

PBMC Training for CAREC, Beijing

A Case study on the Implementation of Road Maintenance Term Contracts in Hong Kong

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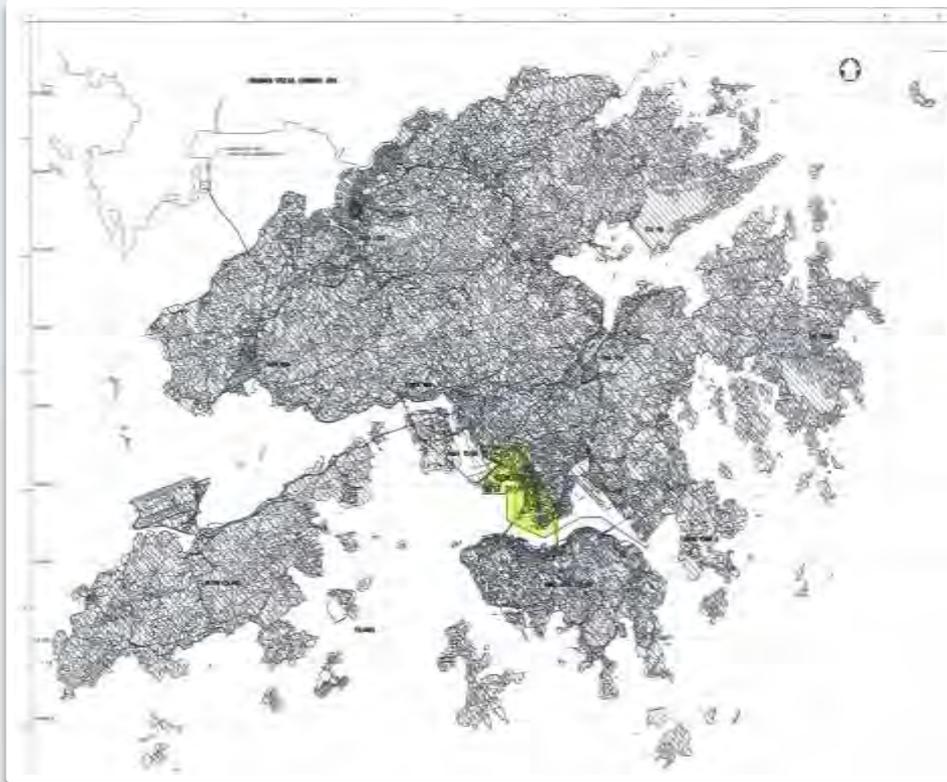


1. Introduction



Section 1

Hong Kong Management of Road Network

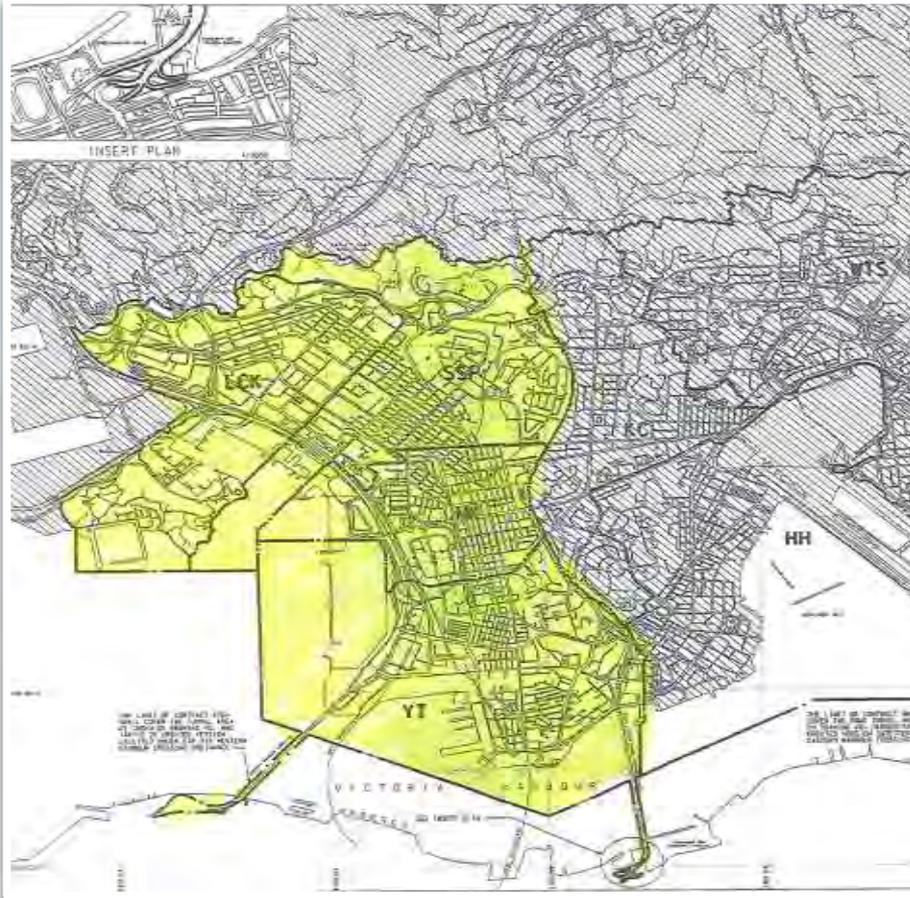


Six Maintenance Term Contracts for Roads (except High Speed Road)

- *Hong Kong Island*
- *Kowloon East*
- *Kowloon West*
- *Tai Po and North District*
- *New Territories West*
- *Shatin, Sai Kung and Island District*
- **Two High Speed Road Maintenance Term Contract**
 - *New Territories East*
 - *New Territories West*

Section 1

Road Maintenance Term Contract in Kowloon West of Hong Kong



Extent of Road Network

- 534 Number of Road Carriageway (633848 km Lane Length)
- 569 Number of Footway (726041km Lane Length)
- 22 Number of Subway
- 94 Number of Road Bridges
- 39 Number of Foot Bridges
- 2 Tunnels
- 423 Number of Slopes

2. Organization of Contractor Under Maintenance Term Contract



Section 2

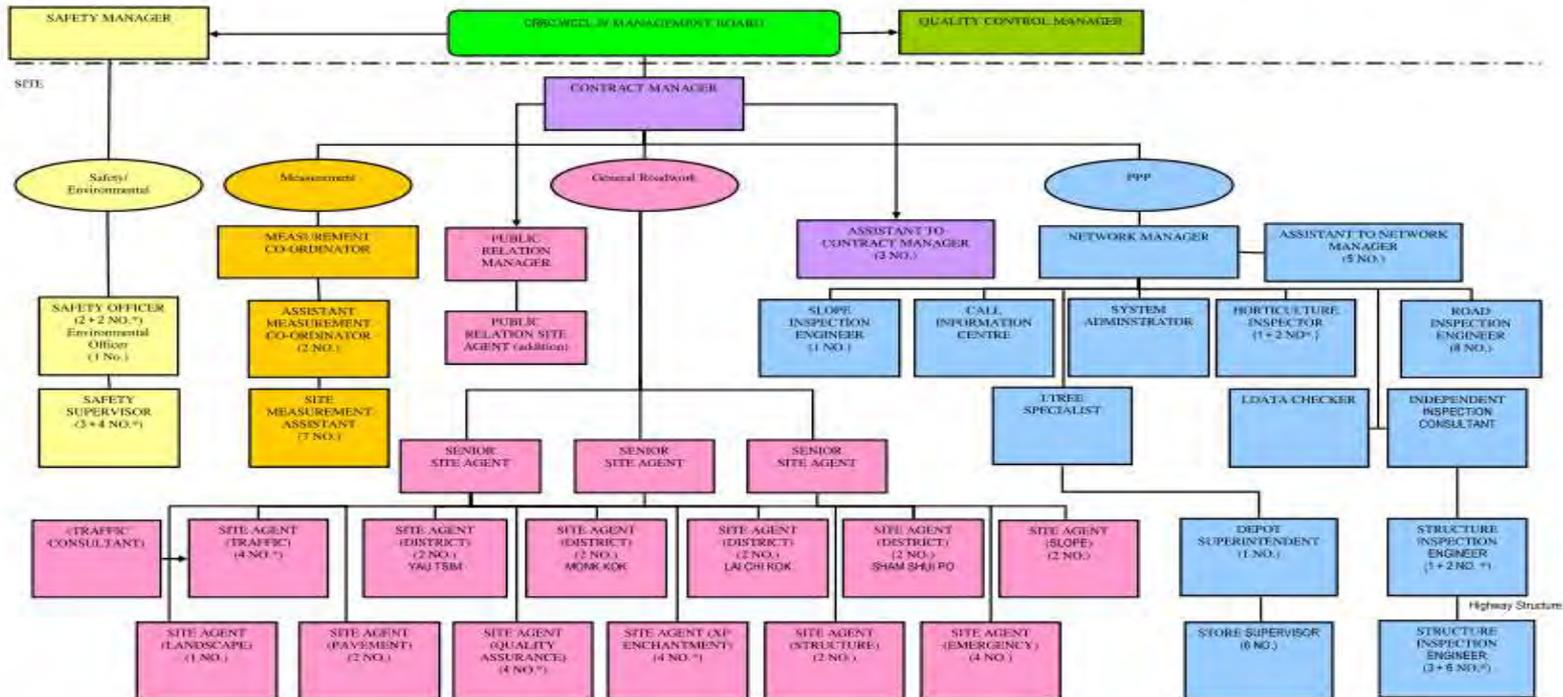
Contractor's Project Organisation

(Refer to Contract No. 13/HY/2009 Highways Department Term Contract (Management and Maintenance of Roads in Kowloon West excluding High Speed Roads 2010–2014))



Appendix A – CRBC - WCCL JV organization chart

*Additional No. of Staff



Section 2

Contractor's Key Site Staff

Contractor's Key Site Staff
Chart_Nov 2012(rev.0)



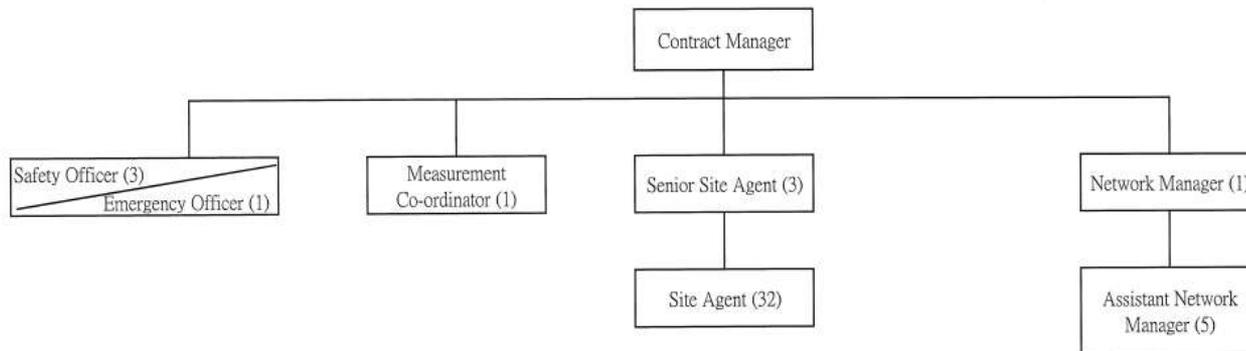
CRBC – WCCL JV
中國路橋 – 偉金建築合營公司



Contract No. 13/HY/2009

Highways Department Term Contract (Management and Maintenance of Roads in Kowloon West excluding High Speed Roads 2)

