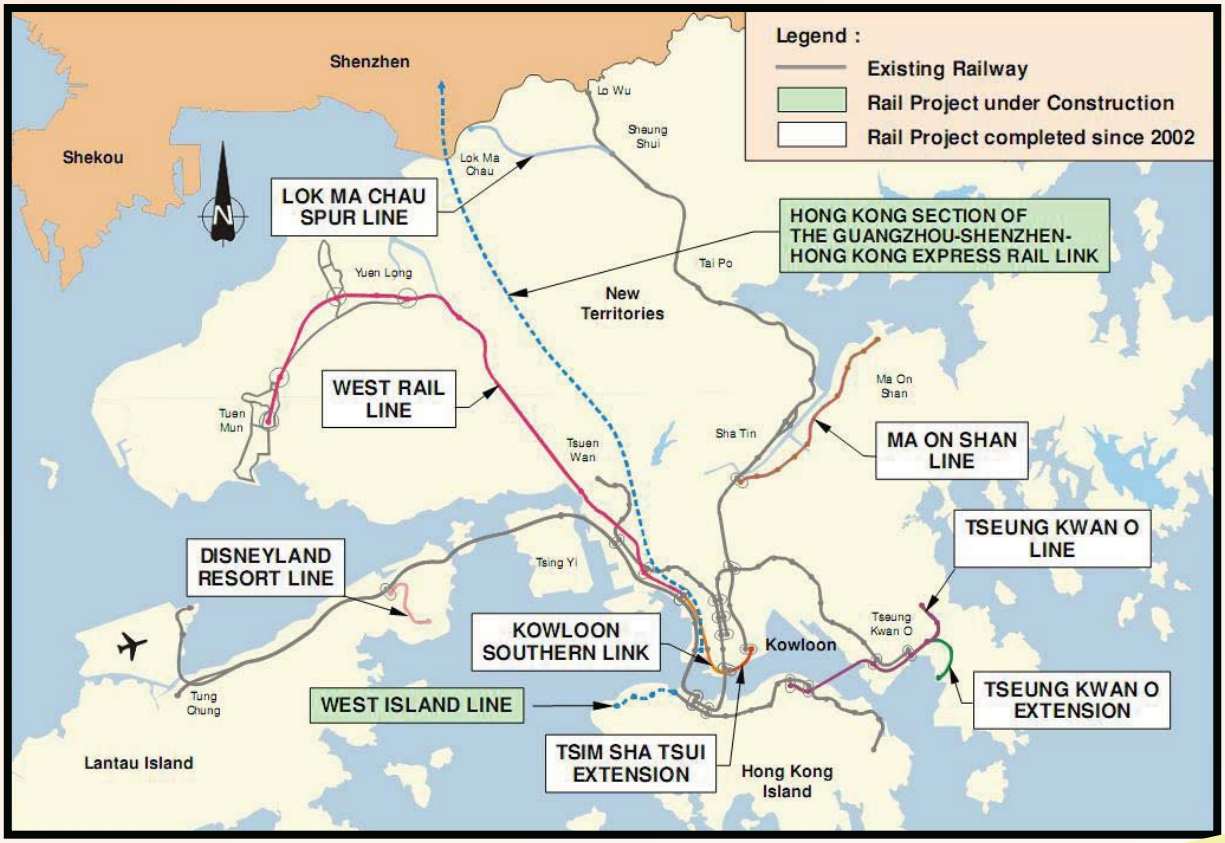
“Railways are safe, efficient, reliable, comfortable and environmentally friendly mass transport carriers. The government policy emphasizes on railway development as the backbone of public transport. We adhere to this policy and aim at planning and implementing a railway system at world-class level.”

Railway Development Strategy

Railways play a key role in Hong Kong's transport systems and Government accords a high priority to railway development. The Railway Development Strategy 2000, which provides a blueprint for the next phase of railway development, includes a number of new railway schemes to meet Hong Kong's increasing transport needs in a sustainable manner over the next two decades. Less reliance on road-based transport will alleviate the pressure on transport systems, reduce overall tailpipe emission from vehicles and, in turn, lessen the impact on the environment.

Eight new railway lines, or extensions of existing lines, were commissioned between 2002 and 2009. The construction of the West Island Line and the Hong Kong section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link are in progress now for completion in 2014 and 2015 respectively. In addition, the Shatin to Central Link, the Kwun Tong Line Extension, and the South Island Line (East) are in the design stage.

We started to review and update the Railway Development Strategy 2000 in March 2011 for a period of about two years. This comprises reviewing the priority of the railway network expansion proposals that were identified previously but not yet implemented such as the Northern Link, North Hong Kong Island Line, the South Island Line (West), and the Hong Kong–Shenzhen Western Express Line. The target is to update the railway development strategy to meet the transport demands for railways up to 2031.



Alignments of Eight New Railway Lines

Environmental-friendly Construction of West Island Line

Construction of West Island Line (WIL) commenced in July 2009. To minimise impacts that construction works may have on the environment, due consideration was given to the implementation of various environmentally friendly construction methods such as noise mitigation and dust control as described below.

