

Topic for tonight

A Technical and Project Review of the 10 Airport Core Projects and their Influence on Current Developments

Presented by Raymond Wong

The need of a new Airport

The full capacity of Kai Tak Airport was at 25,000,000 passenger per year and 320 aircraft daily



The need of a new Airport

Passenger handling capacity	1980 – 7,000,000
(10 -12% growth)	1991 – 19,000,000
	2003 – 48,000,000
Air cargo handling capacity	1980 – 260,000 tons
(11 -14% growth)	1991 – 855,000 tons
	2003 – 3,500,000 tons

Other issues – rapid expansion in China cargo handling with an average growth of 16% after 1990.

Development Background

Replacement of the Kai Tak Airport was discussed in early 1970s. Various sites were examined and Chek Lap Kok emerged as the preferred location.

A master plan was drawn up in 1982, but was shelved in 1983 because of the world economic situation and resulted to a drop in air traffic growth forecast.

The plans were revived in 1987 following strong growth in Kai Tak's passenger and cargo traffic. Alternative sites were again reviewed and final studies were carried out on Chek Lap Kok and a site in the western harbour near Lamma Island.

Development Background

Finally CLK was given the go-ahead in 1989 as part of a comprehensive Port & Airport Development Strategy (PADS) which also included other major port development concerns.

In 1991, PADS was distilled into an Airport Core Programme (ACP) which included all the transport and other infrastructure required to open the new airport at CLK.

China gave the ACP formal support in late 1991 through a Sino-British Memorandum of Understanding and a Consultative Committee on the new airport and related projects was set up to oversee and coordinate the detailed aspect of the programme including concerns on public involvement.

Managing the New Airport Programme

A statutory body known as the Provisional Airport Authority (PAA) was formed in 1990 responsible for the detail planning and implementation of the related works for the replacement the old airport with a new.

PAA was affirmed as the Airport Authority (AA) in late 1995 whose mandate was to define and promote all aspects of the new airport and the related developments.

Upon the completion of the programme, AA would also responsible for the operation of the new facility.

Organization of the Airport Authority

At the top of the hierarchy was the AA Broad which was responsible for all the strategic and corporate decisions. On a day-to-day basis, decisions are made by the Chief Executive Officer with the help of directors from seven key divisions.

Airport Management Division – for airport operations and the coordination of the Kai Tak relocation program.

Corporate Development Division – in charge of the promotion of the new airport and the maintenance of good community relations.

Human Resources & Admin Division

Finance & Commercial Division – oversees the financial and expenditure of AA, provides supportive business services and ensure the design of the new airport gives the maximum commercial value.

Legal & Secretarial Division – provision of legal advice across the entire range of the AA's activities and control over the registration and safe custody of corporate documentations.

Planning & Coordination Division – formulation of AA's long term development strategy (traffic forecast, expansion phasing, operation research and analysis etc.)

Project Division – supervise the design & construction of the new airport and to coordinate the ACP as a whole.

To make the construction of the new airport and the associated infrastructure more effective in terms of management, construction and coordination, the involved works were sub-divided into 10 Airport Core Projects for implementation, which include:

1. New Airport at Chek Lap Kok
2. Tung Chung New Town
3. North Lantau Expressway
4. Airport Railway
5. Lantau Fixed Crossing
6. Route 3 (Kwai Tsing Section)
7. West Kowloon Reclamation
8. West Kowloon Expressway
9. Western Harbour Crossing
10. Central Reclamation

Location of Airport Core Projects



Airport Core Projects – approx. costs

1. Airport – \$65B, including formation of the airport island (\$22B) and the construction of the Terminal Building (\$15B)
2. Tung Chung New Town – \$6B
3. North Lantau Expressway – \$10B
4. Airport Railway – \$28B
5. Lantau Fixed Crossing – \$12B, including the construction of the Tsing Ma Bridge (\$7.2B), Ma Wan Viaduct and Kap Shui Mun Bridge (\$1.6B).

Airport Core Projects – approx. costs

6. Route 3 (Kwai Tsing Section) – \$10B, including the construction of the Cheung Tsing Tunnel (\$0.8B) and a 6.5km elevated expressway (\$2.2B)
7. West Kowloon Reclamation – \$6B
8. West Kowloon Expressway – \$8B
9. Western Harbour Crossing – \$6B
10. Central Reclamation – \$4B

Total costs for the Airport Core Project around \$155B
as in 1997 price

Airport Core Projects – Contracts

	Contract Title	Contract Commencement Date	Contractor/ Awarded Contract Sum (ACP Portion Only) (Money of the Day)
New Airport at Chek Lap Kok (Airport Authority Hong Kong)	1. Automated People Mover System (Contract No. C350)	March 1994	New Hong Kong Airport People Mover System Joint Venture \$ 321.00 M
	2. Baggage Handling System (Contract No. C360)	March 1994	Swire Engineering Services Ltd. \$ 640.00 M
	3. Construction of a Power Sub-station at Chek Lap Kok (Contract No. C531)	October 1994	Gold Banner Construction and Development Ltd. \$ 48.50 M
	4. Stormwater Drainage Box Culverts Construction (Contract No. C501)	November 1994	Hsin Chong Construction Co., Ltd. \$ 557.30 M
	5. Airfield Tunnels (Contract No. C430)	November 1994	Downer - McAlpine - Paul Y Joint Venture \$ 665.60 M
	6. Passenger Terminal Building Structure (Contract No. C302)	January 1995	BCJ Joint Venture \$ 10,134.00 M
	7. Terminal Building - Building Services (Contract No. C320)	January 1995	AEH Joint Venture \$ 1,880.00 M

Tung Chung Development - Phase I	1. Tung Chung Development Phase I - Infrastructure (Contract No. NL 2/93)	18 July 1994	Shui On - China Harbour Joint Venture \$ 510.00 M
	2. North Lantau Sewage Treatment Facilities - Sewage Treatment Works and Pumping Station (Contract No. NL 3/93)	18 July 1994	Kier - SFK - CFCITEC Joint Venture \$ 192.66 M
	3. Construction of Divisional Fire Station with ambulance facilities in Tung Chung, Lantau Island (Contract No. SS D331)	28 September 1995	Techoy Construction Company \$ 46.74 M
	4. Construction of North Lantau Development Phase I District Police Station in Tung Chung (Contract No. SS C395)	12 October 1995	Woon Lee Construction Co., Ltd. \$ 77.13 M
	5. Lift and Dumbwater Installation for North Lantau Development Phase I District Police Station in Tung Chung (Contract No. LF D366)	12 October 1995	Kone Elevator (HK) Ltd. \$ 2.92 M
	6. North Lantau Refuse Transfer Station (Contract No. EP/SP/20/94)	1 April 1996	Ecoserve Ltd. \$ 238.50 M
North Lantau Expressway	1. North Lantau Expressway - Tai Ho Section (Contract No. HY/91/07)	8 June 1992	Lantau Expressway Joint Venture \$ 3,502.65 M
	2. North Lantau Expressway - Yam O Section (Contract No. HY/91/08)	14 September 1992	Aoki Corporation/Franki Contractors Ltd./Tobishima Corporation Joint Venture \$ 1,327.55 M
	3. North Lantau Expressway - Tung Chung Section (Contract No. HY/92/05)	27 September 1993	China State - Leighton - Hochtief Joint Venture \$ 969.10 M
Lantau Link*	1. Lantau Link - Tsing Ma Bridge (Contract No. HY/91/18)	25 May 1992	Anglo Japanese Construction Joint Venture \$ 7,144.00 M