Contractor's Key Site Staff



Legend : Site Agent (No. required)



Section 2

Contractor's Obligation Under Maintenance Term Contract

- Attendance to **Emergency** Works
- Inspect and report the road defects to the Engineer through both site inspection and **Electronic Management and Maintenance System (EMMS)**
- Provide working **programme and estimation** of works
- Prepare temporary **traffic arrangement** proposal or **traffic impact assessment**
- Receive **Works Orders** from the Engineer
- Report progress by **daily report**
- **Complete** the Works Orders in a timely manner
- Compliance to all **safety, environmental and quality** standard
- Updating the **inventory, maintenance history and positions** in the management system



Section 2

Contractor's Obligation Under Maintenance Term Contract

- keep **minimum plant and equipment** at depots for urgent works
- keep **minimum emergency plant and equipment** at depots for emergency works
- set up **special task force** (i.e. tree gang, standby gang or drainage gang) in time of adverse weather / typhoon / emergency situation)
- up keep and maintain a **high quality** of road network and with no obstruction
- maintain a good record of meeting the **pledge** of Highways Department in handling compliants and emergency situation
- Liaison with all relevant **government departments and utilities companies** to facilitate the carrying out of the proposed works intended by the Engineer as follows:



3. Major Scope of Works Under Maintenance Term Contract



Section 3

Major Scope of Works Under Maintenance Term Contract

Major scope of works under maintenance contract include:

- **Resurfacing of Carriageway**
- **Footway**
- **Drainage Maintenance and Rehabilitation**
- **Maintenance of Structure, Slope, Landscape and Tunnel**
- **Emergency Works**



Section 3

Resurfacing of Carriageway

Asphalt Resurfacing

- **Traditional Milling and Paving Method**
- **Hot-In-Place Recycling Method by Thermal Patcher**



Section 3

Resurfacing of Carriageway

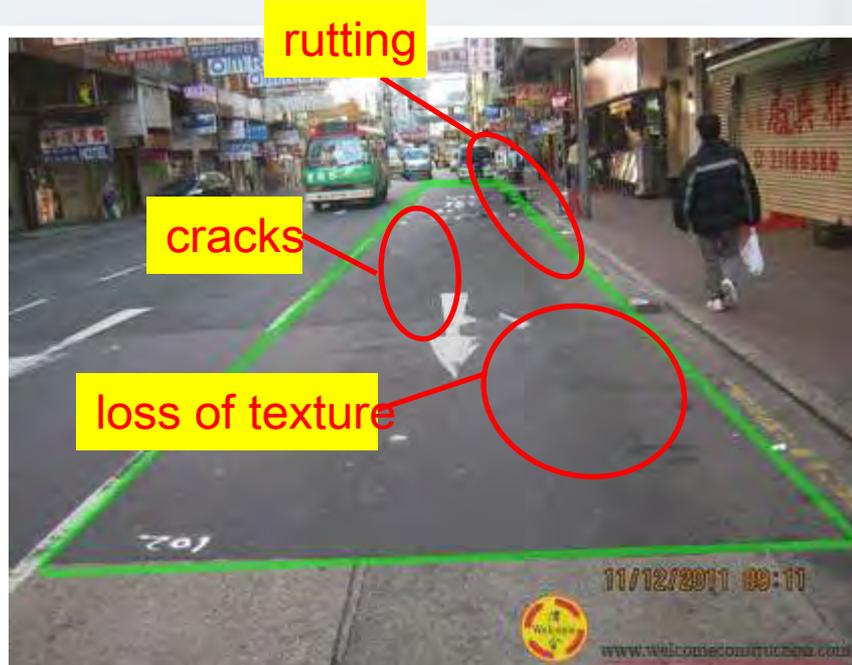
- Traditional Milling And Paving Method

Item	Advantages	Disadvantages
1	Suitable for sub-urban area	Noisy and Dusty
2	Can complete more surface area per establishment about 300m ² to 600m ² per shift	Higher traffic impact and need traffic diversion for a more complicated set up to accommodate the plant and equipment
3	Suitable for Day Time	Night Time – induce noise complaints

Section 3

Traditional Milling And Paving Method

Before works (rutting, loss of texture and cracks)



After works with final compaction



Section 3

Traditional Milling And Paving Method

Step 1 - Milling of defective road surface



Step 2 - Laying of asphalt to formation level



Section 3

Hot-in-place Recycling Method by Thermal Patcher (PM400 and PM500)

The infra-red heating method has the following benefits:

Item	Advantages as compare with traditional method
1	suitable for urban area which is more quiet
2	can use recycled clean asphalt material from existing ground after it is softened by PM400
3	add new hot asphalt material for the top layer from PM500 where stocked cold asphalt material to be reheated and use on site even in middle of the night or during holidays
4	can be demobilized in less than 5 minutes in case of traffic congestion or require emergency road opening in the busy day time
5	can resurface about 20 square meter 50 mm thick of carriageway in 45 minutes time



Section 3

Hot-in-place Recycling Method by Thermal Patcher

PM 500 heating unit to reheat the asphalt material store in the stock (3 tonne container)

The asphalt material is produced with 150 degree centigrade temperature



Section 3

Hot-in-place Recycling Method by Thermal Patcher

Using Thermal Patcher PM400 to rectify the defects with heating panel of dimension 3500 mm x 1525 mm



Section 3

Hot-in-place Recycling Method by Thermal Patcher

Before works
(rutting, depression, cracks)



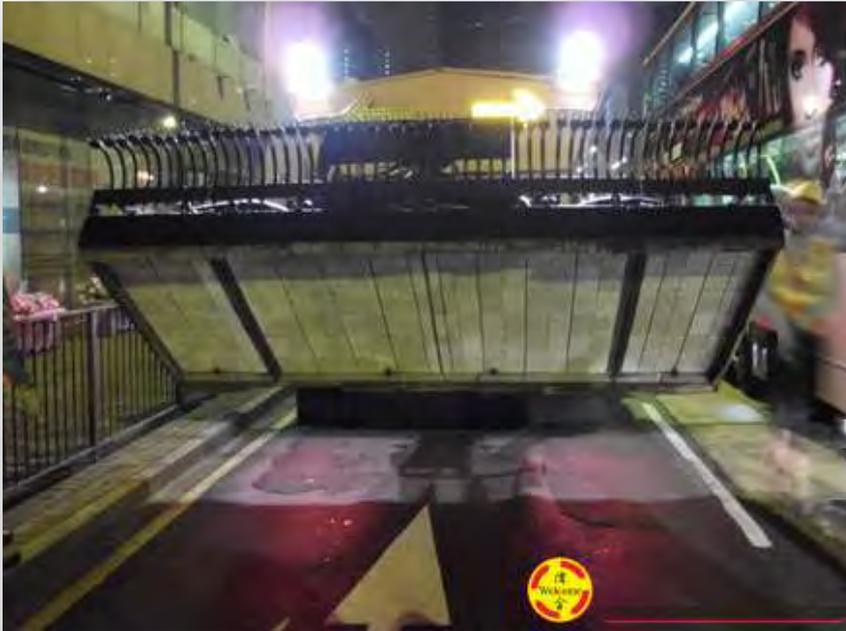
Completed works
(from 2300 to 0600 next day)



Section 3

Hot-in-place Recycling Method by Thermal Patcher

Step 1 - Heater Panel cover full width of 3.5 metres carriageway generate infra-red radiation penetrating the existing asphalt underneath



Section 3

Hot-in-place Recycling Method by Thermal Patcher

Step 2 - Existing surface was softened and scarified by the scraper to a depth of 50mm



Step 3 - Some existing surface were removed due to its serious oxidation and contamination by road marking



Section 3

Hot-in-place Recycling Method by Thermal Patcher

Step 4 - Add some new asphalt on the top to replace the contaminated old asphalt material



Step 5 - Proper grading and compaction to achieve a new surface before road opening



Section 3

Resurfacing of Concrete Carriageway

Method of Resurfacing of concrete carriageway includes:

- **Normal Portland Cement Mortar**
- **Fast Setting Polyester Resin Mortar**
- **Sho-Bond SBR Mortar**
- **Anti-Skidding Dressing System**
- **Matacryl MMA Road Dressing System**



Section 3

Resurfacing of Concrete Carriageway

Item	Type of Material	Defect Type	Suitability	Advantages	Disadvantages
1	Normal Portland Cement Concrete	Crack Depression Loss of texture Spalled joint Stepping	Day time Less busy road	Durable	Long curing time (28 days)
2	Fast Setting Polyester Resin Mortar		Night time Very busy road	Apply to minimum 100 mm thickness Fast Curing (Cure in 2 hours-20MPa, 28 days- 40MPa))	Less durable Expensive
3	Sho-Bond SBR Mortar		Night time Extreme busy road	Apply to minimum 25mm thickness Durable Very fast curing (Cure in 2 hour-50MPa/ 30 minutes-50MPa)	Durable Very expensive



Section 3

Resurfacing of Concrete Carriageway

Item	Type of Material	Defect Type	Suitability	Advantages	Disadvantages
4	Anti-Skidding Dressing Mortar	Loss of texture	Asphalt and concrete surface with loss surface texture Extreme busy road	Super Fast Curing (Cure in 1-2 hour)	Not durable Less Expensive
5	MataCryl MMA Road Dressing System	Crack Depression Loss of texture Spalled joint Stepping	Concrete surface with loss surface texture , cracked surface or depression	Super Fast Curing (Cure in 1 hour)	Durable Expensive



Section 3

Normal Portland Cement Concrete

Curing time 28 days 40 MPa



Compaction with vibration by probe



Section 3

Fast Setting Polyester Resin Mortars (PE)

Before Works



Completed Works



Section 3

Fast Setting Polyester Resin Mortars (PE)

Step 1- Curing for 2 hr(20 MPa) / 28 days(40MPa)



Step 2: Preparation of sand , gravels and PE Material before mixing



Section 3

Fast Setting Polyester Resin Mortars (PE)

Step 3- Weight of sand by container



Step 4- Compaction of mixed PE material



Section 3

Sho-bond Mortar

50 MPa in 4 hours(natural curing) / 30 minutes (by jet heater)

Road conditions with cracks and uneven surface before works



Completed Works



Section 3

Sho-bond Mortar

Step 1- Existing Concrete surface removed by breaker and cleaned to receive the primer



