Topic on

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

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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

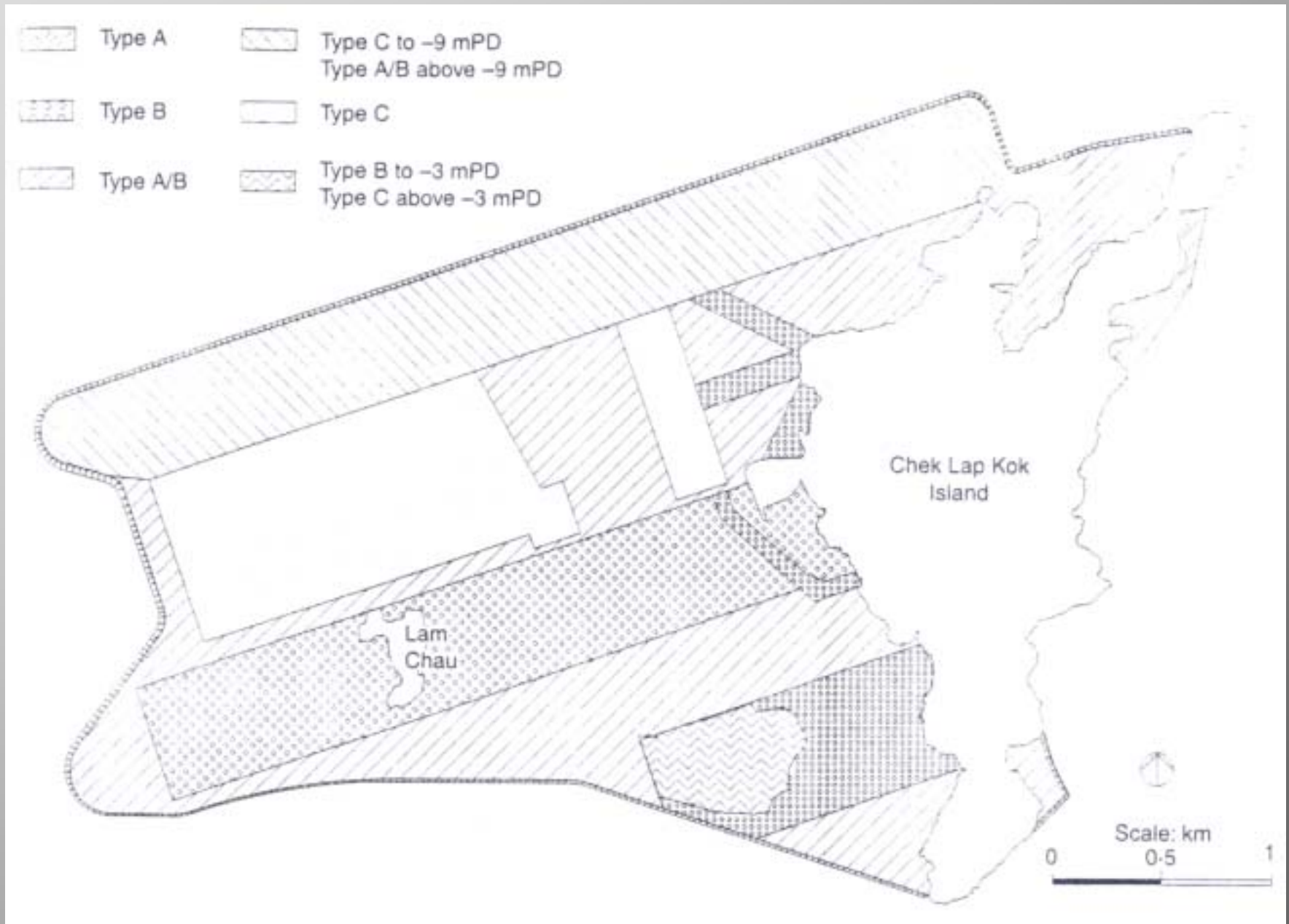
(544-580) – Electrical and Mechanical Works

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)