ACPs – Example of Contracts Breakdown

Airport Railway were sub-divided into more than 40 main contracts for implementation, these include:

- (501) – Hong Kong Station and associated tunnels
- (501A) – Central Subway
- (502) – Western Immersed Tube Tunnel
- (503B) – Kowloon South Tunnels & Ancillary Building
- (503C) – Kowloon Station
- (505) – Tai Kok Tsui (Olympic) Station
- (508) – Lai King Station and Tunnels
- (509) – Kwai Chung Park Viaduct

Airport Railway contracts (continue)

- (510) – Rambler Channel Bridge
- (511C) – Tsing Yi Station
- (512) – Tsing Yi Tunnels and Viaducts
- (514) – East Lantau Tunnels
- (516) – Tung Chung Station and Tunnels
- (518) – Siu Ho Wan Depot
- (520) – Trackwork
- (544-580) – Electrical and Mechanical Works

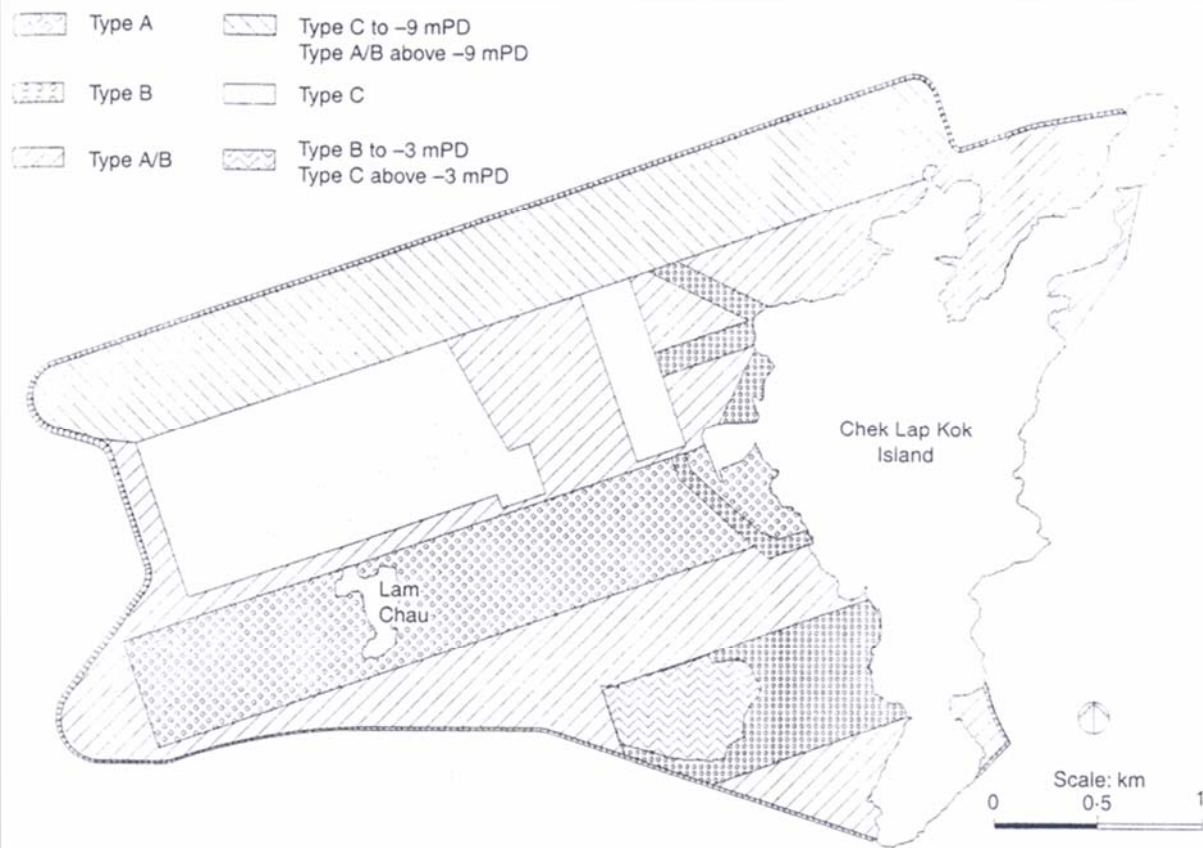
As well as other associated portions entrusted to other ACPs contracts or Govt. Departments for implementation.
(e.g. CLK Station as part of the Ground Transportation Centre under the Terminal Building)

New Airport at Chek Lap Kok

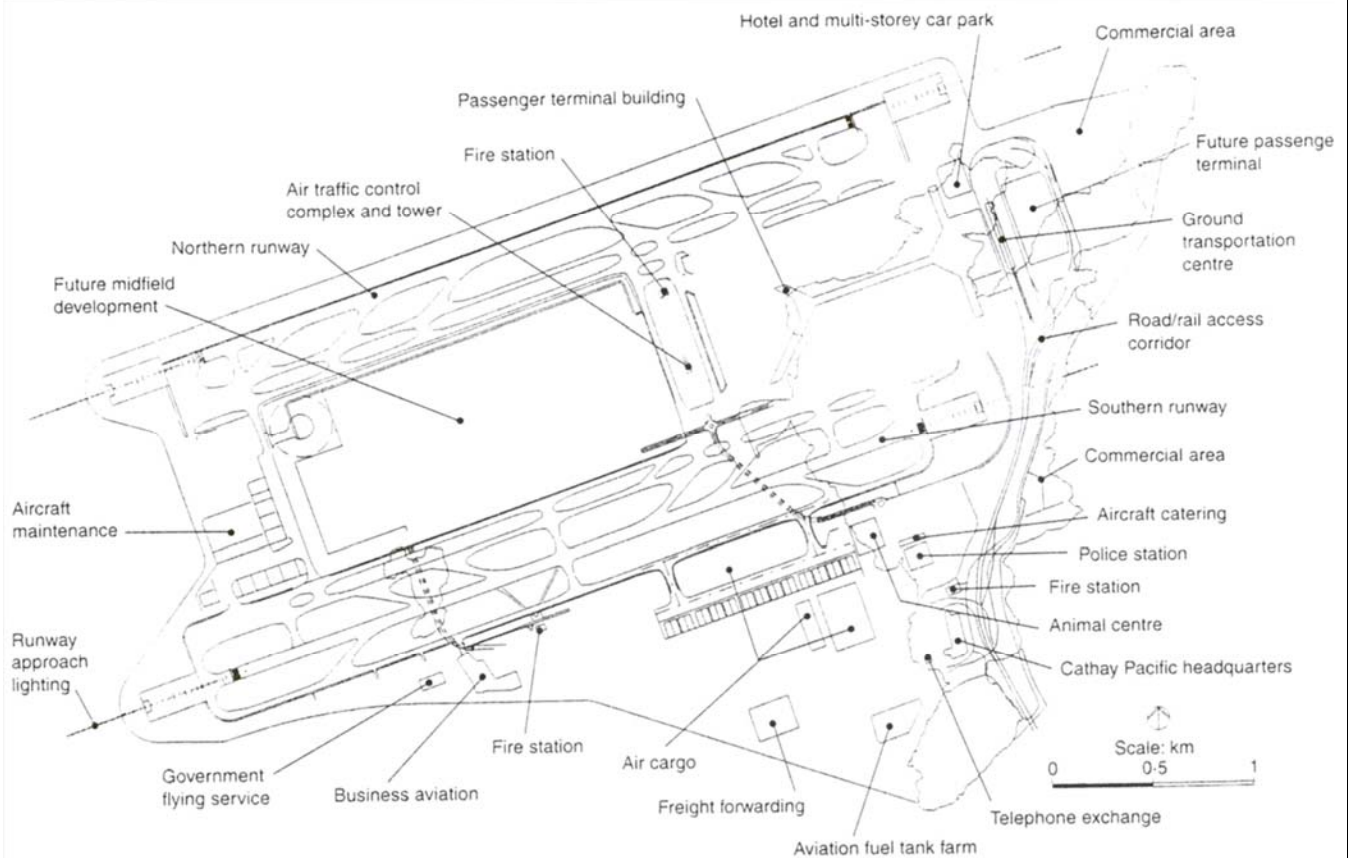
Formation of the
Airport Platform
from the original
Chek Lap Kok Island