Step 2- Mixing of primer with hardener by electric hand mixer



Section 3 Sho-bond Mortar

Step 3- Application of primer by brush



Step 4- Mixing of SBR Mortar with binder and aggregate



Section 3 Sho-bond Mortar

Step 5- SBR Mortar to be mixed thoroughly before lay



Step 6 - Using a trowel to place the mortar



Section 3 Sho-bond Mortar

Step 7 - Leveling of the laid Sho-bond mortar before setting



Section 3

Anti-Skidding Dressing System

Existing concrete surface with loss of texture and down slope



Super fast cure binder – fully cured in 1 to 2 hour



Section 3

Anti-Skidding Dressing System

Step 1- Scarifying of existing road surface



Step 2- Apply primer by brush



Section 3

Anti-Skidding Dressing System

Step 3 - Curing of primer



Step 4 - Pour anti-skid dressing and spread with a grader



Section 3

Anti-Skidding Dressing System

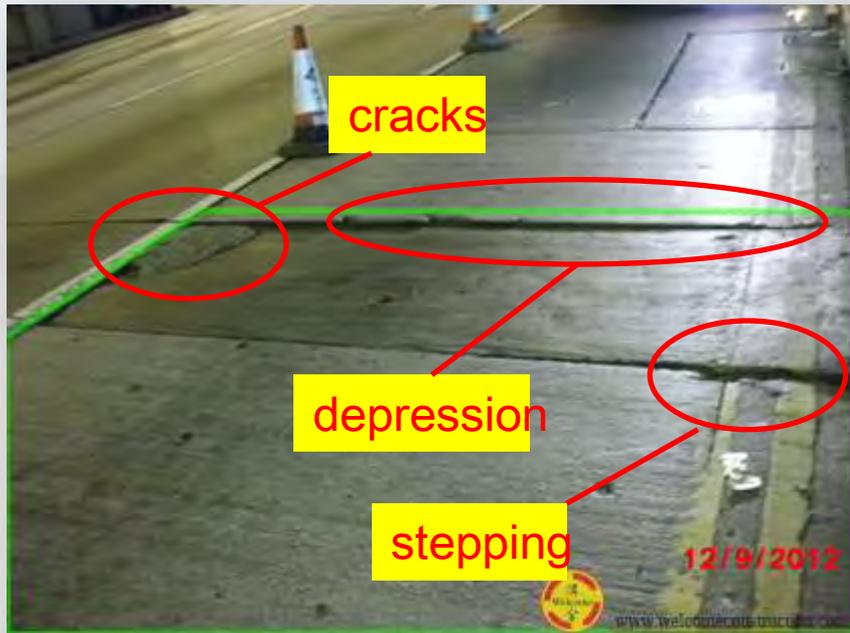
Step 5 - Sprinkling of bauxite dressing evenly at a minimum rate of 1.5 kg/m²



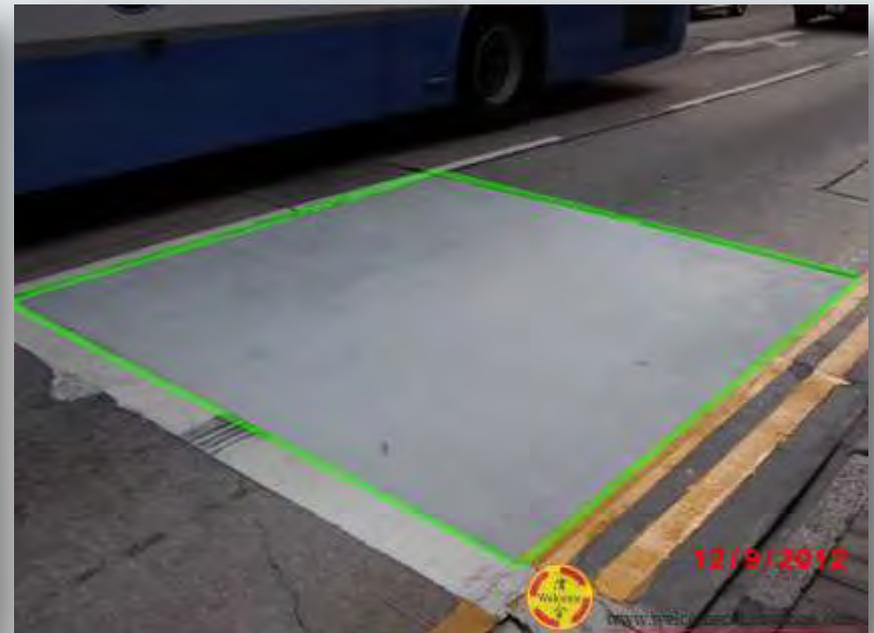
Section 3

Matacryl MMA Road Dressing System

Existing surface with cracks, depression and stepping



Complete and cure in one hour



Section 3

Matacryl MMA Road Dressing System

Step 1-Scarifying of road surface to receive primer



Step 2-Remove all dirt and dusty debris



Section 3

Matacryl MMA Road Dressing System

Apply primer with brush (Step 3)



Mix the Matacryl resin and apply to the surface (Step 4)



Section 3

Matacryl MMA Road Dressing System

Step 5-Sprinkle epoxy quartz sand to resin layer



Step 6-Apply sealer to the top layer



Section 3 Footway

Two different types of footway

Item	Type	Advantages	Disadvantages
1	Portland Cement Mortar	More durable	Not environmental friendly with the frequent breaking up, disposal and reinstatement when any repair is required
2	Paving Block (recycled glass and granite paver)	Environmental friendly by using Recycled Glass for making Paver and with many choices of architectural pattern and color	Frequent Maintenance in -cracking -depression -rocking -stepping -loss of color -loss of texture

Section 3 Footway

Item	Type	Advantages	Disadvantages
2	Paving Block (recycled glass and granite paver)	Easy to open up for laying or repair of underground utilities	Less Durable
		Save energy in the production of paving blocks and no heating is required	
	Paving Block (TiO ₂)	Contain titanium dioxide(TiO ₂) which help to abate nitrogen oxides (Nox) which are the third major greenhouse gases that lead to global warming	

Section 3

Portland Cement Mortar

Before Works with crocodile cracks on surface



After works



Section 3 Portland Cement Mortar

Step 1- Break up / removal of existing surface



Step 2 -Compaction of formation level



Section 3 Portland Cement Mortar

Step 3 -Concreting and leveling



Step 4 -Texturing with steel wire brush



Section 3

Paving Block

Recycled glass Paver



Granite /Recycled Glass Paver



Section 3

Paving Block

Granite / Clay Paver



Artificial Granite/ Granite Paver



Section 3

Paving Block

Artificial Granite/ Granite Paver



Granite Paver



Section 3

Drainage Maintenance and Rehabilitation

The method for drainage maintenance and rehabilitation includes:

- **Cleansing by High Water Pressure Jet Unit**
- **Rehabilitation of Defective Pipe by In-situ Internal Lining**
- **Replacement of Defective Pipe by Pipe Jacking Method**
- **Replacement of Defective Pipe by Trench Opening**



Section 3

Drainage Maintenance and Rehabilitation

Problem of drainage system	High Pressure Water Jetting	In-situ Internal Lining	Trench Opening	Pipe Jacking
Blockage due to soft material	✓			
Blockage due hard material	✓		✓	✓
Blockage due to collapsed pipe		✓	✓	✓
Cracked pipe		✓	✓	✓



Section 3

Cleansing by High Pressure Water Jet Unit

High pressure water jet unit



Cleansing of blocked gully connection pipe



Section 3

Rehabilitation of Pipe by Internal Lining

Liner (resin mix with fibre) was inserted to the manhole by lifting crane



Liner to be blown up to keep intact to the inner side of the cracked concrete pipe and cured by steam



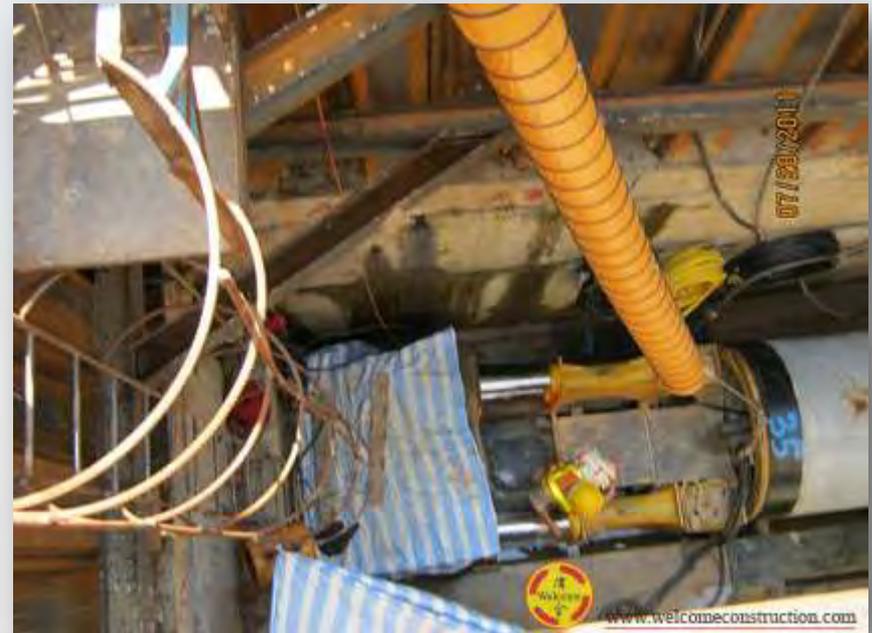
Section 3

Replacement of Pipe by Pipe Jacking Method

Drilling through 100 metre length underneath the railway track (1200mm diameter drill head)



Pipe jacking unit by hydraulic jack



Section 3

Replacement of Pipe by Pipe Jacking Method

Trench with shoring over 3m depth



Pipe ready for concrete surround and backfill



Section 3

Maintenance of Structure, Slope, Landscape, Tunnel

Type	Structure (Bridges, Footbridges, Subways, Gantries)	Slope	Landscape	Tunnel
Cleansing	Profile barrier, wall, floor, lift, escalator, street furniture, drainage system	Drainage channel, rock, dead branches and leaves	Remove rubbish, dead branches and leaves, grass cutting, weeding	Street furniture



Section 3

Maintenance of Structure, Slope, Landscape, Tunnel

Type	Structure (Bridges, Footbridges, Subways, Gantries)	Slope	Landscape	Tunnel
Maintenance and Repair	Movement joint, painting, bearing, roof cladding, drainage, rusting, graffiti	Railing, drainage channel, cracked shotcrete surface, erosion	watering of plant, pruning, thinning, fell dead or dying trees, apply chemical treatment, tree surgery, fertilizing, replacement of dead trees and shrubs	Painting, water leakage, spalling, resurfacing, road marking



Section 3

Maintenance of Structure, Slope, Landscape, Tunnel

Type	Structure (Bridges, Footbridges, Subways, Gantries)	Slope	Landscape	Tunnel
Improvement works	Railing, tiles, anti-skidding surface	Stepped channel, steel railing and staircase	Planting, planter	Grouting



Section 3

Emergency Works

- **Classification of Emergency Works**
- **Response time to attend emergency calling**
- **Special Task Forces**



Section 3

Classification of Emergency Works

Category	Reasons leading to emergency works
Compliant	<ul style="list-style-type: none">Illegal obstruction on carriagewayMissing manhole/gully cover/ safety fencesDamaged street furnitureDepression on footwayPot holes on carriagewayExcessive stepping or depression on carriageway
Safety	<ul style="list-style-type: none">Traffic accident with damaged street furnitureExcessive standing water or water discharging flowing across the roadDefect features with loss of structural integrityRutting of asphalt road surfaceUnguarded road openingLoss of road texture



Section 3

Classification of Emergency Works

Category	Reasons leading to emergency works
Adverse Weather	Fallen tree Landslide Typhoon no. 8 or above Black Rainstorm Flooding due to drainage or damaged water pipeline Collapse of road carriageway

Section 3

Response time to attend the emergency calling

Description	Within normal working hours (0700 – 1900) excluding general holiday	Outside normal working hours (1900 – 0700) or on general holiday (0700 – 1900)
Response time after receiving the order from the Engineer	1 hour	2 hours