Noise Enclosures

The construction works of the WIL project are governed by the Environmental Impact Assessment Ordinance. The normal working hours are from 7am to 7pm. MTRCL requires its contractors to minimise the impacts on the nearby residents due to their construction works. MTRCL is carrying out stringent supervision of the construction works in order to ensure that any noise, waste water and dust generated from the construction activities comply with the legal requirement and standard. At the King George V Memorial Park access shaft site, Kennedy Town Praya construction site and Hill Road Rest Garden construction site, blasting is being carried out for tunnelling works. In order to minimise the construction noise, large noise enclosures at the King George V Memorial Park access shaft site and Kennedy Town Praya site were completed in July and October 2010. The large noise enclosure in Hill Road Rest Garden was also completed in February 2011.

Noise Enclosure at Kennedy Town Praya

Noise Enclosure at King George V Memorial Park

Noise Enclosure at Hill Road

Elevated and fully Enclosed Conveyor Belt for Transportation of Excavated Materials

WIL is an underground railway. Its construction will generate a large quantity of excavated materials. In order to minimise the traffic and environmental impact on the densely populated Western District and the nuisance to the district, majority

of excavated materials generated from the WIL's tunnelling work will be disposed off site by barges. In order to further reduce the traffic impacts on the local roads and dust impacts arising from transportation of excavated materials by trucks, MTRCL has constructed a fully enclosed conveyor belt system connecting the vertical shaft at Kennedy Town Praya and the temporary barging point located at the Western District Public Cargo Working Area. Most of the excavated materials will be transported to the shaft via underground adit from various construction sites, lifted up and put on the fully enclosed conveyor belt, transported to the temporary barging point, loaded on the barges and then disposed off site. The transportation of excavated materials through the fully enclosed conveyor belt system can effectively reduce the dust impacts and the traffic impacts on the local roads.

Location of the Conveyor Belt System

Construction of the Conveyor Belt System

Environmental Monitoring during Construction of The Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link

The Hong Kong Section of Guangzhou-Shenzhen-Hong Kong Express Rail Link (XRL) is about 26km long stretching from West Kowloon to the boundary at Huanggang. Construction commenced in January 2010 for completion in 2015.

During the planning and design of XRL, its effects on environment have been considered and assessed in the Environmental Impact Assessment (EIA) Report. Environmental mitigation measures together with their implementation programme are recommended in the EIA to alleviate and limit the identified impacts. Since the commencement of XRL construction in early 2010, these measures are being employed according to their implementation programmes. Enforcement of the environmental monitoring and auditing (EM&A) system is an effective tool to manage this implementation process and to monitor the environmental performance of the XRL. Effectiveness of the measures and compliance with relevant environmental statutory criteria are continuously checked by this EM&A system throughout the construction period.

A total of 34 noise monitoring stations and 17 air quality monitoring stations have so far been installed along the XRL alignment. Baseline monitoring at each station has been completed prior to the commencement of construction works at the relevant works areas, and regular impact monitoring is performed during construction phase. The monitoring results and monthly EM&A Report are made available to the public via a dedicated Internet website: (*http://www.mtr.com.hk/eng/projects/envir_xrl.html*), creating an open and transparent channel for the public.

Construction of the Urban Section

Construction of XRL for the urban section commenced since January 2010. The works areas include West Kowloon, Nam Cheong, Kwai Chung and Shek Yam.

Construction noise and dust are often the major concerns for the crowded urban area, and measures have accordingly been undertaken on site to control the potential impacts. Mitigation measures include the deployment of quieter construction plants and temporary noise barriers for controlling noise; installation of enclosure for tipping hall at barging points; and provision of regular watering on site to suppress dust generation. The effectiveness of these measures is regularly checked by the Environmental Team during routine environmental audit.

Dust Control Mitigation Measures

Temporary Noise Barrier

Construction of the Rural Section

Apart from construction noise and dust impacts, ecological issue is another key challenge for the construction works under the rural section of XRL. The rural section includes the works areas at Pat Heung, Shek Kong, Tai Kong Po and Mai Po, which are considered to be of ecological value.

Ongoing monitoring for avifaunal species is regularly conducted by qualified ecologists at Mai Po and Pat Heung to evaluate the impact on the avifauna. The monitoring results obtained so far indicated that there is insignificant fluctuation in the number of species and abundance of avifauna. Besides, noise monitoring is carried out at the nearby fish ponds during construction phase.

A comprehensive groundwater monitoring strategy along the project alignment is also formulated and contingency plans are proposed to deal with any groundwater drawdown that might occur during construction.

The project team will be working closely with relevant government departments, green groups and local communities to monitor and minimise impacts to the environment throughout the construction stage.

Regular Ecological Monitoring at Mai Po

Research and Technology

“We continue to focus our researches on environmentally friendly technology, such as incorporation of recycled materials into our road pavements and street furniture and using of energy efficient devices in public lighting.”

Recycled Materials

Recycled Asphalt Pavement

The amount of recycled asphalt pavement (RAP) incorporated in bituminous materials is limited to 15% as stipulated in the General Specification 2006 edition. Based on our research study conducted in 2009, we have increased this RAP limit to 20% in a new maintenance contract commenced in April 2011. At the same time, site trials for adding further amount of RAP in bituminous materials continue and, subject to the satisfactory site performance, we aim to increase the amount of RAP to 30% in future maintenance contracts.

Trial site using 30% RAP at Verbena Road

Paving Blocks with Recycled Glass

Paving Blocks with Recycled Glass

Site trials on the public footpath along Wang Kwong Road, Kowloon Bay confirmed that waste glass cullets can substitute part of the aggregates in concrete paving blocks. The trials revealed that the performance of the paving blocks in that footway did not differ from that of the conventional concrete pavers.