Formation of the Airport Platform - land fill



Layout of the Airport Platform





Early stage of the Airport Terminal Building construction –
foundation and sub-structure

Construction of the
Terminal superstructure



Modulated roof for the Terminal Building



Position the modulated roof
onto the Terminal structure by
500 ton capacity mobile crane



Position the modulated roof onto the Terminal structure (entrance concourse) by crane and slide-on rail



Installation of the Glass Wall



Construction of the
Air Bridge



Finishing up the
Terminal Interior



Paving work for the runway



Paving for the apron area



The new Airport
close to its
completion in 1998



Other facilities in the New Airport



Ground
Transportation Centre



Post Office
Air Mail Centre

Other facilities owned
by the Government



Air Cargo Facilities –
Asian Air Terminal (left)
and Super-Terminal No. 1





HKAE0 Aircraft
Maintenance Depot



Other private
development –
Cathy City



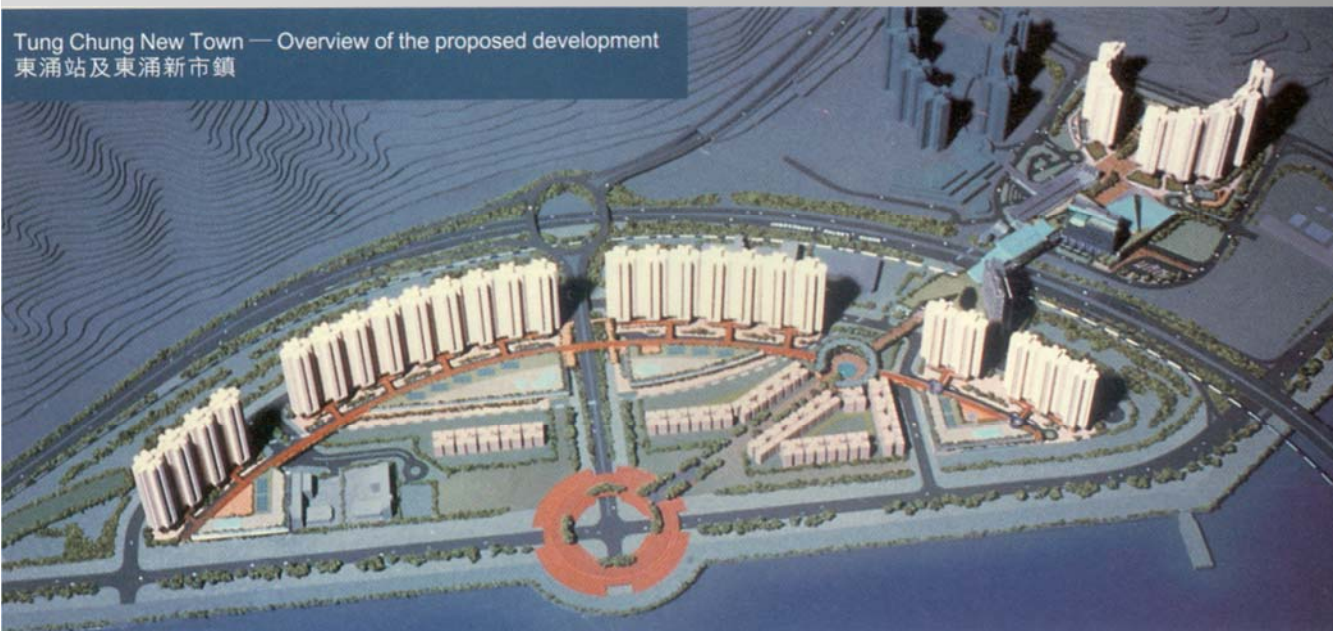
Tung Chung New Town

Major Contracts

1. Tung Chung Development Phase I - Infrastructure (\$0.5 bn)
2. North Lantau Sewage Treatment Facilities (\$0.2 bn)

Original plan for the Tung Chung New Town

Tung Chung New Town — Overview of the proposed development
東涌站及東涌新市鎮



Layout of Tung Chung New Town in 2004



Tung Chung at its early stage in 1995



Formation of the Tung Chung New Town



Tung Chung as seen in 1996

Tung Chung taking
shape as in 1997



North Lantau Expressway

Major Contracts

1. NLE – Yam O Section (\$1.35 bn)
2. NLE – Tai Ho Section (\$3.5 bn)
3. NLE – Tung Chung Section (\$0.97 bn)

All contracts under Highways Department



Original Coastline of
North Lantau
(section between
Yam O and Tai Ho)