Section 3

Special Task Forces to be set up during adverse weather condition

Item	Special Task Force	Conditions to set up	Resources / Duties
1	Drainage Gang	Amber or red Rainstorm	Four Inspection teams with each team consists of one high pressure water jet truck and three laborers <i>- to patrol all black spots and carry out maintenance and repair works until 2 hours after the lowering of the amber or red rainstorm warning</i>



Section 3

Special Task Forces to be set up during adverse weather condition

Item	Special Task Force	Conditions to set up	Resources / Duties
2	Standby Gang	Typhoon No. 8 or above	One team consists of one rubber wheeled loader, a transporter, an 8 tonne grab lorry, one ganger and three laborers - to take special instruction to handle emergency works
3	Tree Gang	Typhoon No. 3 or above	4 teams with each team make up of 5.5 tonne truck, 24 tonne grab truck, a ganger and 3 laborers - to patrol the sensitive route with probable falling trees on highways maintenance slope until the lowering of all typhoon signal or completion of all tree related works



4. Contractor Management System



Section 4

Contractor Management System

Contractor Management System for Maintenance Term Contract includes:

- a. **Subcontractor Management Plan**
- b. **Waste Management Plan**
- c. Quality Plan
- d. Safety Plan
- e. Environmental Plan



Section 4

Subcontractor Management Plan

Selection Criteria of subcontractor

- a. select from the list of potential approved subcontractors in combination with client's approved list
- b. sub-contracting of only one layer of sub-contractor is allowed
- c. criteria for the selection of sub-contractors as follows:
 - *Experience and expertise, specialist or industry leaders with regard to the articular aspects / issues of this Project*
 - *Proven track record in meeting work programme, quality, safety and environmental requirements*
 - *Financially sound and stable*
 - *Adequate capacity, in term of management, plant and labour resources*
 - *Ability to offer innovative solutions*



Section 4

Subcontractor Management Plan

Subcontractor Supervision and Management

- a. appointment of organization of staff with qualified experience and education.
- b. control of further subcontracting the works and avoid multi-layer of subcontracting.
- c. encourage to report any subcontracting necessary such as specialist works for approval.
- d. monitor and assess the works programme, safety, quality and environmental performance.
- e. conduct monthly site meeting to review performance and reinforcement of site instruction.
- f. maintain updated daily attendance records .
- g. subcontractor will be audited quarterly for their performance which will be used for future assessment of further subletting to other projects.



Section 4

Subcontractor Management Plan

Payment of wages to workers of subcontractors

- **All employees** shall produce their site access card for inspection and record every time they enter and leave the site.
- Provide evident for payment of wages with bank transaction record.
- **Labor Officer** will be assigned to monitor the payment of wages by subcontractor to workers and shall be implemented via auto-pay system.
- Aware of early industrial dispute problems and identify the reasons of dispute and monitor the progress of any deterioration.
- **Declaration** of any arrear of wages to worker monthly



Section 4

Waste Management Plan

Inert Construction & Demolition (C&D) Materials:

- i) Soil and
- ii) Building debris, broken rock, concrete.

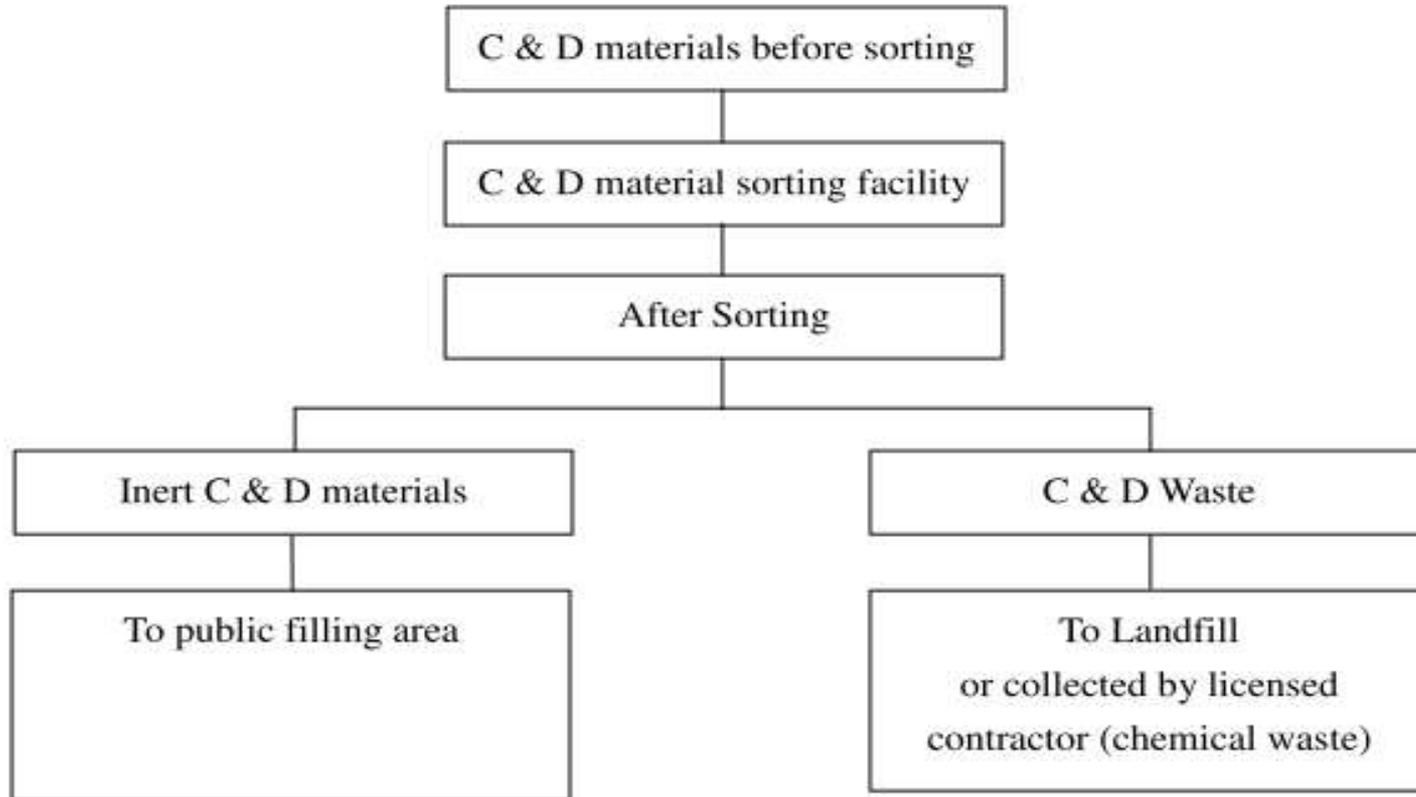
Non-Inert C&D Wastes:

- i) Timber from formworks and falsework;
- ii) Scrap metal from cut-off, rebar, steel pipes and packaging;
- iii) Plastic and paper from pre-formed products and packaging;
- iv) Chemical waste (e.g, spent oil, lubricants, oil and solvent); and
- v) General refuse.



Section 4

Waste Management Plan



Section 4

Waste Management Plan

Purpose of Waste Management Plan is to ensure proper disposal of Construction and Demolition (C&D) materials generated from works

- Assignment of **responsible staff** to in charge of the operation namely Site Engineer and Site Foreman.
- **All subcontractors and laborers** shall carry out the agreed trip ticket system management practices instructed by the Contract Manager.
- C&D materials should be **disposed of at designated public filling facilities or landfills.**
- **No unauthorized disposal of C&D materials** in particular on private agricultural land is prohibited.
- Appointing of experienced person (**Site Foreman**) to control on each site for checking relevant documents of the truck with sorted C&D materials before leaving the Site;

Section 4

Waste Management Plan

- the truck driver bears a duly completed, signed and stamped **Disposal Delivery Form (DDF)** with capacity not overweighted as specified.
- collecting the transaction **receipts** of waste disposal from the truck drivers .
- **segregation** of the recyclable wastes shall be carried out at source.
- useful materials such as timber, rubble and steel / **metal should be segregated for reuse.**
- **assign designated places** for collection of different types of recyclable wastes such as steel material.
- where it is no longer reusable, scrap steel and metal items will **be collected** by recycling companies.
- surveillance checking for the disposal of construction waste will be conducted to provide a direct means to ensure compliance with specified **trip ticket system** procedures



5. Environmental Issues in Road Management Term Contract



Section 5

Environmental Issues in Road Management Term Contract

Two different ways of consideration

- ***Compliance to statutory requirement*** in environmental issues regulated by the Environmental Protection Department that is
 - **Noise Pollution** Abatement Measure
 - **Air Pollution** Abatement Measure
 - **Water Pollution** Abatement Measure

- ***Adoption of Environmental Friendly material***



Section 5

Environmental Issues in Road Management Term Contract

Noise Pollution Abatement Measure

- **avoid working at night** to reduce noise nuisance.
- **provision of noise barrier** to enclose the noisy equipment at night.
- use Quality Powered Mechanical Equipment (**QPME**) with noise emission label certified by the Environmental Protection Department (Compactor, Generator, Paver and Roller).
- alternative innovative method to traditional method for asphalt repair - **use thermal heater in lieu** of milling and paving machine.
- use **Matacryl Road Dressing System** for concrete repair in lieu of traditional method of concreting by PE or Portland Cement Mortar material .



Section 5

Environmental Issues in Road Management Term Contract

Air Pollution Abatement Measure

- reduce dust emission by **sprinkling of water** to dusty operation
- use **vacuummer/ blower** to remove the dust from grinder/ cutter
- use **tarpaulin** to delineate the site and keep the dust away from pedestrians and road users
- **cover up** all dusty stockpile and material with canvas provide a three sides with roof storage area for cement, sandy and silty material

Water Pollution Abatement Measure

- **use container** to retain all waste water generated from works and de-silt it through the de-silting tank before discharge to public drain
- all unused chemical waste such as paint and diesel to be collected by **waste collector** approved by the Environmental Protection Department



Section 5

Environmental Issues in Road Management Term Contract

Adoption of Environmental Friendly material

- **recycled glass** paving blocks
- paving blocks with titanium dioxide (TiO_2) to **remove nitrogen oxides** in the air
- natural granite paving blocks with no additional treatment require
- **recycle the fallen tree** to make mulch by grinding machine
- use **solar energy flash light** for lighting, signing and guarding
- use concrete with **PFA** admixture
- use **steel mould** rather than timber mould for falsework



6. Management and Maintenance in Road Network (EMMS)



Section 6

Management and Maintenance of the Road Network

All instructions from the Engineer for carrying out works under the contract are covered by issuance of works orders and the type of works are as below :

- **Types of Works not covered by M & M (i.e. PPP – Public Private Partnership)**
- **Management and Maintenance of Road Network(M & M)**
 - ◆ The Development of Management and Maintenance of the Road Network
 - ◆ The Functional Advantages of EMMS to the Engineer under the M & M.
 - ◆ Scope of Works by M & M.
 - ◆ Work Flow Diagram of M & M
 - ◆ Electronic Management and Maintenance System (EMMS)



Section 6

Types of Works

Types of Works	Preliminary and Provision Item	Maintenance and Repair Works	Improvement Works	Sources of works
Maintenance Division	Contract Vehicles Site Offices Mobile Phones Cameras Pagers Video Cameras PDA	Carriageway Footway Alley Street Furniture Drainage System Schedule cleansing	Carriageway Footway Alley Street Furniture Drainage System	Planning, Inspection, Complaints, Referrals
District Division				Transport Department Planning
Project Works Division				Planning from Project Department
Structure Division		Bridges, Footbridges, Subways, Gantries	Bridges, Footbridges, Subways, Gantries	Planning, Inspection, Complaints, Referrals
Tunnel Section		Central Harbor Tunnel Western Harbor Tunnel	Central Harbor Tunnel Western Harbor Tunnel	Planning, Inspection, Complaints, Referrals
Slope Division		500 Slopes	Railing, Stairways, Drainage System, Planter	Planning, Inspection, Complaints, Referrals
Landscape Division		500 Slopes	Planting, Planter	Planning, Inspection, Complaints, Referrals



Section 6

Management and Maintenance of the Road Network

The Development of Management and Maintenance of the Road Network

- Management and Maintenance (M & M) of the Road Network was initially set up from the spirit of **Public Private Partnership (PPP)** in 2004 .
- The maintenance works under M & M are **minor and piece meal works** that traditionally require the Engineer to issue numerous works orders of small amount but incur intensive process from inspection , estimate of works, checking and approval to issue works order, inspection, certify works and payment.
- The M & M type of works has transferred the client's duty to the Contractor and the client remain with the duty to **audit** the Contractor's works base on their performance of the contract requirement and will be paid according to the **performance index** calculated from a specific type of audit assessment.