With Development Bureau's directive, concrete paving blocks with recycled glass have been used under the existing road maintenance contracts since October 2010 and the mandatory requirement of using concrete paving blocks with recycled glass has also been added to the specifications of new road maintenance contracts. Recycled glass cullets shall be included as recycled fine aggregates in the paving blocks and shall constitute 20% to 25% by weight of the total aggregates.

Synthetic Gully Grating

Site trial of synthetic gully grating, which comprises mainly recycled waste glass and old tyres, has proved successful and the specification of this material has been prepared in 2010. The manufacturing process of this gully grating has no air pollution. The use of this synthetic gully grating has been incorporated into the maintenance contract commenced in April 2011 as an alternative option to traditional cast iron grating.

Synthetic Gully Grating

Hot-in-place Recycling by Thermal Patcher

The use of thermal patcher to perform minor asphalt pavement repair works up to 2.5m^2 has been stipulated in two maintenance contracts of Highways Department commenced in 2009. Truck-mounted plant heats up and softens the existing asphalt in defective area using infra-red radiation. The softened asphalt is then compacted with additional virgin asphalt to create a seamless reinstatement.

In order to further explore the wider applicability of hot-in-place recycling on pavement preservation, a series of the field trials on larger size thermal patcher was conducted in 2010 to confirm the effectiveness of its application under local working conditions, particularly on road sections subjecting to stringent environmental and traffic constraints. Based on the field observations during the trial, it was found that larger size thermal patcher was a feasible engineering option for repairing bituminous pavement distresses. The pavement surface of a typical 30m long traffic lane could be recycled by larger-size thermal patcher in a 6 to 8 hours of temporary lane closure, which is only about 100m^2 per shift. Its quality is comparable to that accomplished by traditional resurfacing or square patching works. This method recycles the existing asphalt which significantly reduces the use of virgin asphalt as compared with the conventional resurfacing method. Longer-term performance will be monitored.

While the thermal patcher is more environmentally friendly, its productivity however is relatively low. For this reason, this technique is limited to use for local resurfacing and it cannot replace the conventional cold milling and resurfacing method which is still considered more appropriate for extensive use.

Field trial of hot-in-place recycling using larger size thermal patcher

Energy Efficient Device for Public Lighting

By introducing latest technologies in public lighting to replace the conventional equipment, Highways Department achieved energy saving in previous years. In order to further reduce the energy consumption by public lighting, Highways Department will continue to look for new technologies and launched them on site progressively.

Electronic ballasts for road lights

Electronic ballasts have higher energy efficacy than conventional electromagnetic ballasts and can be programmed to adjust the lamp illumination to suit the local conditions. We replaced 3,000 conventional electromagnetic ballasts with electronic

Electronic Ballast

ballasts in 2010 and achieved an annual energy saving of about 680,000 kWh. In 2011, we will strive to replace further 2,500 electromagnetic ballasts with electronic ballasts.

Non-illuminated Retro-reflective traffic bollards

The initial trial to explore the feasibility of using, in certain application areas, non-illuminated retro-reflective traffic bollards (NRTBs) which do not require electricity supply but are able to be seen clearly by motorists during both day time and night time, had been conducted. A further trial to compare the performance and cost-effectiveness of various brands commenced in 2010. About 500 nos. of

Non-illuminated Retro-reflective Traffic Bollards

NRTBs were installed in various districts under these trials. The further trial will be continued in 2011 and 400 nos. of NRTB of different brand will be installed.

White Light Sources

Replacement of conventional yellowish light source by white light sources of a lower illumination level is being studied. When a light source of good colour rendering is used, e.g. white light sources, which include LED, CosmoPolis lamps and Ceramic Discharge Metal Halide (CDM) lamps, lowering of the lighting class (illumination level) for subsidiary roads, including footpath and rear lanes could be considered. With the recent introduction of screw-in type low-wattage CDM lamp, it can be used to replace the conventional yellowish

high pressure sodium (SON) lamps in order to achieve energy saving for footpath and rear lane road lighting. As the replacement of the luminaire is not necessary for CDM lamps, the expense in capital cost is relatively low.

In 2010, 168 nos. of CosmoPolis lights were installed for trial with a view to lowering the lighting class for subsidiary roads and an annual energy saving of 32,200 kWh in electricity consumption was achieved. A small scale trial use of low wattage CDM lamps was also conducted in 2010 in which 12 nos. 50W CDM lamps were installed at footpaths and rear lanes to replace mainly 70W SON lamps. This resulted in an additional annual saving of 1,320kWh in electricity consumption.

Looking ahead, we shall continue our trials in more rear lane lights and relevant footpath lights in 2011 so as to determine the public acceptance in using white light source at their vicinities. In addition, we shall explore the feasibility and cost-effectiveness of using white light sources in other locations. We shall gauge the acceptance of the commuters where white lighting with lower intensity has replaced the conventional yellowish SON lamps. With no particular strong critics received, we shall consider expanding implementation of white light sources in future.