North Lantau Expressway –
formation by cutting and land filling





North Lantau Expressway –
land formation by sand filling



North Lantau Expressway –
forming the seawall



Construction of a bridge section at Shum Shiu Kok



Construction of a bridge section at Shum Shiu Kok



Construction of a section
of culvert near Tai Ho



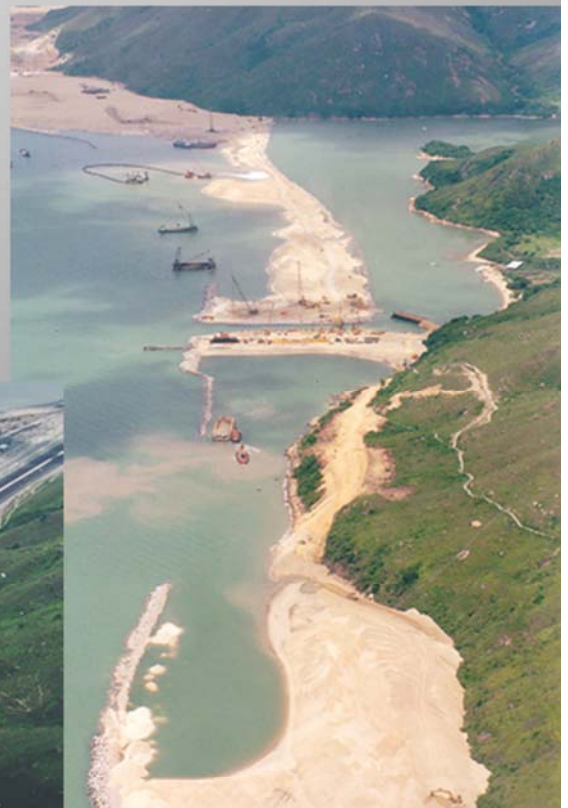
North Lantau
Expressway – formation
of the Yam O Section



Junction Point to
Penny Bay (Disney
Land) at Yam O



Tai Ho Section and
the Depot Facilities of
the Tung Chung Line





Expressway as seen
near the Toll Plaza of
the Lantau Fixed
Crossing



The completed Expressway at Yam O and Tai Ho



Lantau Fixed Crossing

Major Contracts

1. Tsing Ma Bridge (\$7.15 bn)
2. Kap Shui Mun Bridge and Ma Wan Viaduct (\$1.65 bn)
3. Toll Plaza and associated roadworks (\$0.3 bn)

Majority of the contracts under Highways
Department



The 1377m span
Tsing Ma Bridge

The Tsing Ma Bridge

Ma Wan side

Tsing Yi side



Cable anchor

Main span

Side span and approach bridge

Water Channel between Tsing Yi and Ma Wan as in 1995



Formation on Tsing Yi side –
construction of the bridge
tower and the anchor for the
suspension cable



The approach
concourse on the
Tsing Yi side



Approach section leading
to the main span



Construction of the
bridge tower



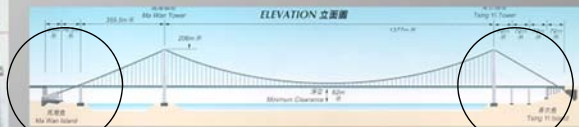
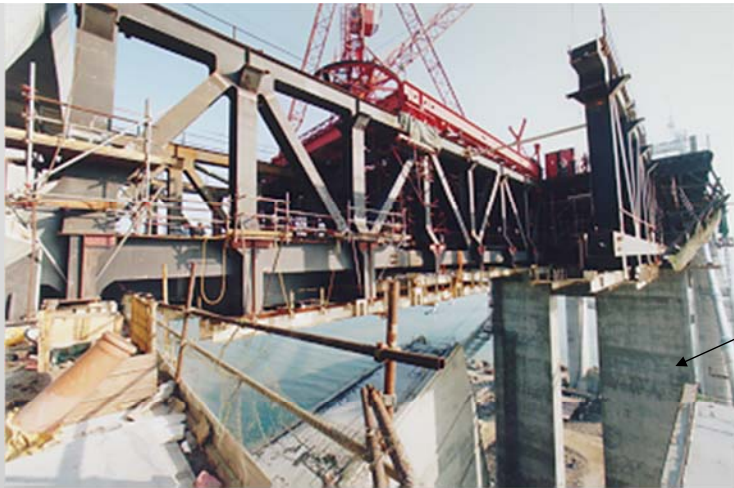
Formation work on the Ma Wan side as seen in 1995



Forming the cable anchor on the Ma Wan formed land



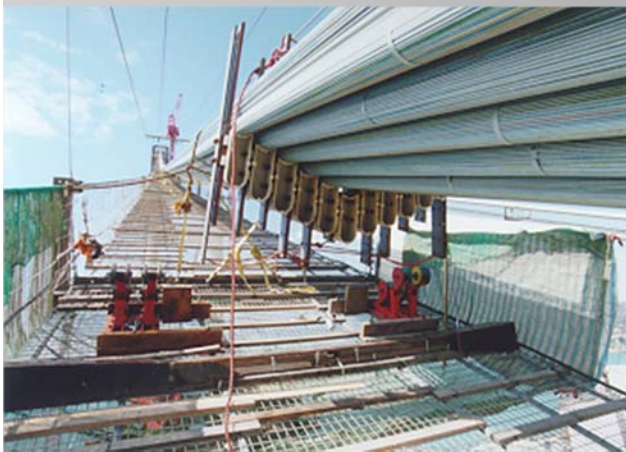
An aerial photograph showing a large-scale construction project for a dam. The dam's concrete structure is visible, with several large rectangular sections. A red crane is positioned on a barge in the water in the foreground. The surrounding area includes a body of water, a rocky shoreline, and some industrial or construction buildings in the background.



Connecting the steel wire to the ground anchor



Forming the suspension cable





Compaction and
final encasing of the
main cable



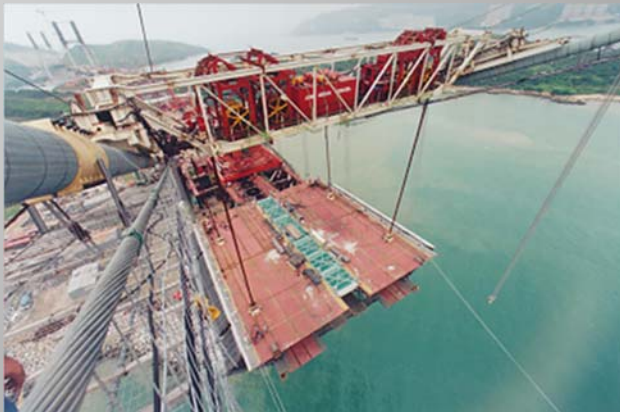
Suspension cable
supported onto the tower
head by the saddle





Hoisting and erecting the modulated bridge deck onto the suspension cable

Hoisting gantry using strand jack for the lifting of the deck module onto the suspension cable



Exterior and interior view
inside the bridge deck



The Ma Wan Viaduct – the linking section between the
Tsing Ma and Kap Shui Mun Bridge





Construction detail of the Ma Wan Viaduct

Kap Shui Mun Bridge –
a 430m cable-stayed bridge



Hoisting and erecting of the
modulated bridge deck



Forming the approach
section of the KSM Bridge
on the Lantau side





Forming the approach section of the KSM Bridge using incremental launching method