Section 6

Management and Maintenance of the Road Network

The Development of Management and Maintenance of the Road Network

- Contractor responsible for the following works under **the M & M System**
 - ◆ prepare **programme** of different inspection
 - ◆ carry out various types of **inspection**
 - ◆ prepare and submit **inspection report**
 - ◆ carry out **rectification of defects** if any
 - ◆ prepare and submit **rectification report**
 - ◆ updating of **maintenance history and inventory record**

- **The concept of partnering (PPP)** shall lead to a better relationship between the client and contractor and bridges the gap between the two parties



Section 6

Management and Maintenance of the Road Network

The Development of Management and Maintenance of the Road Network

- The ultimate goal **is to achieve a better quality of work with the minimum supervision and control**
(i.e. Saving to the client in employing more site supervisory staff and at the same time reduce the time and cost of the contractor to follow the traditional inspection and approval procedures. Since, the contractor is acting on their own to do the works, it has an incentive for the contractor to do thing right in one time in order to get a good performance index)



Section 6

The Functional Advantages Of EMMS To The Engineer Under The M & M

Electronic Maintenance Management System (EMMS) facilitate the following functions for management and maintenance of road network

- a. planning
- b. programming
- c. inventory data collection
- d. maintenance history recording
- e. data storage
- f. compliant handling
- g. management reports
- h. retrieval of all aspects of the maintenance, inspection, remedial and repair works records



Section 6

The Functional Advantages Of EMMS To The Engineer Under The M & M

- i. allow the Engineer unrestricted **24 hour access** to the EMMS for auditing and monitoring purpose
- j. maintain full maintenance record of **Key Performance Indicator(KPI)**
 - > completion of Category (i) with safety issue defect within 24 hour
 - > emergency response
 - > accident analysis of cases handled by the Contractor
 - > number of third party claims
 - > number of enquiries/ reports/ compliants
 - > percentage of contract compliance reflected by percentage deduction of performance standard in the quarter



Section 6

Scope of works by M & M

Item	Category	Frequency	Completion of Rectification	Type of Inspection
1	Carriageway and Footway	6 month	Within 48 hour (others) Within 28/ 42 days(defective asphalt carriageway)	Detailed Inspection
2	Carriageway and Footway	7 /30 days	Within 24 hour	Safety Inspection
3	Drainage	daily	Within 24 hour	All the time
4	Road Marking	6 month	Within 42 days	Detailed Inspection
5	Structure	6 month	Within 30 days	Structural Inspection
6	Slope	6 month	Within 30 days	Slope Inspection
7	Landscape	6 month	Within 30 days	Horticultural Maintenance Inspection



Section 6

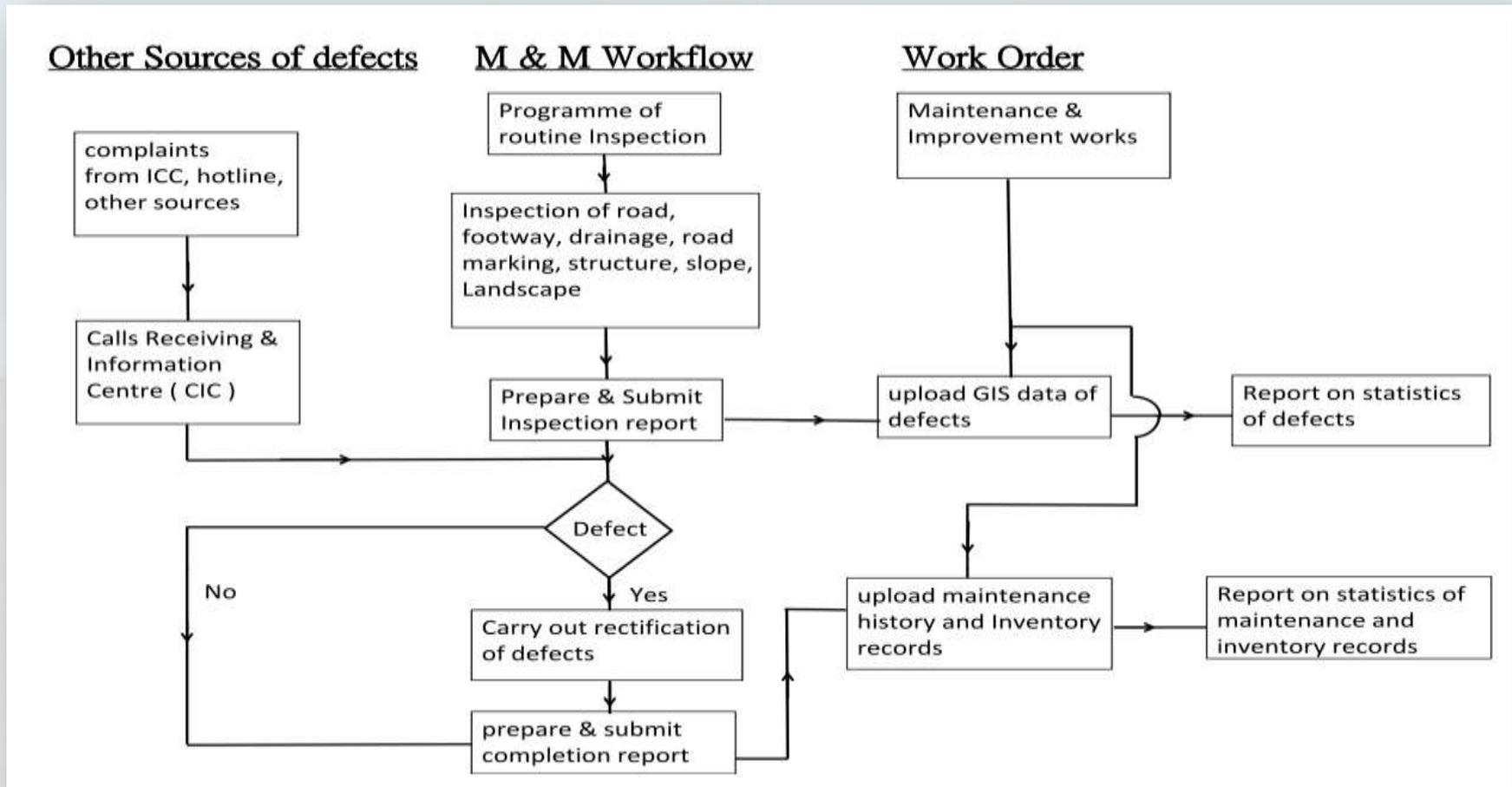
Scope of works by M & M

Item	Category	Type of Inspection	Extent of Works under M & M
1	Carriageway and Footway	Detailed Inspection	Carriageway (asphalt) cover 2.5 m ² Carriageway (concrete) cover 0.3m ²
2	Carriageway and Footway	Safety Inspection	Footway (concrete/ paver) cover 30 m ² Railing cover 3 m length Steel cover covers 3 number
3	Drainage	All the time	All connector pipe to main drainage system
4	Road Marking	Detailed Inspection	Loss of marking over 20%
5	Structure	6 Month Inspection	Cracks, lose paint, rusting, lose bolt, loss of grout to plinth, leakage of roof, railing etc
6	Slope /Landscape	6 Month Inspection	Weeding, thinning, pruning, remove debris, remove dead trees, railing, channel, hard slope surface, weep holes



Section 6

Scope of works by M & M



Section 6

Electronic Management and Maintenance System (EMMS)

A brief introduction of EMMS:

- User Interface
- Defect Library
- Calendar View
- Road Inspection Report
- Enquiry and Search
- Reports
- Call Receiving and Information Centre (CIC)
- Auditing by the Engineer



Section 6

User Interface

User Interface for Log-In

The screenshot shows the login page for the Electronic Maintenance Management System. At the top left is the logo of the Highways Department, The Government of the Hong Kong Special Administrative Region. The page title is "User Login" with a timestamp of "13/07/2009". The main heading is "Electronic Maintenance Management System". Below this, there are two input fields: "User Name" and "Password". At the bottom of the form are two buttons: "Login" and "Reset". The system ID "WCL/EMMS/78" is visible in the top right corner.

User Interface of Front Page

The screenshot shows the front page of the system after a successful login. The page title is "wcladmin login to EMMS successfully." The page features a navigation menu on the left side with the following items: Home, Defects Library, Works Order, Repair Order, Programme & Progress, Calendar View, List View, Inspection, Roadwork, Geotechnical, Structure, Vegetation, Complaint Database, Documents, Storage, View, Email & Search, Job Alerts, Alerts, and Alerts Search. The Highways Department logo and name are visible at the top left, and the system ID "WCL/EMMS" is at the top right.