LED road lights and LED light tubes

While LED lighting still cannot match the energy efficiency of the high wattage high pressure sodium lamps that we use in major roads and main roads, its development has been advancing fast in recent years. The LED light efficacies are becoming comparable to traditional energy efficient lamp sources in lower wattage range. LED road light has the potential to replace lower wattage high pressure sodium lamp with an estimated 10% saving potential. LED light tube has the potential to become an alternative (though more expensive) to the use of T5 fluorescent light tube to replace T8 fluorescent light tube with the same estimated 30% saving potential.

In order to explore its potential, we installed 31 nos. of low wattage LED road lights in 2010. We also installed 243 nos. of LED light tubes in footbridge and subway in the same period. We shall continue to conduct further trial of these LED road lights and LED light tubes to explore their performance in 2011. Meanwhile, the high costs of the LED technology are preventing it from wide-spreading application. We shall also monitor the capital cost movement of this new technology in order to determine its cost-effectiveness for possible further application.

LED Road Lights

LED Light Tubes for Footbridge

Asset Management

“Enables sustainable construction with due consideration to balancing environmental, social and economic needs.”

Featured Concrete Paver

It has always been our goals to create and maintain safe and attractive streets for road users and pedestrians. Clay bricks, natural/ artificial granite pavers and concrete pavers/ concrete pavement have been used to suit different district characters in our streetscape enhancement schemes. Our departmental goal is to minimize waste and use more sustainable paving materials.

During 2010, a review to explore opportunities to use more sustainable paving materials in our streetscape enhancement projects was carried out. Whilst clay brick pavers have generally proved to be popular and welcome by the general public in recent years, the review revealed that they require high energy to produce compared with concrete pavers. Concrete pavers have the additional benefit of being possible to manufacture with less energy and from locally recycled waste such as glass bottles. However, one common criticism of concrete pavers/concrete pavement is that they are less attractive than clay pavers. Therefore, the 2010 review examined different designs of concrete pavers in the market and compared their relative technical, aesthetical and economical compatibility with clay pavers.

The initial conclusions from this review suggest that these new concrete paving products have potential to become cost effective, visually attractive and environmentally friendly pavers. Street enhancement projects will be selected to conduct trials for the new pavers with a view to ascertaining their technical suitability and acceptance by the public.

A Balanced Approach to Preservation and Risk Management for Wall Trees

Hong Kong's wall trees are mainly Ficus species whose vigorous roots provide anchorage by spreading across and penetrating the face of masonry walls. Although, when mature, such trees are an interesting landscape feature in the streetscape and provide a welcome contrast to the dense urban area, they also pose a risk to pedestrians and vehicles passing underneath as well as the long-term stability of the host walls. As the tree grows, the roots can cause cracking in the walls and displacement of masonry blocks. This is exacerbated by the leveraging effect of the trees on the walls, particularly during typhoons.

Based on past wall tree failure cases, the extent of root penetration into walls was observed to be less than anticipated and that wall tree failure was more likely due to uprooting than trunk breakage. Since the force of wind on wall trees is proportional to the surface area of the crown, pruning the canopy to reduce the loading was a common measure to maintain a wall tree in a safe condition with minimal impact on its health.

In order to retain these interesting trees on one hand and to ensure public safety on the other, a risk assessment study was undertaken in 2010 for all wall trees (188 nos) within registered slopes maintained by Highways Department to identify the optimum maintenance strategy. Information on the health of the tree, the existence of dead or diseased branches, the extent of root attachment to the wall, the occurrence of signs of masonry displacement, the presence of structural cracks, and the condition of adjacent footpaths etc. were collected.

Following the risk assessment exercise, selective pruning in accordance with international horticultural practice to remove defective branches and reduce the loading of the crown as well as periodic checks by a separates technical team on the structural integrity of the walls and appropriate mitigation measures are also made. Notwithstanding the objective of retaining these attractive wall trees to enhance the urban streetscape, safety remains the first priority. If any wall tree is considered to pose a hazard to the public or property that cannot be mitigated satisfactorily, then felling of the tree will be carried out promptly.

Slope Greening

Highways Department has put in hand a proactive woodland management strategy with the aim of long term enhancement to the landscape and environmental quality of our slopes. Grass slopes are gradually planted with pioneering tree species to enrich the planted environment on the hillside. Woodland management operations, (such as thinning of vegetation for better tree growth, clearance of undesirable tree species eg. Leucaena leucocephala and replacement plantings of species like Liquidambar, Morus and Castanopsis etc for attraction of butterflies and birds etc.) are being carried out to ensure healthier woodland development and ultimately a more diversified ecosystem.

Lung Fu Road after operation (2010)

Lung Fu Road before woodland management operation (2009)

Over 85,000 number of trees and 200,000 number of shrubs, mostly native species, were planted in 2010 on slopes being maintained by Highways Department. These plants were carefully selected for their visual interest and attractiveness to wildlife and the planting designs have been professionally prepared to fully exploit the site potentials for the creation of a visually pleasing landscape with seasonal effect and benefits to the local flora and fauna habitat.

Stakeholders Engagement

“Striving for improvement to our services through engagement with both internal and external stakeholders by general environmental management, training activities and public participation.”

General Environmental Management

Highways Department fully implements the Environmental Management System (EMS) certified to ISO 14001:2004. Under the EMS, the environmental performance and the compliance with the environmental requirements including various legislations are regularly checked and monitored.