Route 3 – Kwai Tsing Section

Major Contracts

1. Cheung Ching Tunnel and associated roadworks (\$0.85 bn)
2. Kwai Chung Viaduct (\$2.2 bn)

Contracts under Highways Department

Route 3, Tsing
Kwai Section at
Kwai Chung



Approach section of Route 3 heading to the Rambler Channel

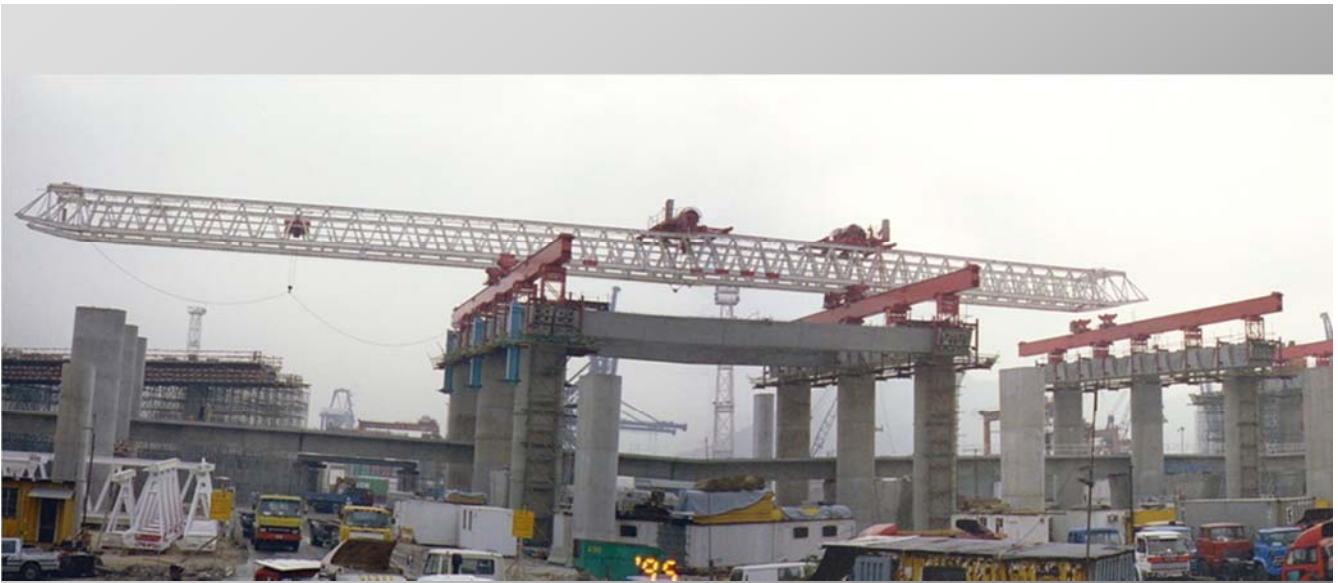




This section of Route 3 is mainly composing of 4-lane 2-way elevated roadway, averaged 35m span and 15m above ground

Forming the deck of elevated bridge using precast beam by launching machine (section along Kwai Chung & Kwai Tai Road)





Detail set-up of the launching machine on top of the portal frame

Elevated track of the
Airport Railway
running along Route 3
at Kwai Chung Raod



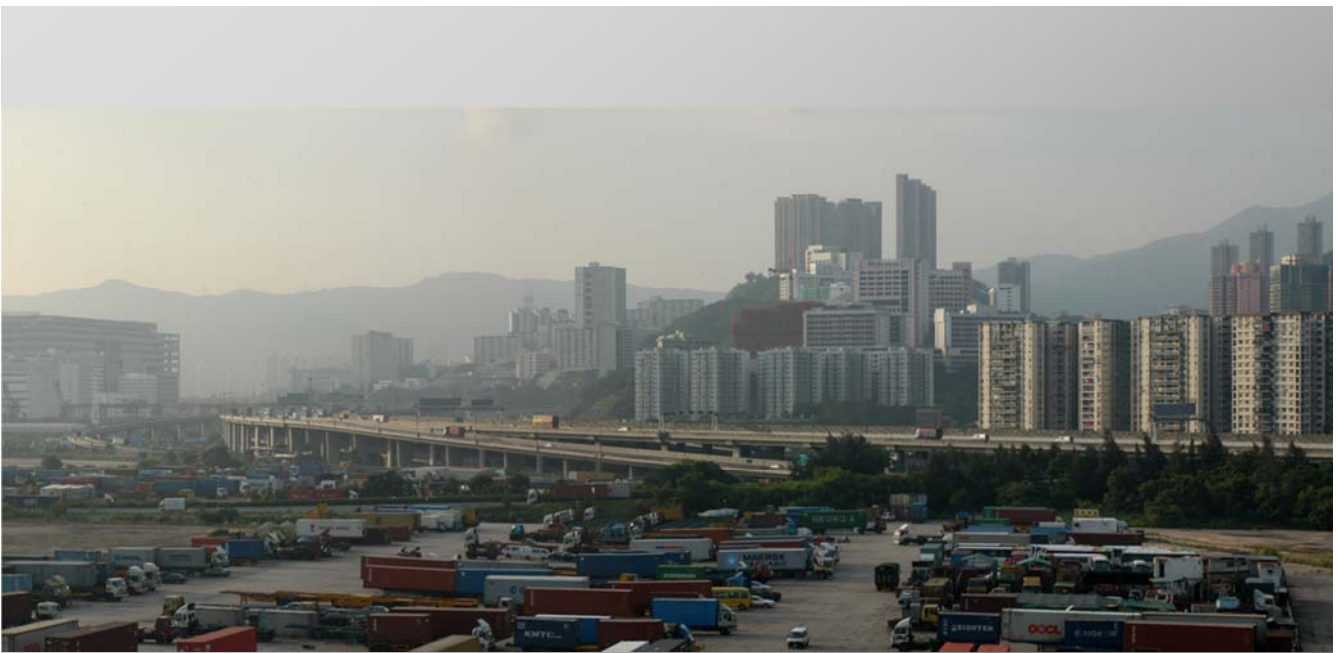
Launching machine for
installing the precast girder
section of the elevated track



Viaduct section
before crossing the
Rambler Channel
(using precast box-
section segment
instead of U-beams)



Viaduct section
formed using in-situ
method with deck
formwork supported
by falsework



The completed Route 3 between Mei Foo and Lai King
as seen from the Container Terminals

West Kowloon Reclamation

West Kowloon at Yaumatei/Shamshuipo at the
early stage of reclamation



Gradual progress
of Reclamation
at Yaumatei



Gradual progress
of Reclamation
at Yaumatei



Reclamation at
Cheung Sha Wan –
relocation of the
Fish Markets



Government docks and private-owned shipyards being relocated during the reclamation process



Commencement of roadwork and other infrastructure facilities after reclamation completed in 1996



South-most tip of West Kowloon Reclamation – connection to the harbour crossing tunnels



Reclamation at
Stonecutter Island
to form land for
Container Terminal
No. 5 to 8



Container Terminal No.
5 to 8 put into operation
in early 1997



West Kowloon in 2001





West Kowloon Reclamation as seen in 2004

West Kowloon Expressway

Major Contracts

1. WKE, North Section (\$1.25 bn)
2. WKE, South Section (\$0.96 bn)

Contracts under Highways Department

West Kowloon Expressway comprising:

1. North Section – Elevated, 2.7 km
2. South Section – On-grade, 1.5 km



West Kowloon Expressway –
construction of Mei Foo Interchange



West Kowloon
Expressway at
Tai Kok Tsui near
Olympus Station

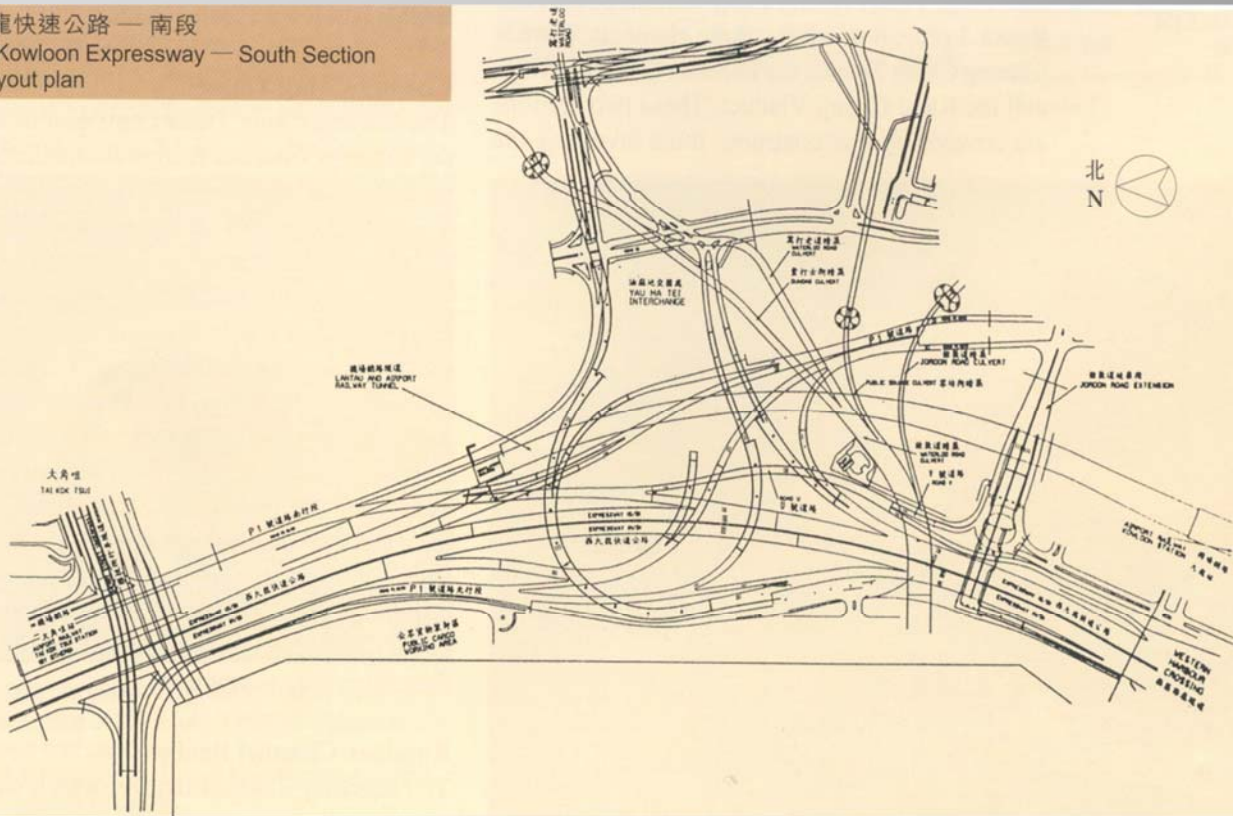


Construction of the
elevated expressway
using precast box-
girder by portal gantry



Layout of WKE South Section showing the YMT Interchange

西九龍快速公路 — 南段
West Kowloon Expressway — South Section
site layout plan



West Kowloon
Expressway as seen
after its opening in
early 1998

Western Harbour Crossing

Franchised under BOT

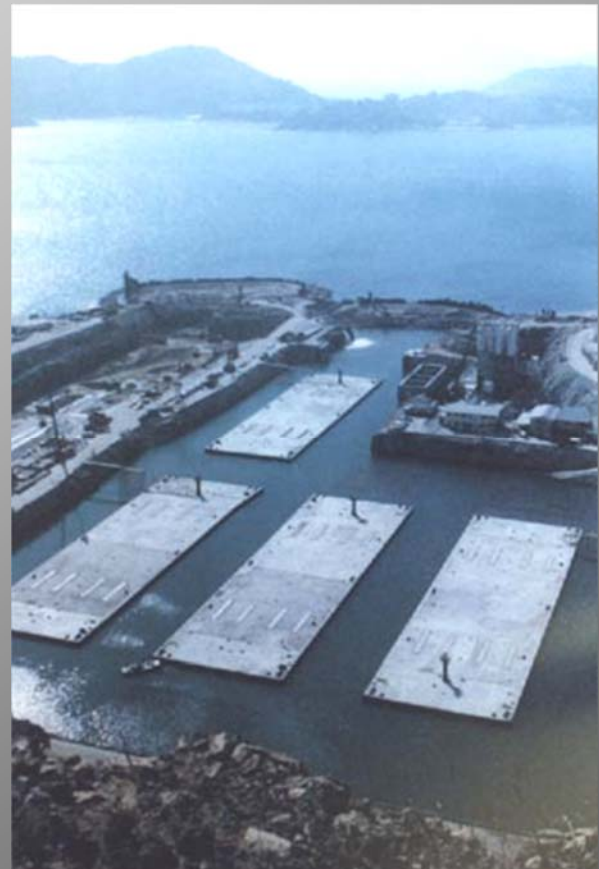
Casting yard for
the forming of the
submerge tunnel
tubes at Shek O
Quarry





Casting the submerge
tunnel tubes

Delivery of the Submerge-
tube by floating-out from the
casting yard (dry dock)