Section 6

Defect Library

CRBC - WCCL JV
Contract No. 13/HY/2009

Photographic Library of Road Defects

Item	Defects Codes	Defect Description	Repair Method	PPP Works Time Limit	Category	PPP
3	K.HO	Hazardous obstruction 	Remove obstruction	48 hrs.	(i)	Yes (= or < 10m ²)
4	K.KB	Defective kerb 	Replace	48 hrs.	(i)	Yes (if caused by depression / undulation, = or < 30m ²)
5	K.BD	Block work defects 	Relay / replace	48 hrs.	(ii)	Yes (if caused by depression / undulation, = or < 30m ²)
6	K.CK	Cracks 	Seal up / excavation and reinstatement	N/A	(iii)	No

Section 6

Defect Library

CRBC - WCCL JV
Contract No. 13/HY/2009

Photographic Library of Road Defects

Item	Defects Codes	Defect Description	Repair Method	PPP Works Time Limit	Category	PPP
7	K.UN	Sunken 	relay / replace	N/A	(iii)	No
8	K.DP	Depression  	Levelling / excavation and reinstatement / relay	48 hrs	(ii)	Yes (= or < 30m ²)
9	K.RV	Ravelling 	Excavation and reinstatement	N/A	(ii)	No
10	K.UL	Undulation 	Excavation and reinstatement	48 hrs	(ii)	Yes (= or < 30m ²)



Section 6

Calendar View

 **Highways Department**
The Government of the Hong Kong Special Administrative Region

WCL/EMMS/3

Home < 2012 / Oct > Today Type Road Safety Team LCK - Lai Chi Kok Refresh List View

Scheduled
 Outstanding
 Rescheduled
 Inspected (Without Defect)
 Pending
 Inspected (With Defect)
 GetPDF
 Inspection Report
 Completion Report

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Calendar View		1	2	3 SH(C), KWAI CHUNG ROAD SH(C), TONKIN STREET SH(F), KWONG LEE ROAD SH(F), CHEUNG SHA WAN ROAD SH(F), TONKIN STREET SH(C), CHING CHEUNG ROAD SH(C), TONKIN STREET SH(F), TONKIN STREET WEST SH(F), TONKIN STREET SH(C), CHING CHEUNG ROAD SH(C), TONKIN STREET WEST	4 SH(F), UN CHAU STREET SH(C), CASTLE PEAK ROAD SH(F), LANE 801307 SOUTH OF SHUN NING ROAD SH(F), CASTLE PEAK ROAD SH(C), UN CHAU STREET SH(F), FAT TSEUNG STREET SH(C), SHUN NING ROAD SH(F), FUK WING STREET SH(F), SHUN NING ROAD SH(F), LANE 801309 NORTH OF SHUN NING ROAD	5 SH(C), LAI FAT STREET SH(C), HING WAH STREET SH(F), LAI HONG STREET SH(F), HING WAH STREET SH(C), HING WAH STREET SH(F), LAI FAT STREET SH(C), LAI HONG STREET SH(F), HING WAH STREET	6 SH(C), CHEUNG SHA WAN ROAD SH(C), WEST KOWLOON CORRIDOR SH(F), CHEUNG SHA WAN ROAD SH(C), LIN CHEUNG ROAD SH(F), CHEUNG SHA WAN PATH
Manage View	7	8 SH(F), CHEUNG YUE STREET SH(F), CHEUNG SHUN STREET SH(F), CHEUNG SHUN STREET SH(C), CHEUNG YEE STREET SH(F), CHEUNG YEE STREET	9 SH(F), CHEUNG SHA WAN ROAD SH(C), CHING CHEUNG ROAD SH(C), CHING CHEUNG ROAD SH(C), KWAI CHUNG ROAD SH(F), KWONG LEE	10 SH(F), KING LAM STREET SH(F), KING LAM STREET SH(F), WING MING STREET SH(F), WING HONG STREET SH(C), WING HONG	11 SH(F), PO ON ROAD SH(C), SHUN NING ROAD SH(F), SHUN NING ROAD SH(F), LANE 801322 NORTH OF SHUN NING ROAD SH(F), LANE 801325 NORTH OF SHUN NING ROAD	12	13 SH(C), CHEUNG SHA WAN ROAD SH(F), CHEUNG SHA WAN ROAD SH(C), CHEUNG SHA WAN ROAD SH(F), CHEUNG SHA WAN ROAD SH(C), LIN CHEUNG



Section 6 Calendar View

Inspection Type

- Road Safety
- All
- Road Safety
- Road Detailed
- Road Drainage
- Road Markings
- Road Stepping
- Slope Routine Maintenance
- Structure General
- Structure 6 Monthly
- Vegetation

Inspection District

- LCK - Lai Chi Kok
- SSP - Sham Shui Po
- YT - Yau Tsim
- MK - Mong Kok
- STRKC - Structure Kowloon Central
- STRKE - Structure Kowloon East
- STRKW - Structure Kowloon West
- CHT - Cross Harbour Tunnel
- LA/M (K&S)
- LA/K
- WD - Works Division
- STRHN - Structure Hong Kong North
- STRHS - Structure Hong Kong South
- SLPG2 - Slope G2
- SLPHES2 - Slope HES2
- SLPHNW - Slope HNW
- SLPKG1 - Slope KG1
- NS - North South
- NN - North North
- TP - Tai Po
- ST - Sha Tin
- IS - Islands
- SK - Sai Kung
- TKO - Tseung Kwan O
- HSE1 - High Speed Road E1
- HSE2 - High Speed Road E2
- HSE3 - High Speed Road E3
- HSE4 - High Speed Road E4
- CB1 - Cross Boundary 1
- CB2 - Cross Boundary 2



Color Indication for Inspection

- Scheduled
- Outstanding
- Rescheduled
- Inspected (Without Defect)
- Pending
- Inspected (With Defect)



Section 6 Calendar View

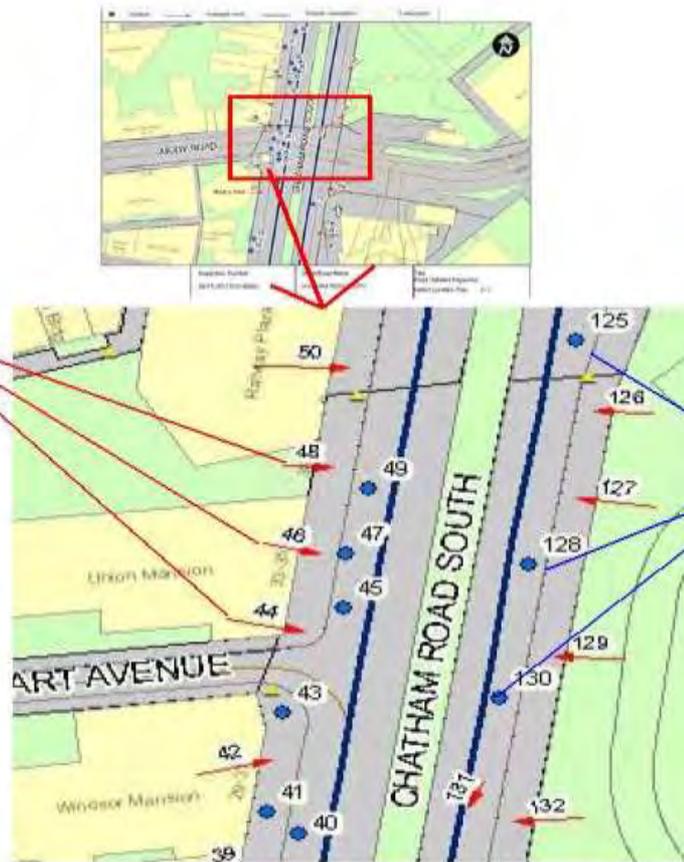
Defects in Detailed Inspection (DI)				
Carriageway		K Kerb/ Footway/Run-in/ Cycle Track/Block Paved Carriageway	D Drainage / Utilities	T Str
R Rigid	F Flexible			
1. cracking	1. cracking	1. CK cracks	1. G gully grating	1. BO br
BC block	FC fine<2mm width	2. ST subsided trench	2. C channel w/wo cover	2. CB cr (=3m
NC corner	BC block	3. KB defective kerb		3. CC cr
DC diagonal	CC crocodile	4. BD block work defects	3. M manhole/chamb	4. DS di
KC shrinkage	DC diagonal	5. RV ravelling	er/sandtrap	5. NP st
LC longitudinal	LC longitudinal	6. UN uneven	w/wo cover	6. PB pr
TC transverse	SC slippage	7. DP depression		7. PP ps
2. SP joint stepping	TC transverse	8. HO hazardous obstructions (>10m2)	D damaged	8. RA ra
3. RK rocking	2. CR corrugation		M missing	9. SG si
4. JS joint sealant defect	3. DP depression		B blocked	10. PA F
5. Spalling	4. RU rutting		S sunken	11. TS t
SS surface	5. SV shoving		P protrude	12. RM
BX box-out	6. FL flushing			13. RS r
6. RV ravelling	7. PO polishing			14. CE c
7. TX loss of textures	8. RV ravelling		4. P ponding/flooding	15. LP li
8. ST subsided trench	9. PH Pothole			16. TP t
9. OS oil spillage (>100m2)	10. ST Subsided trench			17. EC c gate
	11. HO hazardous obstructions (>10m2)			18. NB r (heig
	12. OS oil spillage			D dama: 2,5,E M missit 5&11

Defects Table from HYD-RD/GN015A
CORD - Catalogue of Road Defects



Section 6 Calendar View

Legend of "General View"



Legend of "Defect"



Section 6

Calendar View



Item 43-1 (M&M) (Defect Area: 2.00 m2)

Block works defects-Block work defects (Permit)



Item 48-1

General View

Item 43-1 (M&M) (Defect Area: 2.00 m2)

Block works defects-Block work defects (Permit)

Description for Defect Item

Item 48-1

General View

Description for General View



Section 6

Enquiry and Search

Highways Department
The Government of the Hong Kong Special Administrative Region

2. Select M.H. layer

WCL/EMMS/5

Enquiry and Search

Inspection	Maintenance History	Complaint Statistics	Works Order	Repair Order
Contract No.	<input type="text"/>			
Layer	Traffic Sign <input type="button" value="v"/>			
M_GID	<input type="text"/>	User ID	<input type="text"/>	
Feature Type	<input type="text"/> <input type="button" value="v"/>			
Surface Type	<input type="text"/> <input type="button" value="v"/>	Construct Type	<input type="text"/> <input type="button" value="v"/>	
Works Description	<input type="text"/>			
Team	YT - Yau Tsim <input type="button" value="v"/>	Repair Order No.	<input type="text"/>	
Works Order No.	<input type="text"/>	Works Type	<input type="text"/>	
Design Life	<input type="text"/>	Level	<input type="text"/> <input type="button" value="v"/>	
Actual Commencement Date	From <input type="text"/> To <input type="text"/>			
Actual Completion Date	From 01-Jan-2012 To 31-Oct-2012			
Street	<input type="text"/>			
CLC No.	<input type="text"/>	Bound	<input type="text"/> <input type="button" value="v"/>	
Lane	<input type="text"/> <input type="button" value="v"/>	Lamp Post No.	<input type="text"/>	
Chainage	<input type="text"/>			
Route	<input type="text"/>			
Structure No.	<input type="text"/>	Slope No	<input type="text"/>	

1 Select Function

3. Select Criteria

4. Press Search

Section 6

Enquiry and Search

Double Click on record for details

Highways Department
The Government of the Hong Kong Special Administrative Region