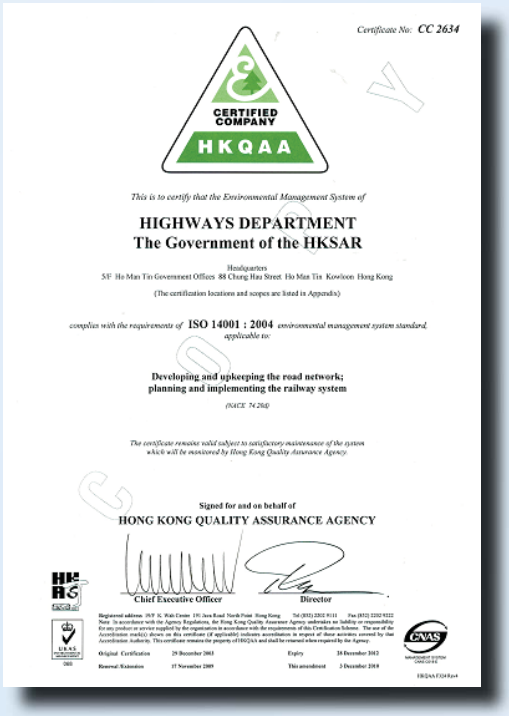
We monitor the environmental performance of our contractors through the following measures:-

- Regular environmental walks jointly conducted by the contractor and the Engineer's Representative
- Regular inspections and monitoring by the Environmental Team and the Independent Environmental Checker required for designated projects under the Environmental Impact Assessment Ordinance
- Monthly Site Safety and Environmental Management Committee Meeting chaired by the Engineer's Representative
- Regular environmental inspections by our project officers

In the event that a contractor is found to be non-compliant, preventive action and/or corrective action will be identified and implemented. Project staff regularly review the progress of the follow-up actions taken and report them to the senior management until completion of the actions.

In handling public complaints including those related to environmental matters, the Department has established a well-implemented system in order to ensure the complaints are handled systematically and promptly. Upon the receipt of public complaint, it will be passed to relevant subject officers for investigation and immediate action. All subject officers are responsible to inform the complainant on the progress of the matter until the action is completed. Also, the Public Relations Unit of the Department collects, compiles and analyses complaint statistic and then packages as a valuable experience for reference by the Department for enhancement in the quality of service.

Besides, internal and external audits to the EMS are organized annually to monitor the overall performance of different offices within the Department regarding the compliance of relevant environmental standards and procedures. The audits results are presented in the Departmental Quality Management Committee meeting for the discussion by the senior management.


Certificate No. CC 2634

CERTIFIED COMPANY
HKQAA

This is to certify that the Environmental Management System of

HIGHWAYS DEPARTMENT
The Government of the HKSAR

Headquarters
5/F Ho Man Tin Government Offices 88 Chung Hau Street Ho Man Tin Kowloon Hong Kong

(The certification locations and scopes are listed in Appendix)

complies with the requirements of ISO 14001 : 2004 environmental management system standard, applicable to:

Developing and upkeeping the road network; planning and implementing the railway system

(QACE 34.20)

The certificate remains valid subject to satisfactory maintenance of the system which will be monitored by Hong Kong Quality Assurance Agency.

Signed for and on behalf of
HONG KONG QUALITY ASSURANCE AGENCY

Chief Executive Officer Director

Original Certification 29 December 2003 Expiry 28 December 2012
Renewal/Extension 17 November 2009 This amendment 3 December 2010

Certificate of ISO 14001:2004 Environmental Management System

Environmental Training

In-house Environmental Training

In 2010, various training courses were organized to acquaint our staff with the environmental management system implemented in the Department. For new comers, Half-day Awareness courses were organized which aimed at providing them the basic knowledge of the Environmental Management System (EMS) complying with ISO 14001 and facilitating them to understand the principle and operation of the EMS.

In order to maintain the EMS, internal audit was organized annually. A Two-day EMS Internal Auditor training course was conducted to equip our staff to serve as internal auditors with the necessary auditing knowledge and skills in carrying out internal audit.

For frontline professional and technical staff involving in environmental monitoring, relevant training was provided to them so that they could have a deeper understanding of the environmental checking requirements under our EMS. The training course covered latest changes in handling and reporting of identified non-compliance with legal requirements.

As several railway projects are being planned and designed recently, relevant project officers need to acquire up-to-date technology on railway projects especially in environmental aspects. The Railway Development Office of this Department organized an internal seminar on Hong Kong Section of Guangzhou – Shenzhen – Hong Kong Express Rail Link (XRL) Environmental Impact Assessment and Trackside Fire Safety Strategy in December 2010. The design stage of this project was completed and the construction stage was commenced in the reporting period. Participants of this seminar could share the experience and acquire up-to-date environmental related knowledge and technology for application.

The Department continued to provide training for staff who were required to use the computer software "RoadNoise 2000" for the assessment of road traffic noise and design of noise barrier. The training included requirement of Environmental Protection Department on noise assessment method and also hands-on experience of using the software.