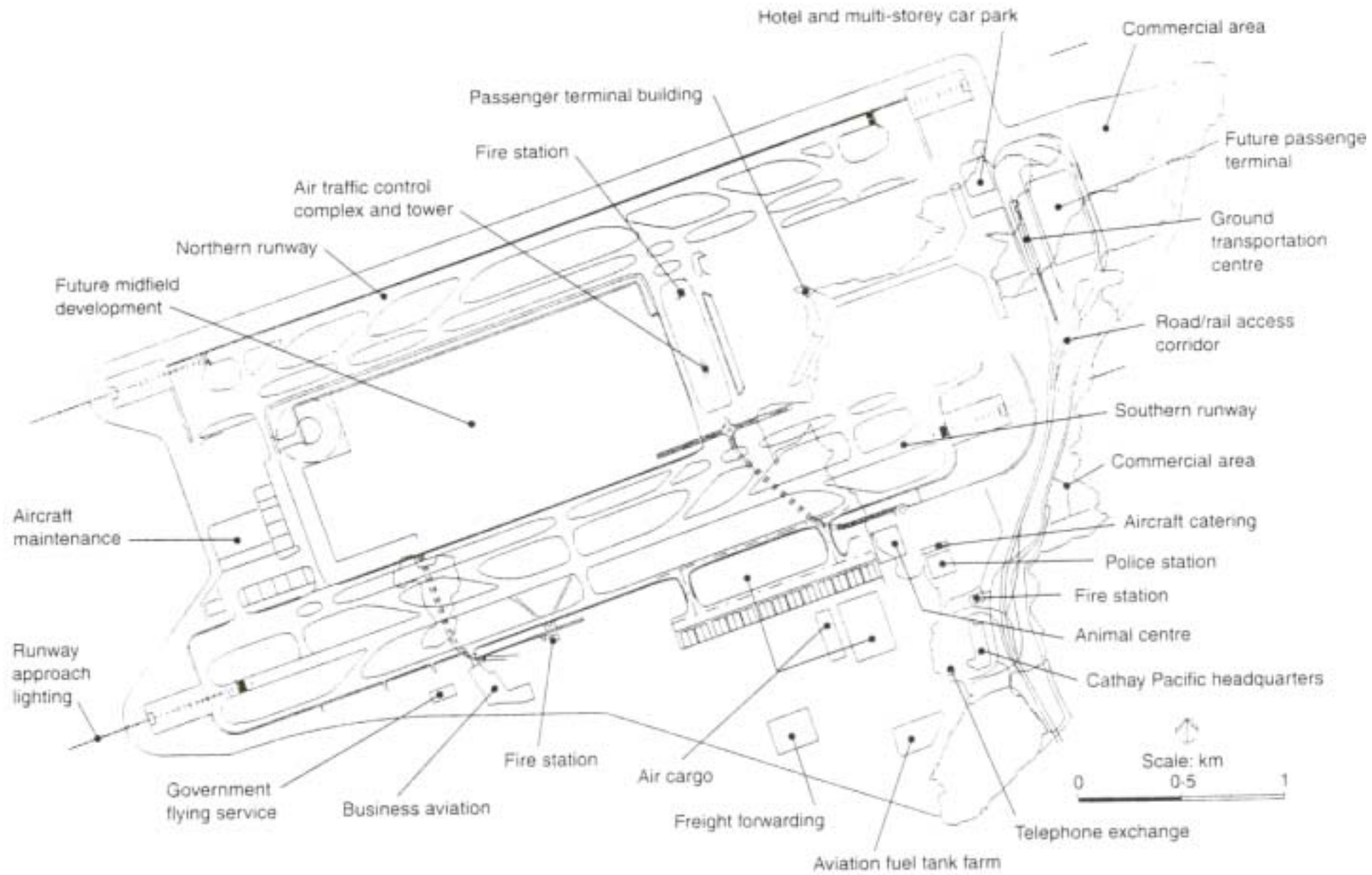
New Airport at Chek Lap Kok

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

Formation of the Airport Platform - land fill



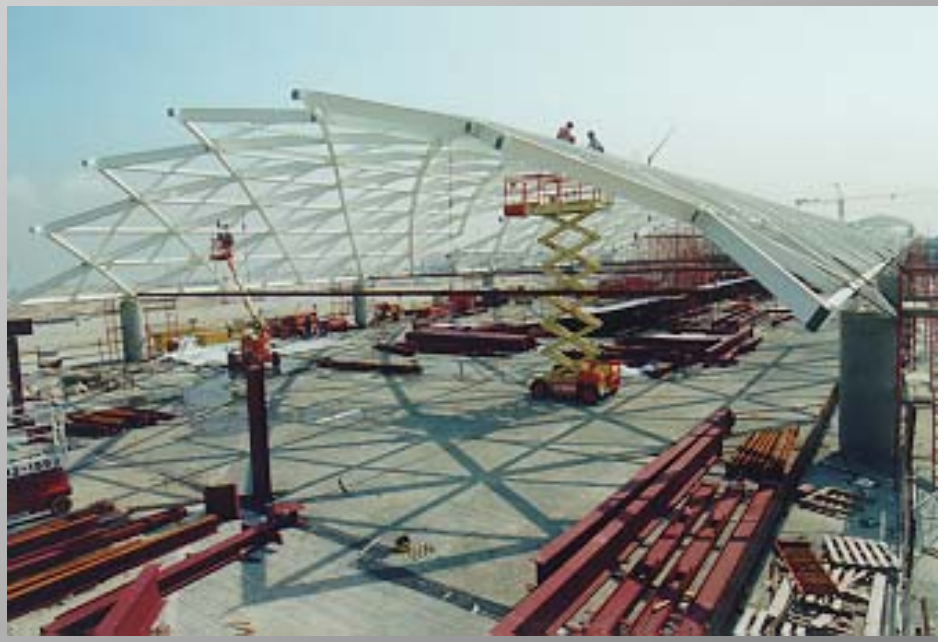
Layout of the Airport Platform