Enquiry and Search

5. List of Search Result

Maintenance History
Selected Layer: TS

GID	ST_ID	Street / Structure No / Slope No	Works Date	Works Number	Works Descrip
7502950.00000000		HI LUNG LANE	2012-06-05	BB029787-7	REPLACEMENT OF TRAFFIC SIGN TS2148
7502981.00000000		WATERLOO ROAD	2012-07-05	BB029787-7	REPLACEMENT OF TRAFFIC SIGN TS2132
7507770.00000000		HANKOW ROAD	2012-01-28	BB039515-2	PERMANENT REMOVAL OF TRAFFIC SIGN TS2131
7507771.00000000		HANKOW ROAD	2012-01-28	BB039515-2	REPLACEMENT OF TRAFFIC SIGN TS2131 AND NEW INSTALLATION
7507795.00000000		HAIKOW ROAD	2012-02-02	BB040000-5	NEW INSTALLATION OF TRAFFIC SIGN TS102
7509787.00000000		CHATHAM ROAD SOUTH	2012-05-19	BB040574-7	PERMANENT REMOVAL OF TRAFFIC SIGN TS2135
7509788.00000000		CHATHAM ROAD SOUTH	2012-05-19	BB040574-7	RE-FIXING OF TRAFFIC SIGN TS2135 AND NEW INSTALLATION OF 1
7510276.00000000		KIMBERLEY ROAD	2012-05-20	BB040552-4	NEW INSTALLATION OF TRAFFIC SIGN TS2134
7510279.00000000		KIMBERLEY ROAD	2012-05-20	BB040552-4	NEW INSTALLATION OF TRAFFIC SIGN TS838
7510280.00000000		KIMBERLEY ROAD	2012-05-20	BB040552-4	NEW INSTALLATION OF TRAFFIC SIGN TS2133
7510281.00000000		KIMBERLEY ROAD	2012-05-20	BB040552-4	NEW INSTALLATION OF TRAFFIC SIGN TS838
7510282.00000000		KIMBERLEY ROAD	2012-05-20	BB040552-4	PERMANENT REMOVAL OF TRAFFIC SIGN TS2137
7510283.00000000		KIMBERLEY ROAD	2012-05-20	BB040552-4	PERMANENT REMOVAL OF TRAFFIC SIGN TS2137
7511189.00000000		TUNG KUN STREET	2012-07-14	BB039258-3	PERMANENT REMOVAL OF TRAFFIC SIGN GOODS VEHICLE NO ST1
7511174.00000000		AUSTIN ROAD	2012-07-31	BB040050-1	PERMANENT REMOVAL OF TRAFFIC SIGN
7511175.00000000		AUSTIN ROAD	2012-07-31	BB040050-1	PERMANENT REMOVAL OF TRAFFIC SIGN
7511176.00000000		AUSTIN ROAD	2012-07-31	BB040050-1	PERMANENT REMOVAL OF DIRECTIONAL SIGN TO AUSTIN STATION
7511189.00000000		GRANVILLE ROAD	2012-07-03	BB040049-5	PERMANENT REMOVAL OF TRAFFIC SIGN TS115
7511190.00000000		GRANVILLE ROAD	2012-07-03	BB040049-5	PERMANENT REMOVAL OF TRAFFIC SIGN TS102
7511191.00000000		GRANVILLE ROAD	2012-07-03	BB040049-5	PERMANENT REMOVAL OF TRAFFIC SIGN TS198
7511192.00000000		GRANVILLE ROAD	2012-07-03	BB040049-5	RELOCATION OF TRAFFIC SIGN TS115
7511234.00000000		GRANVILLE ROAD	2012-07-05	BB040041-2	PERMANENT REMOVAL OF TRAFFIC SIGN TS2133
7511235.00000000		GRANVILLE ROAD	2012-07-05	BB040041-2	RELOCATION OF TRAFFIC SIGN TS2133
7511236.00000000		KOWLOON PARK DRIVE	2012-07-17	BB040043-8	NEW INSTALLATION OF TRAFFIC SIGN TS400
7511237.00000000		FERRY STREET	2012-07-10	BB039278-2	RE-FIXING OF TRAFFIC SIGN TS115
7511238.00000000		FERRY STREET	2012-07-10	BB039278-2	RE-FIXING OF TRAFFIC SIGN TS733
7511239.00000000		FERRY STREET	2012-07-10	BB039278-2	RE-FIXING OF TRAFFIC SIGN TS198



Section 6

Enquiry and Search

 **Highways Department**
The Government of the Hong Kong Special Administrative Region

WCL/EMMS/5

Enquiry and Search

Inspection	Maintenance History	Complaint Statistics	Works Order	Repair Order
Contract No.	13/HY/2009			
Layer	Traffic Sign			
M_GID	7502950.00000000	User ID		
Feature Type	Traffic sign plate			
Surface Type		Construct Type		
Works Description	REPLACEMENT OF TRAFFIC SIGN TS2148			
Team	YT - Yau Tsim	Repair Order No.		
Works Order No.	BB029787-7	Works Type	3	
Design Life		Level		
Actual Commencement Date	From dd-MMM-yyyy To dd-MMM-yyyy			
Actual Completion Date	From 05-Jun-2012 To 05-Jun-2012			
Street	HI LUNG LANE			
CLC No.		Bound		
Lane		Lamp Post No.		
Chainage				
Route				
Structure No.		Slope No		

7. Selected record information is shown

Section 6 Reports

Reports

Home
Defects Library
Works Order
Repair Order
Programme & Progress
Calendar View
List View
Inspection
Roadworks
Geotechnical
Structure
Vegetation
Complaint Statistics
Documents
Manage
View
Enquiry & Search
All Activities
Inventory
Inventory Search
Maintenance History
Simple Map
Personal Setting
Administration
Lookup
User Management
Excel Import
Reports

Complaint Statistics

Complaint Statistics Classification Report
Classification: All Year: 2012 Month: Oct [View Report](#) [Reset](#)

Statistics on Complaint Resolved Report
Sub. Matter: All Year: 2012 Month: Oct Team: All [View Report](#) [Reset](#)

Progress of Works

Contractor's Daily Report on Outstanding Defects
Team: All Date: dd-MMM-yyyy Overdue only [View Report](#) [Reset](#)

Contractor's Daily Report
Report Date: dd-MMM-yyyy

Daily records of labour and Tradesman
Year: 2012 Month: Oct [View Report](#) [Reset](#)

Monthly Report on Works Completed
Team: All WO Type: All Works Type: Construction and Maintenance Year: 2012 Month: Oct [View Report](#) [Reset](#)

Vegetation Reports

RHI & HMO Report Summary
Year: 2012 Month: Oct District: All [View Report](#) [Reset](#)

Vegetation Summary
District: All [View Report](#) [Reset](#)

OVT Monitoring Summary
Year: 2012 District: All [View Report](#) [Reset](#)

OVT ID:

Identified Plant Monitoring Summary
Year: 2012 District: All [View Report](#) [Reset](#)

Plant Ref. No:

Others



Section 6 Reports

Reports

Home
Defects Library
Works Order
Repair Order
Programme & Progress
Calendar View
List View
Inspection
Roadworks
Geotechnical
Structure
Vegetation
Complaint Statistics
Documents
Manage
View
Enquiry & Search
All Activities
Inventory
Inventory Search
Maintenance History
Simple Map
Personal Setting
Administration
Lookup
User Management
Excel Import

Reports

2. Select Report Type

Complaint Statistics

Complaint Statistics Classification Report
Classification: All Year: 2012 Month: Oct View Report Reset

Statistics on Complaint Resolved Report
Sub Matter: All Year: 2012 Month: Oct Team: All View Report Reset

Progress of Works

Contractor's Daily Report on Outstanding Defects
Team: All Date: dd-MMM-yyyy Overdue only View Report Reset

Contractor's Daily Report
Report Date: dd-MMM-yyyy

Daily records of labour and Tradesman
Year: 2012 Month: Oct View Report Reset

Monthly Report on Works Completed
Team: All WO Type: All Works Type: Construction and Maintenance Year: 2012 Month: Oct View Report Reset

Vegetation Reports

RHI & HMO Report Summary
Year: 2012 Month: Oct District: All View Report Reset

Vegetation Summary
District: All View Report Reset

OVT Monitoring Summary
Year: 2012 District: All OVT ID: View Report Reset

Identified Plant Monitoring Summary
Year: 2012 District: All Plant Ref. No: View Report Reset

Others

1. Select "Report"



Section 6 Reports

User Management
Excel Import
Reports
Reports Upload
Logout

Others

Highways Department Report on Effective Control of Mosquitoes and Removal of Stagnant Water on Construction Sites
Year: 2012 | Month: Aug | View Report | Reset

Anti-mosquito Measures on Maintenance Works
Year: 2012 | Month: Sep | View Report | Reset

Anti-mosquito Measures on SIMAR Slopes
Year: 2012 | Month: Oct | View Report | Reset

3. Select "Report Period"

4. Press "View Report"



Section 6 Reports

To: CAS(W)S, ETWB

**Report on Effective Control of Mosquitoes and
Removal of Stagnant Water**

(Aug 2012)

via SE/PR

SE/SEA

Division Unit: HyD / Urban (K)

Date: 2012.09.13

Completed by: T C Yu ME/SSP
(Name/Post)

Tel. No.: 2707 7236

Contract Number	Contractor	No. of tool box talks on control of mosquitoes and prevention of stagnant water	No. of persons attended tool box talks	No. of site inspection specifically for control of mosquitoes and prevention of stagnant water (Weekly safety walks excluded)	No. of activities specifically for control of mosquitoes and prevention of stagnant water (See Remarks)	Remarks (e.g. Safety and Health Promotion, spraying larvicides, reports attached etc.)
07/HY/2008	Sun Eggok Kong (Civil) Limited	5	80	92	99	Removal of stagnant water. Levelling uneven grounds, display posters and grass cutting at depots. Spraying larvicides on sites.
13/HY/2009	CRBC-WCCJ JV	3	170	4	4	Removal of stagnant water. Levelling uneven grounds, display posters and grass cutting at depots. Spraying larvicides on sites.

5. The report is shown



Section 6 Reports

Compliant Statistics of Different Problems of Road Work

Complaint Statistics of Different Problems of Road Works in Mar 2012

13/HY/2009

Problems	No. of Record(s)
Poor / sub-standard workmanship	0
Long duration	0
Noisy works	10
Untidy site	0
Site safety	1
Unattended site / no working in site	4
Dust nuisance	0
Footpath / road obstruction	2
No site display board	1
Others (please specify)	11
Traffic obstruction	1
Repeated working	0
Frequent change of display board completion date	0
Unsatisfactory reinstatement	0
Noisy steel plate	1
Inadequate or no lighting, signing & guarding	0
Unsatisfactory temporary works (e.g. temp pavement)	1
Total =	32