Training	Date	No. of Participant
Half-day Awareness Course to EMS	Jan , Feb & Mar	189
2-day EMS Internal Auditor Training Course	Jul	16
1-day Training on Environmental Monitoring/Measurement Procedures & Environmental Requirements for Technical Staff	1-3, Nov	90
1-day Training on Environmental Monitoring/Measurement Procedures & Environmental Requirements for Professional Staff	18,28,29 Oct	27
Internal Seminar on XRL Environmental Impact Assessment & Trackside Fire Safety Strategy	6 Dec	53
Training on "RoadNoise 2000"	18 Mar	21

Summary of In-house Environmental Training

Environmental Training in collaboration with others

To enhance our staff's knowledge on environmental management measures, we continued to co-organize the Joint Safety, Health and Environmental Seminar 2010 with CLP Power Hong Kong Limited, Civil Engineering and Development Department and Environmental Protection Department. The aim of the seminar was to enhance the knowledge of environmental management measures for the professional and technical staff.

Co-organizing Joint Safety, Health and Environmental Seminar 2010

Environmental Training and Promotion Campaign in Construction Site

Site supervisory staff and contractors' staff are required to possess relevant environmental training and qualifications. Environmental Officers and Environmental Supervisors are assigned for inspection, supervision and monitoring of the environmental performance of the works. These staff have to attend specific training courses. Environmental training including environmental nuisance abatement, waste management, site-specific induction training and toolbox talks were provided to workers. Contractors' site management staff shall also attend the "Environmental management course for construction managers".

Contractors were encouraged to organize and participate in various environmental promotional activities such as display of environmental messages on sites, organizing thematic talks, preparation of newsletters, awarding staff of their good performance on environmental management, and joining environmental campaigns and competitions, etc.

The contractors of the term contracts 04/HY/2006, 05/HY/2006 and 11/HY/2007 jointly held an environmental promotion activity named "Quiz and Innovative Design Competition on Green Construction" on 5 November 2010. This was a new cross-contracts environmental promotion activity consists of a series of programmes, which deliver the green message in an interactive way. The competition stimulated the contractors' staff in the design of innovative and cost-effective environmental measures in daily maintenance activities and enhanced their environmental awareness on site activities.

The participating teams joined the quiz to answer questions relating to environmental legislations and good site practices. Further, the teams submitted their environmental designs and prepared presentations to demonstrate their design details. The winning team designed a purposed-built engine compartment with sound absorbing lining and noise enclosure for the saw blade to maximize the absorption of the sound generated from operating a saw cutting machine in road maintenance works.

Participating in the Quiz and Innovative Design Competition on Green Construction

Winning Design for reduction of noise generated from a saw cutting machine

Public Engagement

Roving Exhibitions

In order to promote the major projects to the public, the following roving exhibitions were organized in 2010:-

- Hong Kong–Zhuhai–Macao Bridge Hong Kong Boundary Crossing Facilities (HZMB - HKBCF) International Design Idea Competition

  Exhibition Period: 15 May 2010 to 20 December 2010

  Venue: Former Central Police Station, Tung Chung MTR Station, Cheung Sha Wan Government Office, Shatin Government Office, Tuen Mun Government Office, Times Square, Homantin Government Office, Tung Chung Citygate Outlets and Tung Chung Ma Tung Road Indoor Recreational Centre

  This exhibition presented the winning designs of the competition and the information on the HZMB and the related projects including the proposed environmental mitigation measures for the projects. Many positive responses were received from the participants. The Department successfully engaged local and overseas professionals, and the public to contribute ideas on the HKBCF and raised public awareness on the HZMB and the related projects.

Tung Chung MTR

Times Square – Online Game Zone

Kid enjoyed playing the HZMB online game designed by Hong Kong Design Institute

Winning Entries and video showing background of the project were shown in the HZMB HKBCF Roving Exhibition

- Central – Wan Chai Bypass and Island Eastern Corridor Link Exterior Design: Ventilation Buildings, East Vent Shaft and Administration Building

  Exhibition Period: 29 July 2010 to 3 September 2010

  Venue: Project Community Liaison Centre in North Point, One IFC, Wan Chai MTR Station, HKCEC, Times Square and the Central Oasis (former Central Market)

Customer Liaison Centre

More than 12,800 people patronized this exhibitions, with about 7,050 participants casted their votes on their preferred design options and about 600 participants provided additional comments mainly on the general design and environmental aspect toward the proposed tunnel buildings.

Central Oasis

IFC

Times Square

Telephone Survey

In order to provide inputs to the Department as a whole in identifying service improvement areas and devising future communication strategies including environmental related aspects, a bi-annual market research in form of telephone survey was conducted to measure the degree of satisfaction among the public towards the service provided by the Department.

The latest survey was conducted in late 2009 in order to keep track of the public's perception on the service performance. The results were released in early 2010 which revealed that 82% of the general public claimed that they were "quite / very satisfied" with the overall performance of HyD. This is a significant improvement as compared with 72% of last survey in 2007.

"Promise to protect the environment" is an area attained average level of importance to the public. The performance of the Department in this area had improved as compared with the results of past years.

Customer Liaison Group

Highways Department has set up a Customer Liaison Group to collect customer feedback on pledge items in a qualitative approach.

The meeting of the Customer Liaison Group was conducted in March 2010. Through this open and interactive communication channel, group members expressed their individual opinion on various services in depth, which help the Department understand members' feedback and concerns on the performance.

Together with the Telephone Survey, this group enables the Department to implement a holistic review to the Performance Pledge. Such a review ensures that the services provided by the Department can better meet public expectation.

Customer Liaison Group to collect feedback on pledge items

Environmental Performance

"For the purpose of sustainable development, we have been striving for continual improvement in the protection of environment by attaining objectives, reaching targets and achieving merits."