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

HKAEO Aircraft
Maintenance Depot

Other private development – Cathy City

Tung Chung New Town

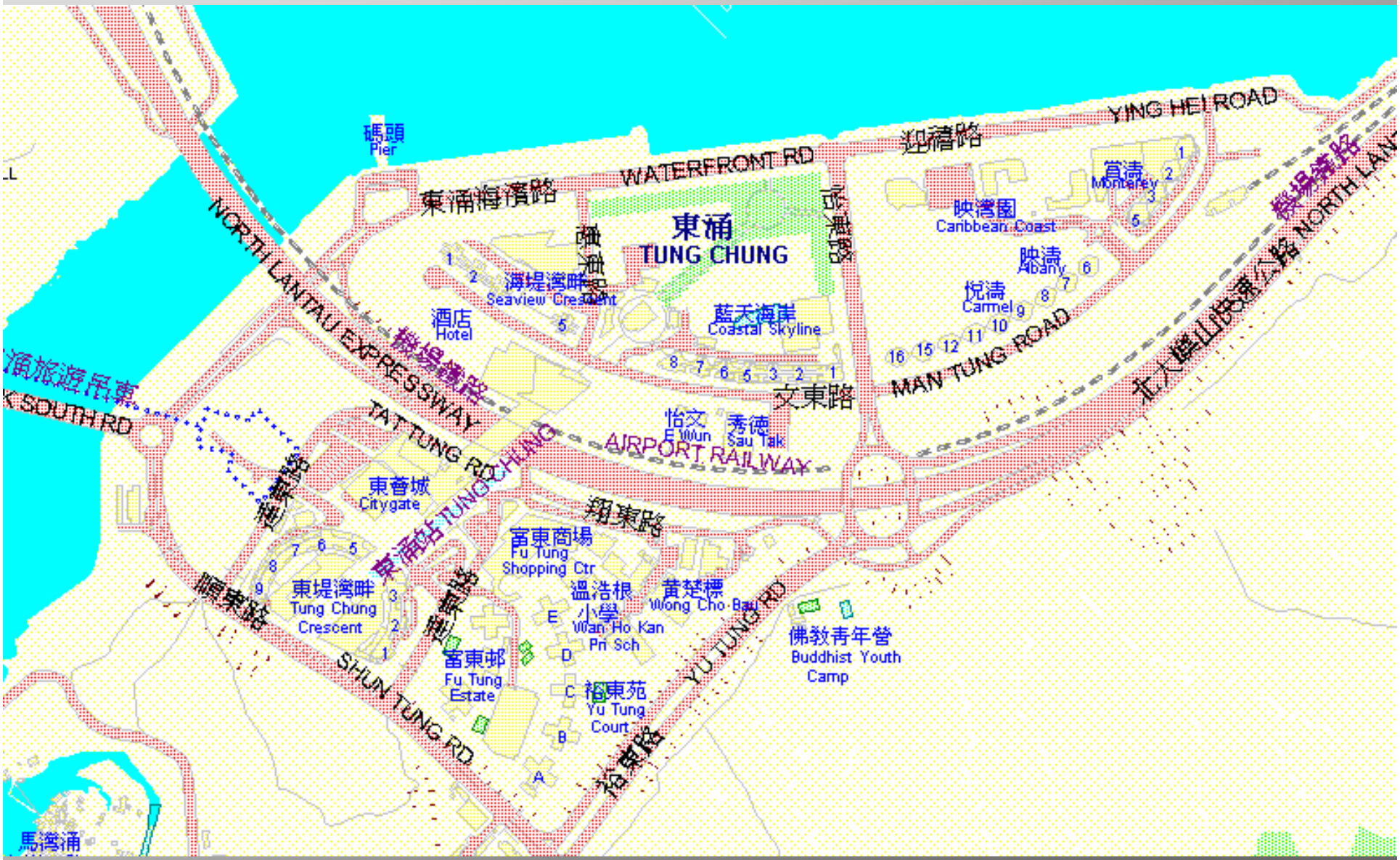
Major Contracts

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

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