Transport the submerge-tube by barges and place them onto pre-arranged position

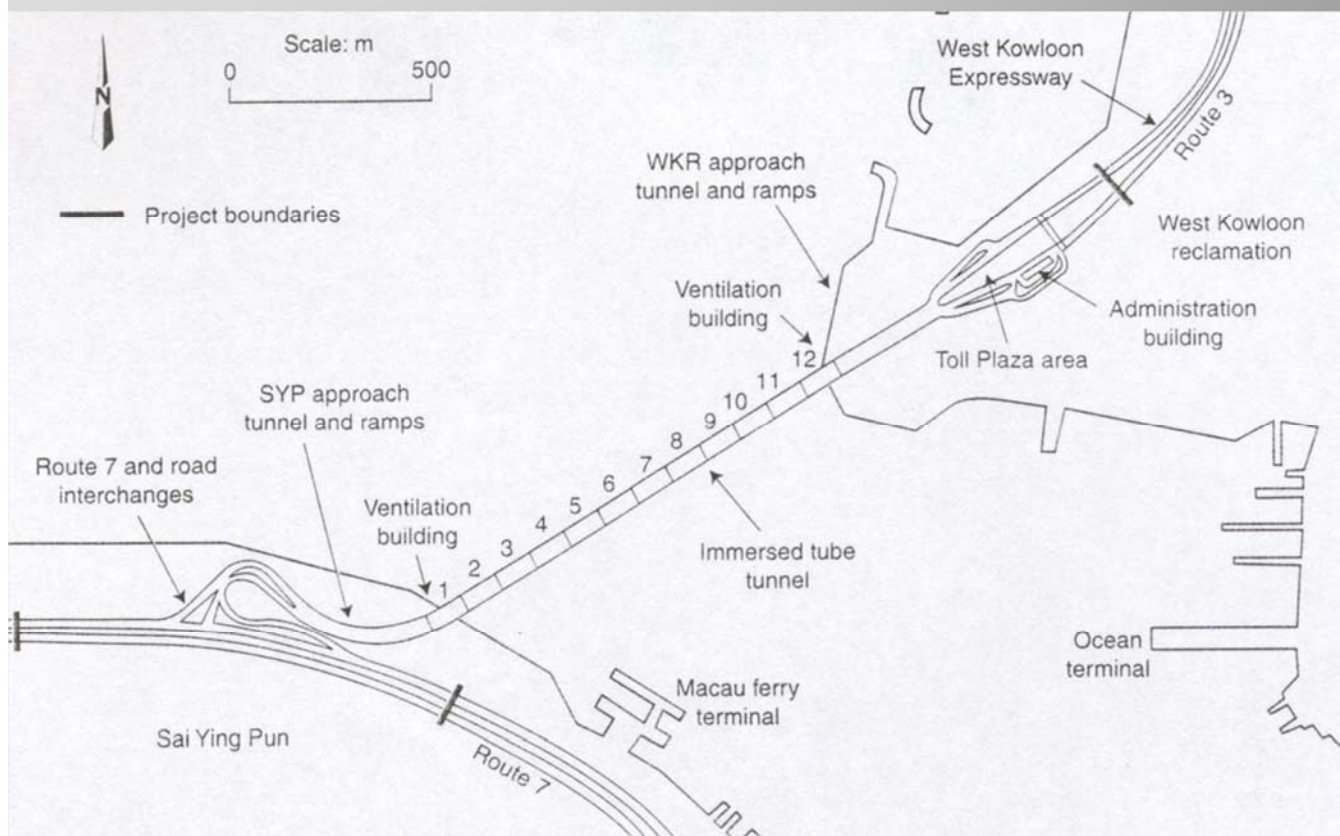
Connecting the submerge-tube to the tunnel approach



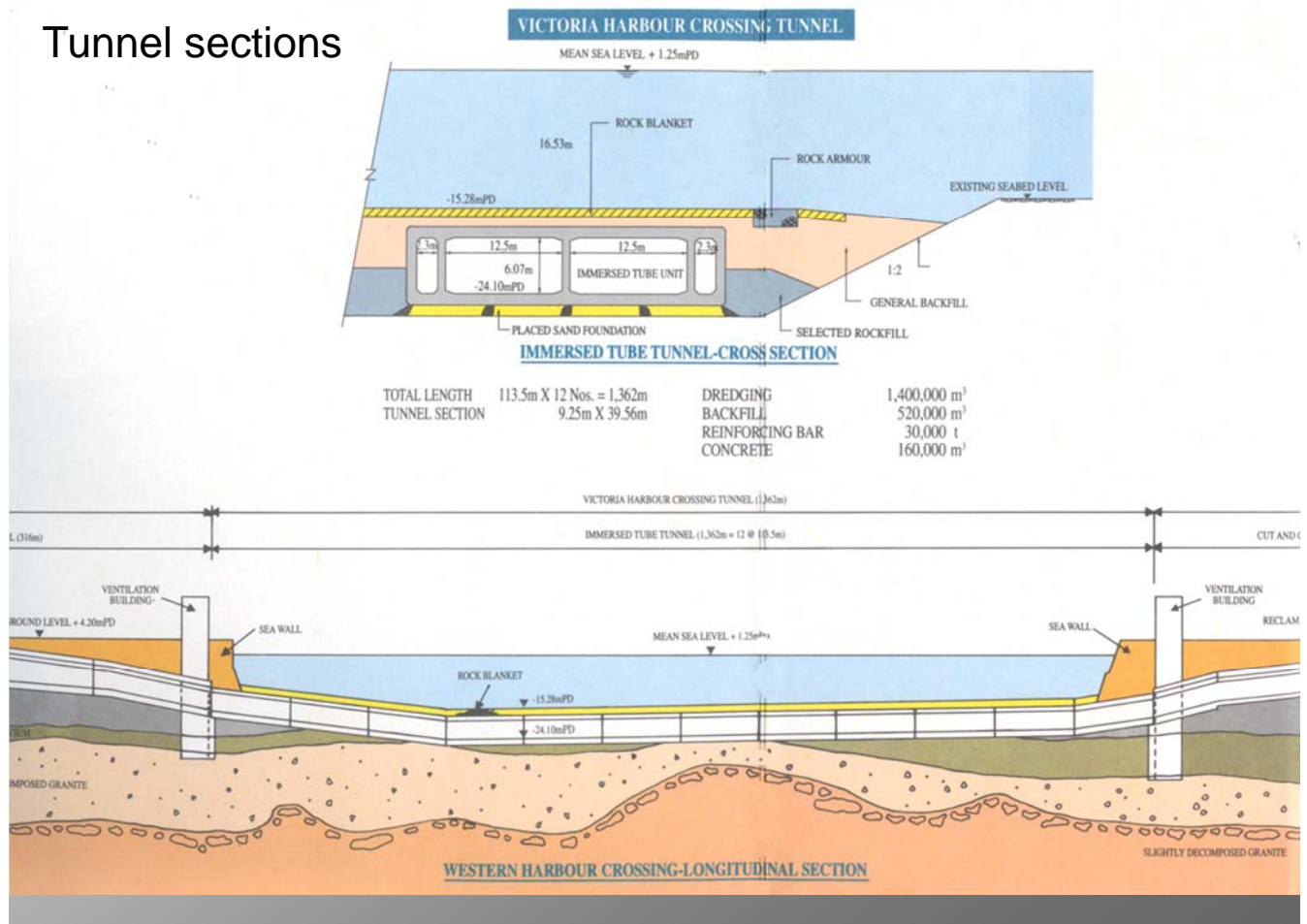
Forming the tunnel approach
using cut-and-cover arrangement



Layout of the Immersed Tunnel and the Tunnel Concourse



Tunnel sections



The tunnel approach and connection arrangement at Sai Ying Poon side



Associated roadwork forming the entrance concourse to the Western Harbour Crossing at Sai Ying Poon side



Associated roadwork for the Western Harbour Crossing at Sai Ying Poon

Western Harbour Crossing at the West Kowloon entrance



Central Reclamation

Phase I Engineering Works (\$1.7 bn)