Environmental Awards

Outstanding Environmental Management and Performance Award (OEMPA) and Considerate Contractors Site Award (CCSA)

Development Bureau organized the Considerate Contractors Site Awards (CCSA) Scheme to recognize construction sites with good site safety and environmental performance and considerate attitude towards the neighborhood and the public. In 2010, our construction sites received six CCSA and three OEMPA including a gold prize for the OEMPA and a gold prize for the CCSA.

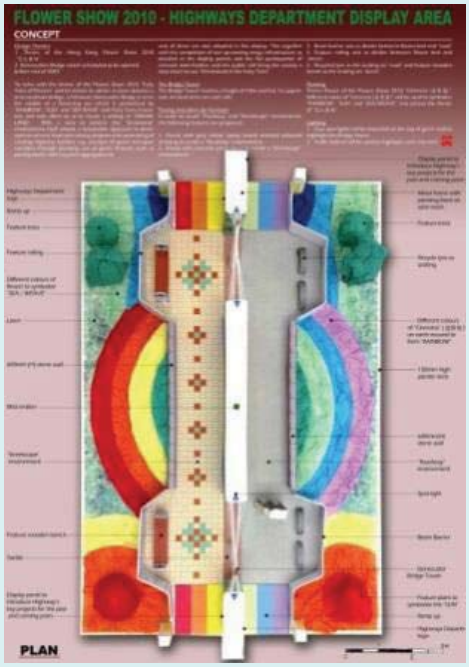
Display boards for Contract numbered HY/2007/09 "Reconstruction and Improvement of Tuen Mun Road - Eastern Section" (CCSA (New Works) merit and OEMPA gold prizes)

Display boards for Contract numbered 05/HY/2006 "Highways Department Term Contract (Management and Maintenance of Roads in Tai Po and North Districts excluding High Speed Roads 2007-2012)" (CCSA (RMAA Works) gold and OEMPA merit prizes)

Hong Kong Flower Show 2010 – Grand Award for Design Excellence

HyD actively participates in Hong Kong Flower Show every year to promote the work of the department and greening. This is a valuable opportunity to enhance public awareness of our goal - "Enhancing the Highway Environment". This year, we were honoured to receive the Grand Award for Design Excellence for the HyD's display in the 2010 Hong Kong Flower Show.

The theme – "Fairy Tales of Flower"



Conceptual Design Plan

The theme of the Flower Show 2010 is "Fairy Tales of Flowers". In order to let visitors to admire in close distance a new landmark bridge, a miniature Stonecutter Bridge with symbolized "seawave", "rainbow" and "sun" as well as fairy tales characters drawn by school children were set in the middle of a sea of flowers. Common roadside facilities were also included on both side of the miniature bridge.

Hong Kong Flower Show 2010

Achievement of Environmental Objectives and Targets

We set clear objectives and targets in our environmental management plan every year, and are pleased to conclude that most of our targets for 2010 were satisfactorily met. Our achievements are summarized as follows:-

Objectives	Targets set for 2010	Achievement (as at 31 Dec 2010)
Installation of electronic ballasts with a view to reducing energy consumption	To complete installation of 3,000 electronic ballasts for road lighting territory wise	Target achieved
Trial installation of LED road lights with a view to reduce energy consumption	To complete trial installation of 100 LED road light territory wise	31 nos. LED road lights were installed in 2010. Long time was spent to source good product and suitable trial site in 2010.
Installation of LED light tubes on footbridges with a view to reducing energy consumption	To complete installation of 200 LED light tubes in 6 footbridges	Target achieved; 243 LED light tubes installed.
Further trial of installation of non-illuminated retro-reflective traffic bollards (NRTB)	To complete trial installation of 800 NRTB territory wise	400 nos. NRTB were installed in 2010. New models were sourced in 2010, which will be put on trial in 2011.

Objectives	Targets set for 2010	Achievement (as at 31 Dec 2010)
Setting a 5-year target in saving 5% electricity consumption in HMTGO by 2014	To consider reducing energy consumption by:-	
	(i) installing sensory motion detectors at the pantries and some cellular offices;	Architectural Services Department (ArchSD) approved the installation works for commencement in early 2011.
	(ii) placing light screening sheets at the office windows to lower the indoor temperature in summer; and	ArchSD is reviewing the cost-effectiveness of such works. Works would be carried out upon ArchSD's approval.
	(iii) exploring the feasibility of energy saving devices to be installed at the elevators (e.g. inactive mode where lights are switched off & elevators remain stationary at the ground floor)	Energy saving devices have been installed at the elevators. Some elevators would be in inactive mode during non-peak office hours.
Adopting measures in water conservation	To install dual-flush toilets, automatic low flow water taps, low flow showers and sensor type urinals in the toilets of HMTGO	The devices have been installed in the toilets of UG/F, 1/F, 2/F of HMTGO under the refurbishment works.
Improving indoor air quality	To continue upkeeping the indoor air quality at or above the level of "Good Class" in HMTGO	Target achieved; The indoor air quality of HMTGO was maintained as "Good Class" in 2010.
Carrying out carbon audit to track the effectiveness of Green House Gas (GHG) reduction	To carry out carbon audit twice per year to track the effectiveness of GHG reduction efforts	Target achieved; Two carbon audits were arranged by BMO of HMTGO
Encouraging the use of recycled paper in the Department	To continue encouraging the use of recycled paper and maintaining the percentage of recycles paper at 94% of the total paper consumption	Target achieved; The percentage of recycled paper consumpted was at 94.82% of the total paper consumption in 2010.
Recycling materials	To continue introducing progressively more use of asphalt incorporating reclaimed asphalt pavement (RAP) in road works	RAP up to 15% by weight of aggregates has been used in four maintenance contracts and six capital works contracts. Use of RAP up to 20% by weight of aggregates has been specified in the new term contract due to commence in April 2011.
	To carry out a site trial on the use of bituminous materials with a higher proportion of RAP	Construction of the trial bituminous pavement using 30% RAP was completed on site at Verbena Road.
	To carry out a site trial on the use of bituminous materials incorporating rubber asphalt	In planning for the production of the asphalt rubber for the site trial, it was revealed that service life of the material is very short and, as a result, any amount which is not used within a short time limit has to be disposed of. This not only significantly increases its production cost, but is also environmentally unacceptable. The site trial therefore did not proceed further
Developing low noise road surfacing (LNRS) materials	To complete the study on the noise reduction performance of three different types of LNRS materials at Chui Tin Street which is a local road	Target achieved; The study was completed successfully.