Generated on 25-Oct-2012



Section 6 Reports

Statistic on Completion Resolved

Statistics on Complaints Resolved

X - This Year Statistics

(X)- Previous Year Statistics

Year/Month	2011	2011	2011	2011	2011	2011	2011	2011	2012	2012	2012	2012	Subtotal
Subject Matters	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	11/12
Road Works	35 (12)	45 (5)	39 (14)	40 (14)	27 (21)	30 (36)	52 (41)	43 (37)	33 (25)	26 (32)	32 (51)	23 (31)	425 (319)
Poor / sub-standard workmanship	1 (0)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	2 (0)	0 (0)	0 (0)	1 (1)	0 (1)	0 (0)	5 (3)
Long duration	0 (1)	2 (1)	1 (0)	0 (0)	0 (0)	2 (0)	1 (0)	4 (0)	3 (0)	0 (0)	0 (0)	0 (0)	13 (2)
Noisy works	3 (1)	2 (1)	1 (2)	4 (0)	1 (4)	6 (12)	14 (9)	14 (11)	3 (2)	9 (11)	10 (14)	3 (12)	70 (79)
Untidy site	0 (0)	0 (1)	1 (1)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	1 (0)	0 (1)	0 (0)	0 (0)	3 (3)
Site safety	1 (0)	3 (0)	1 (0)	0 (2)	1 (0)	1 (3)	2 (2)	2 (3)	1 (1)	1 (2)	1 (1)	1 (1)	15 (15)
Unattended site / no working in site	0 (2)	2 (0)	4 (0)	3 (1)	0 (0)	1 (3)	1 (2)	0 (5)	1 (4)	1 (2)	4 (3)	1 (2)	18 (24)
Dust nuisance	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (1)	1 (1)
Footpath / road obstruction	5 (1)	9 (1)	4 (0)	7 (1)	6 (6)	8 (10)	11 (12)	5 (11)	3 (8)	1 (4)	2 (9)	2 (4)	63 (67)
No site display board	0 (0)	1 (0)	0 (0)	1 (0)	0 (0)	1 (0)	0 (1)	3 (0)	3 (0)	0 (2)	1 (1)	0 (0)	10 (4)
Others (please specify)	10 (2)	12 (1)	17 (2)	8 (2)	5 (5)	5 (8)	10 (7)	7 (5)	7 (3)	13 (2)	11 (13)	14 (6)	119 (56)
Traffic obstruction	4 (0)	4 (0)	3 (1)	0 (2)	1 (3)	0 (0)	3 (2)	5 (0)	10 (3)	0 (0)	1 (3)	1 (0)	32 (14)
Repeated working	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (1)	1 (3)
Frequent change of display board completion date	1 (0)	0 (0)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)
Unsatisfactory reinstatement	0 (0)	0 (0)	1 (0)	5 (1)	0 (0)	2 (0)	0 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)	8 (3)
Noisy steel plate	3 (0)	1 (0)	1 (0)	1 (0)	0 (1)	0 (0)	4 (2)	0 (1)	0 (1)	0 (0)	1 (4)	1 (1)	12 (10)
Inadequate or no lighting, signing & guarding	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	3 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	4 (1)
Unsatisfactory temporary works (e.g. temp pavement)	7 (5)	9 (0)	4 (6)	10 (5)	13 (1)	3 (0)	1 (2)	2 (1)	0 (3)	0 (5)	1 (2)	0 (3)	50 (33)
Grand Total	35 (12)	45 (5)	39 (14)	40 (14)	27 (21)	30 (36)	52 (41)	43 (37)	33 (25)	26 (32)	32 (51)	23 (31)	425 (319)



Section 6

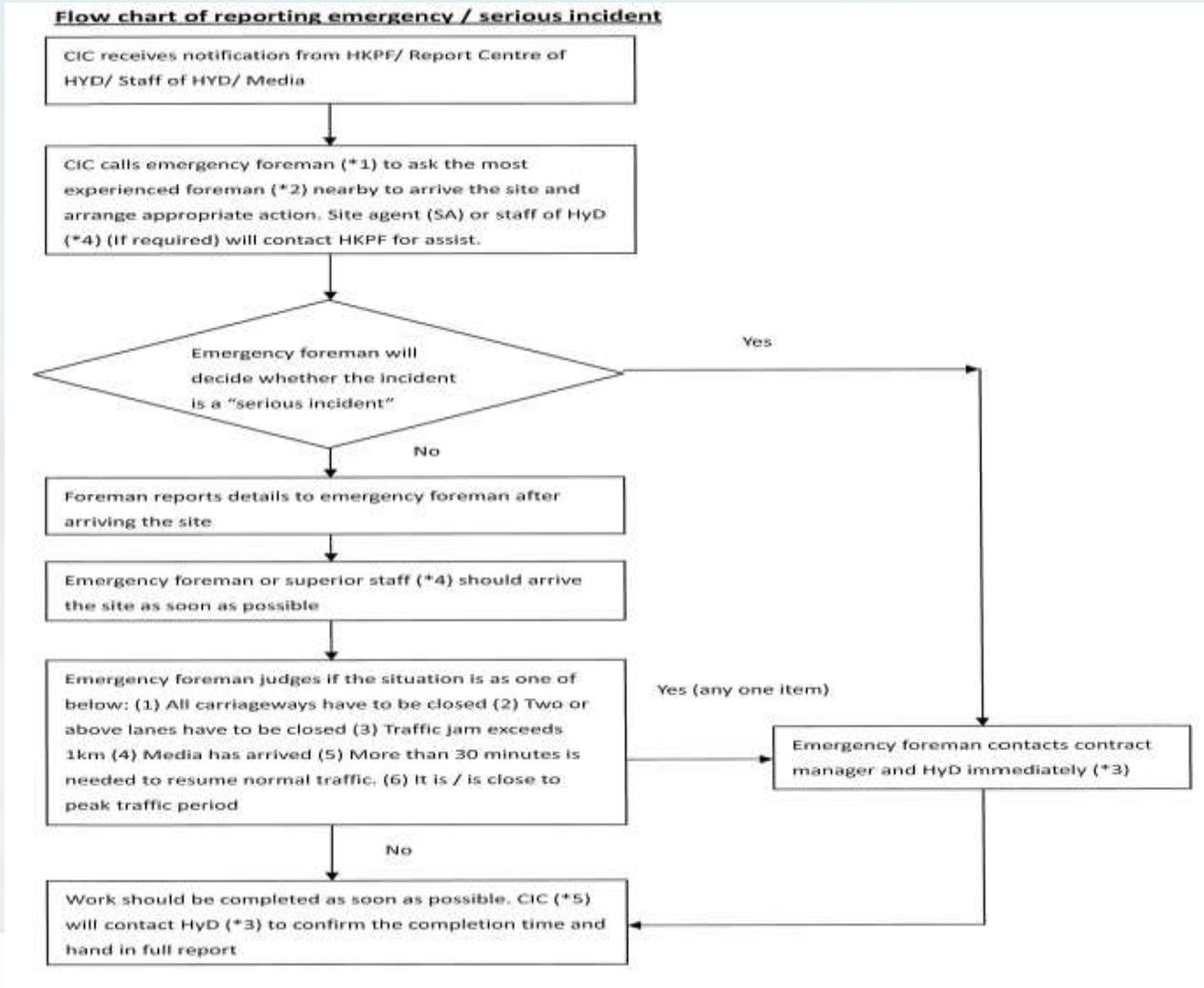
Calls Receiving and Information Centre (CIC)

- the centre to be manned by at least **2 operators** (3 shifts per day).
- equipped with **tele-communication facilities** with call waiting and call recording function.
- a **PC** with broadband internet connection and email facilities.
- a **fax and scanner** machine with its own telecommunication line.
- **attendance to communication** from **Integrated Call Centre(ICC)** from the government compliant hot line.
- arrange to **rectify the defect** from the ICC and report the status of rectification within **2 hours**.



Section 6

Calls Receiving and Information Centre (CIC)



Section 6

Non-Compliance of Performance in EMMS

Summary of Default Notices (DN)

Item	Default Notice	Types of Default and amount of deduction
1	DN(800)	\$800 non-compliance of conditions of excavation permit
		\$800 substandard works identified in one inspection by the Engineer
2	DN(500)	\$500 every 12 hour's delay or part thereof in defect rectification/ submission of inspection report
		\$500 works not carried out according to programme
		\$500 unsatisfactory inspection report submitted
3	DN(4000)	\$4000 unsatisfactory report submission for clearing of black spots



Section 6

Non-Compliance of Performance in EMMS

Summary of Default Notices (DN)

Item	Default Notice	Types of Default and amount of deduction
4	DN(9700)	\$9700 fail to provide thermal heater within 6 months from the commencement of the contract
5	DN(5000)	\$5000 fail or delay to submit GIS data on time
6	DN(500)	\$500 wrong entry of data in the EMMS



7. Payment



Section 7 Payment

Stages of payment:

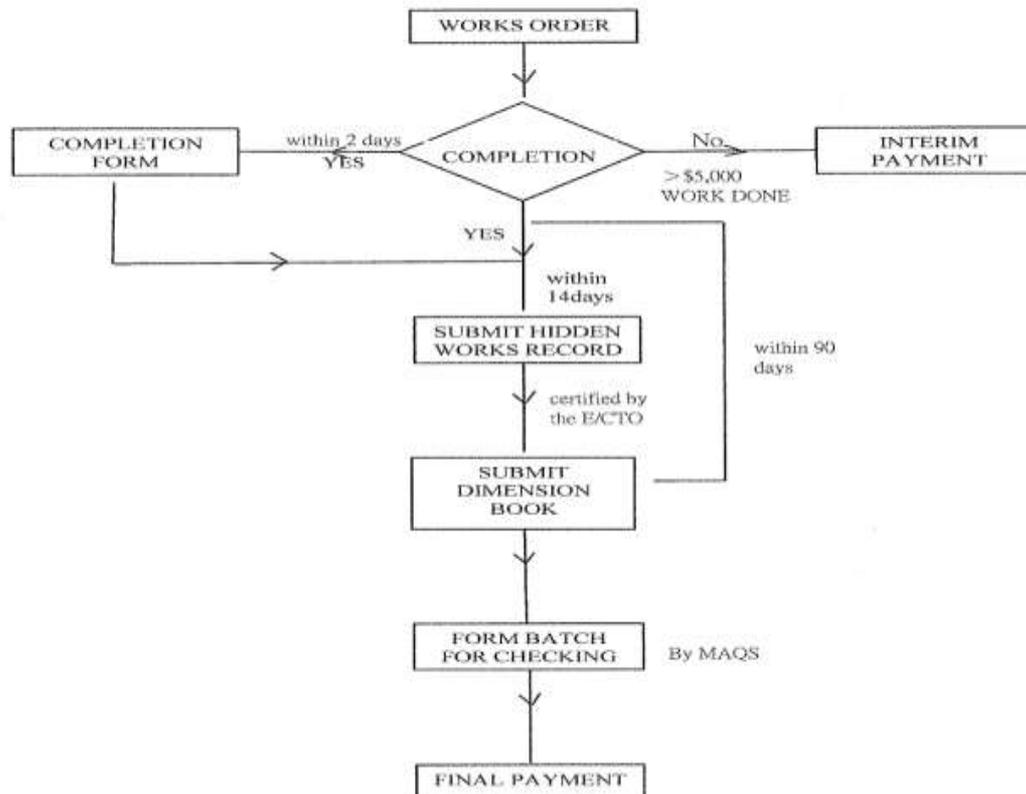
- Interim Payment
- Standard Base Value
- 90 % payment
- Final Payment



Section 7

Flow Chart of Measurement and Payment

FLOW CHART OF MEASUREMENT AND PAYMENT



Section 7

Payment Application

The Government issued works order to contractor and the Contractor should submit completion **within 2** days after completion of works to Government for certification.

Interim Payment

- Contractor can receive interim payment subject to application for works with value over **\$5,000** and works order issued **over 30 days**

Standard Base Value

- If the value of works is small, payment can be made base on Standard Base Value of less than **HK\$1,000.00** (dependent on nature of works such urgency, high urgency or extreme urgency) and no hidden works record is required to be submitted



Section 7

90 % Payment

- If the value of works is substantial over **\$1,000**, hidden works record to be submitted for certification **in 14 days**
- Once the hidden works record is certified, Contractor to submit dimension book of the works done to **Maintenance Accounts and Quantity Surveying Unit (MAQS) within 90 days** to form batch of works orders (not less than 10%) for checking and be paid 90% of the value of works orders completed



Section 7

Final Payment

- **The sample of checks** to be agreed with the Contractor for adjustment or corrections if there is any discrepancy found in the submission. This will affect the payment of the whole batch of works orders subject to adjustment
- **All final payment** shall be processed and certified by the MAQS section with the release of the remaining outstanding payment.



THE END

Thank You



China Road and Bridge Corp.