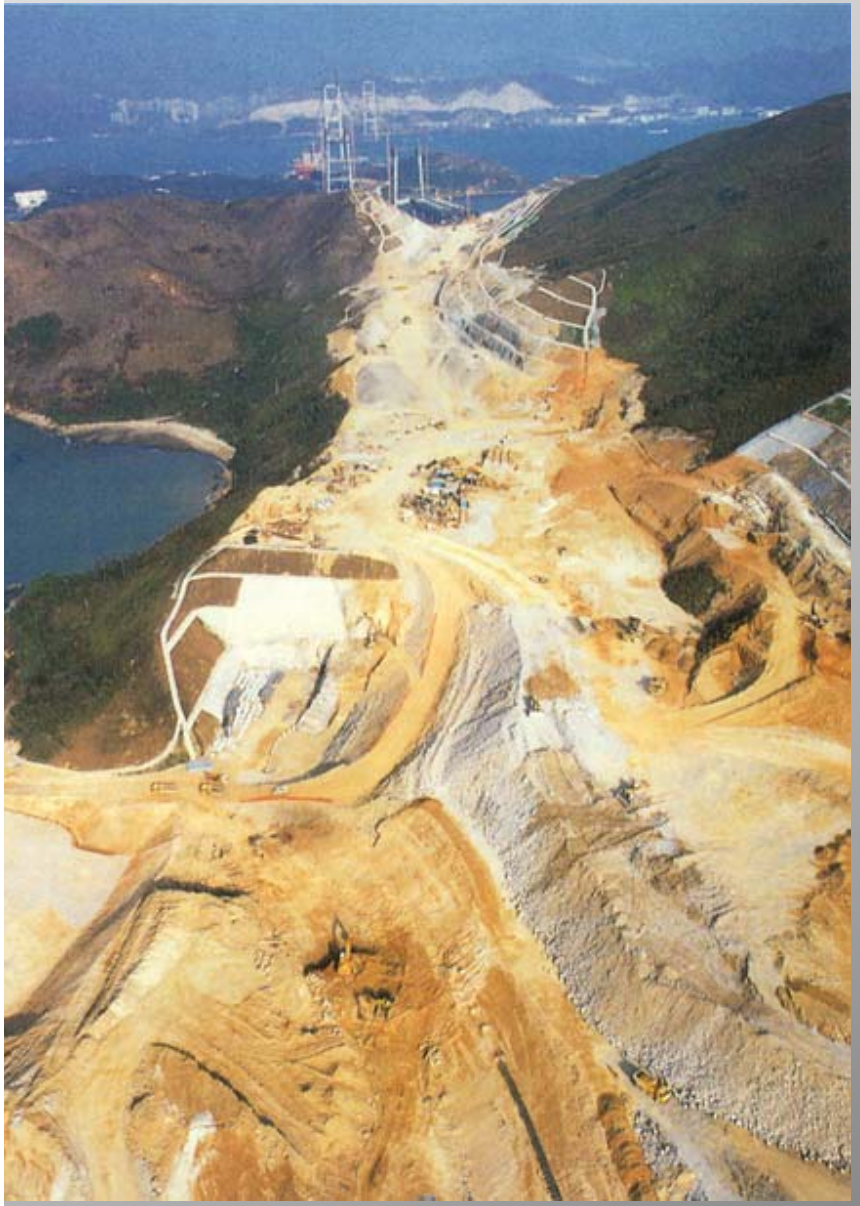
North Lantau Expressway

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

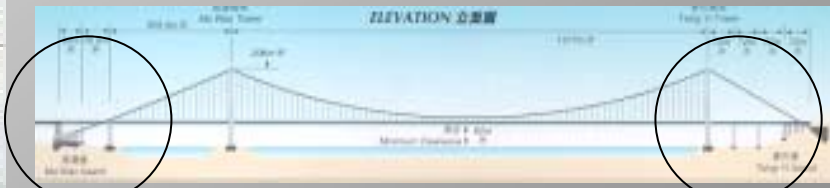
Approach section leading to the main span

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