Objectives	Targets set for 2010	Achievement (as at 31 Dec 2010)
Planting trees and shrubs	To plant 20,000 trees/shrubs in the vicinity of highways projects	Target achieved; 49,983 trees/shrubs were planted.
Adopting site office equipment with energy saving label	To use site office equipment with energy saving labels in all new major works contracts	Target achieved; All 5 new major works contracts commenced in 2010 have adopted energy saving site office equipment.
Procuring environmentally friendly contract vehicle	To procure at least one environmentally friendly petrol private car model in each of the new major works contracts	Target achieved; All 5 new major works contracts commenced in 2010 have procured at least one environmentally friendly contract vehicle.
Reducing dust emission	To include a particular specification clause for dust suppression in all new major works contracts	Target achieved; All 5 new major works contracts commenced in 2010 have included the dust suppression particular specification.

Installation of wastewater treatment unit (Aquasep) for wheel washing purpose

Installing sprinkler system along haul roads

Contract vehicle with Environmentally Friendly Private Car type approved by EPD

Covering the temporary excavation surface with shortcrete or tarpaulin

Refrigerators for site office have Energy Efficiency Grade 1 under the Energy Efficiency Labelling Scheme

Air Conditioners for site office have Energy Efficiency Grade 1 under the Energy Efficiency Labelling Scheme

Photocopiers for site office have Energy Label under the Energy Efficiency Labelling Scheme

Looking Ahead

“With the encouraging results achieved in 2010, we look forward to more research initiatives and green measures in 2011 for the protection of the environment.”

Environmental Objectives and Targets for 2011

We always strive for continual improvement and will continue in 2011 to contribute to the enhancement of the sustainable environment. We will make every endeavour to achieve the targets set below:-

Objectives	Targets
Reducing the energy consumption in public lighting	(i) To install 2,500 electronic ballast for road lighting territory wise; (ii) to continue with the trial use of 400 LED light tubes in footbridge / subways; and (iii) to complete the further trial installation of 400 nos. of non-illuminated retro-reflective traffic bollards (NRTB)
Saving 5% electricity consumption in HMTGO by 2014 (comparing with the baseline electricity consumption in 2009)	(i) To install 10 sets of motion sensors in carparking area; and (ii) to replace 60 nos. of fluorescent lighting by dual lighting fittings with motion sensors in staircases.
Adopting measures in water conservation	To continue install dual-flush toilets, automatic low flow water taps, low flow showers and sensor type urinals in the toilets of HMTGO when they are refurbished
Improving indoor air quality	To continue upkeeping the indoor air quality at or above the level of "Good Class" in HMTGO
Carrying out carbon audit for tracking the effectiveness of Green House Gas (GHG) reduction	To continue carrying out carbon audit twice per year at HMTGO for tracking the effectiveness of GHG reduction efforts
Encouraging the use of recycled paper in the Department	To raise the percentage usage of recycle paper from 94% to 95% of the total consumption
Setting target in reducing photocopying paper consumption	To maintain the consumption of photocopying paper at a level not exceeding the average consumption level for the past two years.
Promoting the wider use of recycled materials	(i) To introduce the use of reclaimed asphalt pavement (RAP) in bituminous pavement construction in more contracts and use of higher RAP contents progressively; and (ii) to introduce the use of thermal patcher for small-scale resurfacing in the new road maintenance contract commencing in April 2011
Planting trees and shrubs	To plant 150,000 trees/shrubs in the vicinity of highways projects
Adopting site office equipment with energy saving label	To use site office equipment with energy saving labels in all new major works contracts
Procuring environmentally friendly contract vehicle	To procure environmentally friendly private car model approved by EPD for saloon type contract vehicle in each of the new major works contracts
Reducing dust emission	To include a particular specification clause for dust suppression in all new major works contracts

Hoping that this report could provide you with a glimpse of our dedication and efforts in environmental protection. Should you have any comment to our work, please share with us your views through our homepage on the Internet (address: http://www.hyd.gov.hk). Thank you for reading this publication.

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