Early stage of the
reclamation work
in 1994

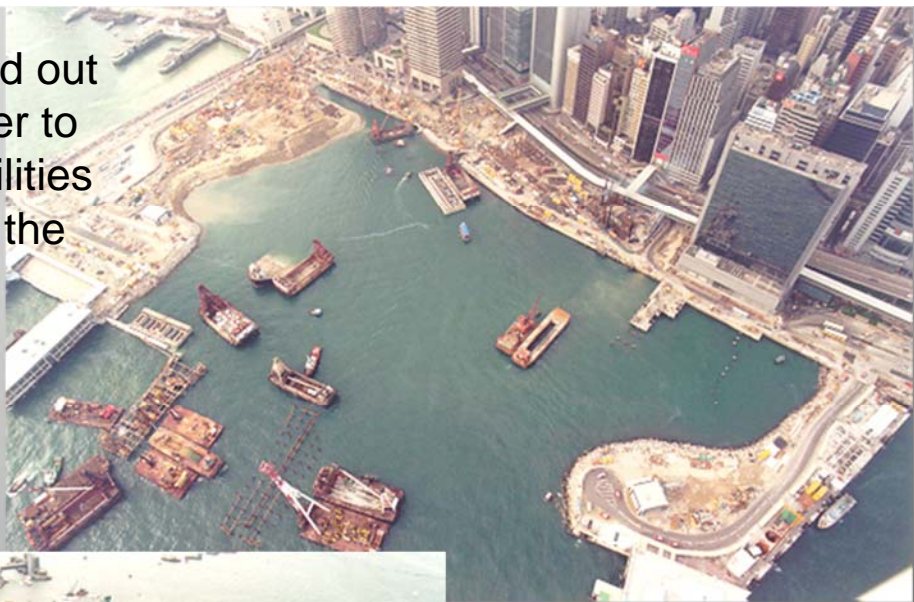


Construction of new ferry piers to replace the old that were
still servicing central to Jordan Road and outlying islands

Servicing ferry piers



Reclamation carried out
in a looped manner to
allow servicing facilities
to be replaced at the
latest stage



Gradual completion of
the reclamation for
handing over for
commencement of
other facilities



Associated works –
sewage diversion and
the construction of a
slip road (future
Centra/Wanchai
By-pass)



Viewing the area
in 2002 from the
IFC 2 Tower



Taking shape of the new
land formed by the
Central Reclamation



Developments
in the Central
Reclamation



Airport Railway

The 32km Airport Railway and Tung Chung Line owned by MTR



Hong Kong Station
of the
Airport Railway



Cut-and-Cover
Tunnel for the Airport
Railway in the newly
Reclaimed Land in
Central



Aerial view of the Central Reclamation seeing the
Railway Alignment going into the Harbour Crossing Tunnel



Landing point of the
Airport Railway at
West Kowloon
Reclamation

Construction of the Kowloon Station and the cut-and-cover tunnel of the Airport Railway at its early stage in 1995



Cut-and-cover tunnel of the Airport Railway near the Kowloon Station



Kowloon Station as seen in 1998, the station provide vast land resources to fund the Airport Railway projects as well as for the future development of the West Kowloon



Airport Railway –
Lai King Station
and Viaducts





Airport Railway
crossing the Rambler
Channel heading to
the Tsing Yi Station



Airport Railway – Viaduct
and track in Kwai Chung





Airport Railway – Tsing Yi
Tunnel and Viaduct



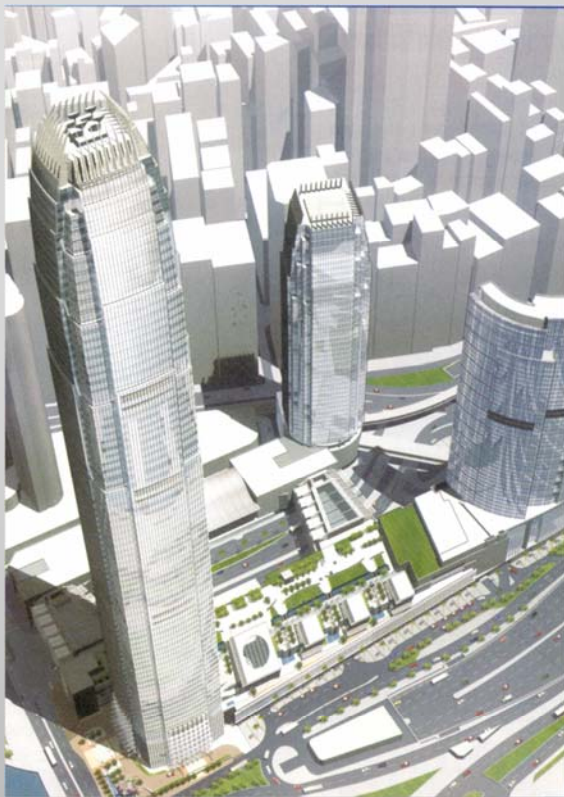
Airport Railway – Track
inside Tsing Ma and Kap
Shui Mun Bridge

Airport Railway – portal of East Lantau Tunnel linking between Kap Shui Mun Bridge and the North Lantau Expressway coastline



Track along the coastline of North Lantau Expressway





Financial sources for the
Airport Railway projects – the
International Financial Centre
and other property
development along the line



Financial sources for
the Airport Railway
projects –property
development in Tsing Yi
and Tung Chung



How the Airport Core Projects benefit the overall development of Hong Kong?

The new airport and the associated projects were part of the overall development of Hong Kong under the Territorial Development Strategy (TDS) as released by the Planning Department in early 1990. TDS is the blue print for future developments, which covers also detail planning framework for railway, highway, port facilities, land use, urban renewal and other sustainable development in a strategic manner.

How the Airport Core Projects benefit the overall development of Hong Kong?

Below are some highlights of the benefits that the ACPs undermined

New Airport – Besides meeting the air transport need in the coming decades, it also helps Hong Kong to become the major transportation hub within the Eastern part of Asia. The land formed in vicinity of the new airport also provides opportunity for some strategic developments such as trade and exhibition services.

Tung Chung New Town & North Lantau Expressway – It established the first population centre in Lantau Island. Besides fulfilling the policy of new town development as part of the town planning scheme, it also provides a base to support the overall development of Lantau in a long run.

Highlights of the benefits of ACPs (continue)

Airport Railway and Lantau Fixed Crossing – Besides providing the basic transportation link to the new airport, Tung Chung new town and the possible future expansion along the north coastline of Lantau, the railway and roadway also integrated into the overall transportation network of Hong Kong in particular in support of the development of the NW New Territories and meeting the rapidly expanding cross-boundary traffic demand.

Route 3 (Tsing Kwai Section) and Western Harbour Crossing – As the former portion of the truck road development, the project integrated with the Country Park Section 2 years later to form the 30 km Route 3 truck route that links efficiently the metro area into the northern part of New Territory. WHC also provided the 3rd harbour crossing tunnel linking the already saturated EHC and CHT.