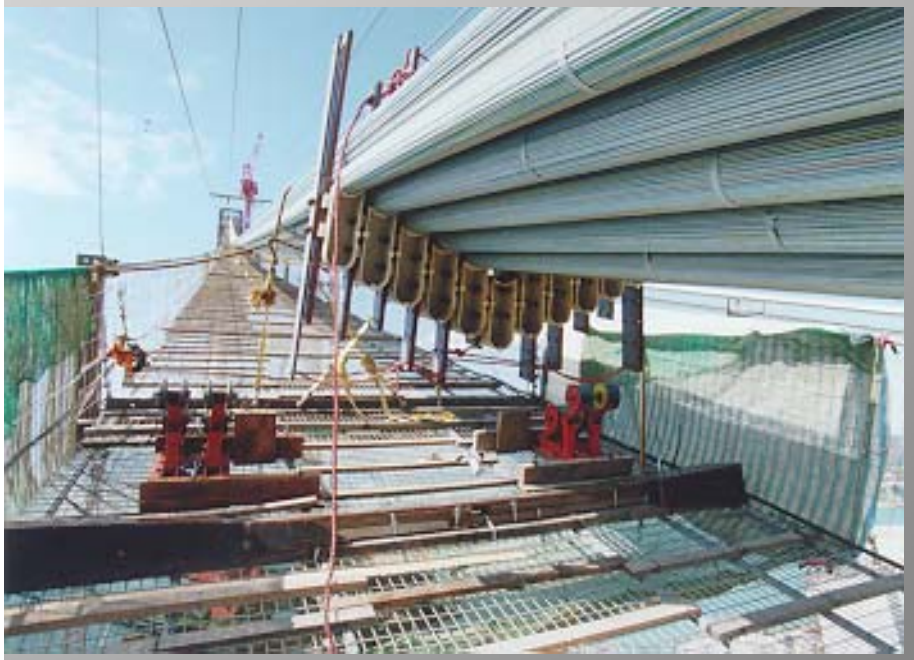
The approach section
on the Ma Wan side



Erection of the side spans on Tsing Yi and Ma Wan using installation of prefabricated components in an in-situ manner

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:

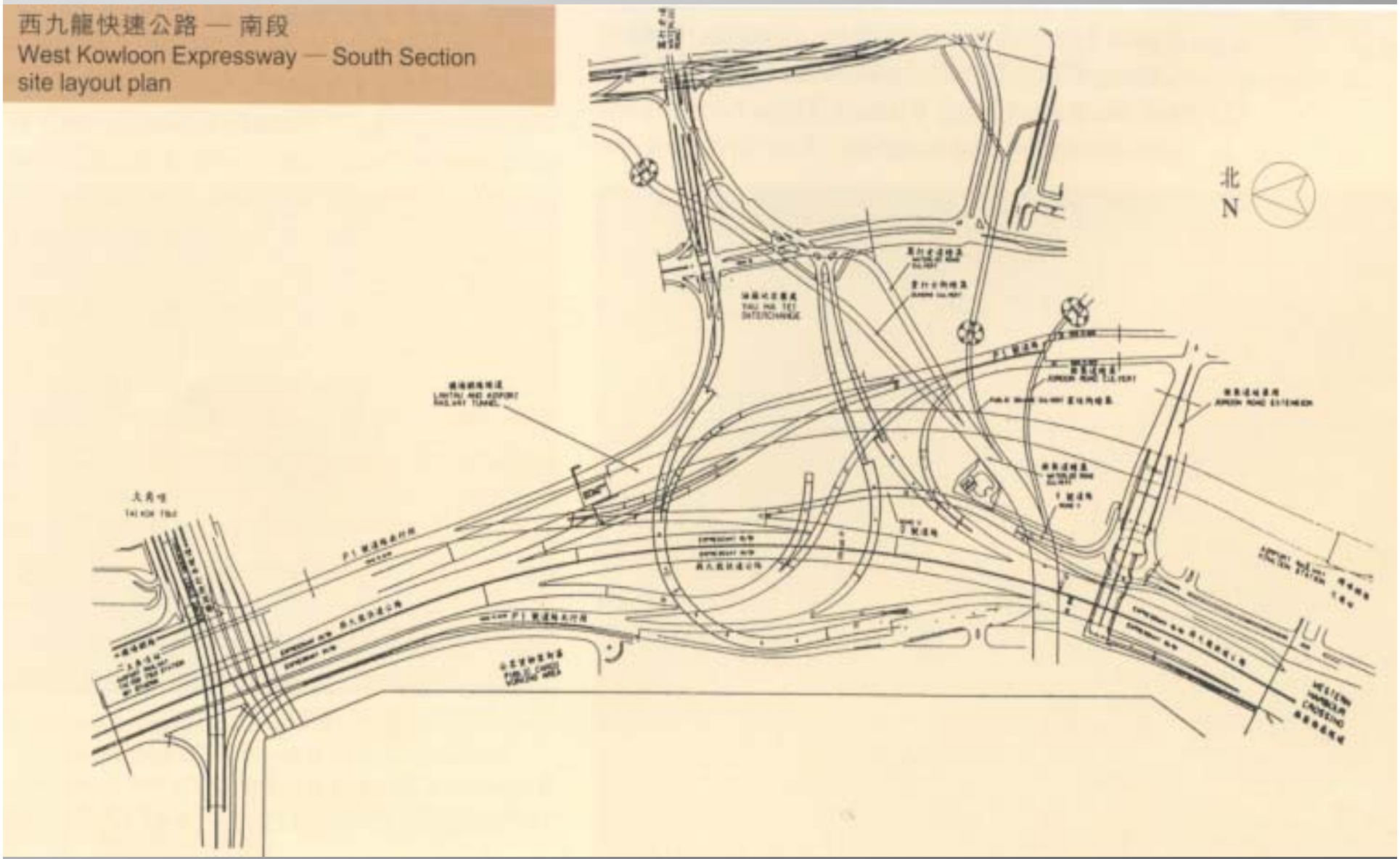
1. North Section – Elevated, 2.7 km
2. South Section – On-grade, 1.5 km

West Kowloon Expressway – construction of Mei Foo Interchange

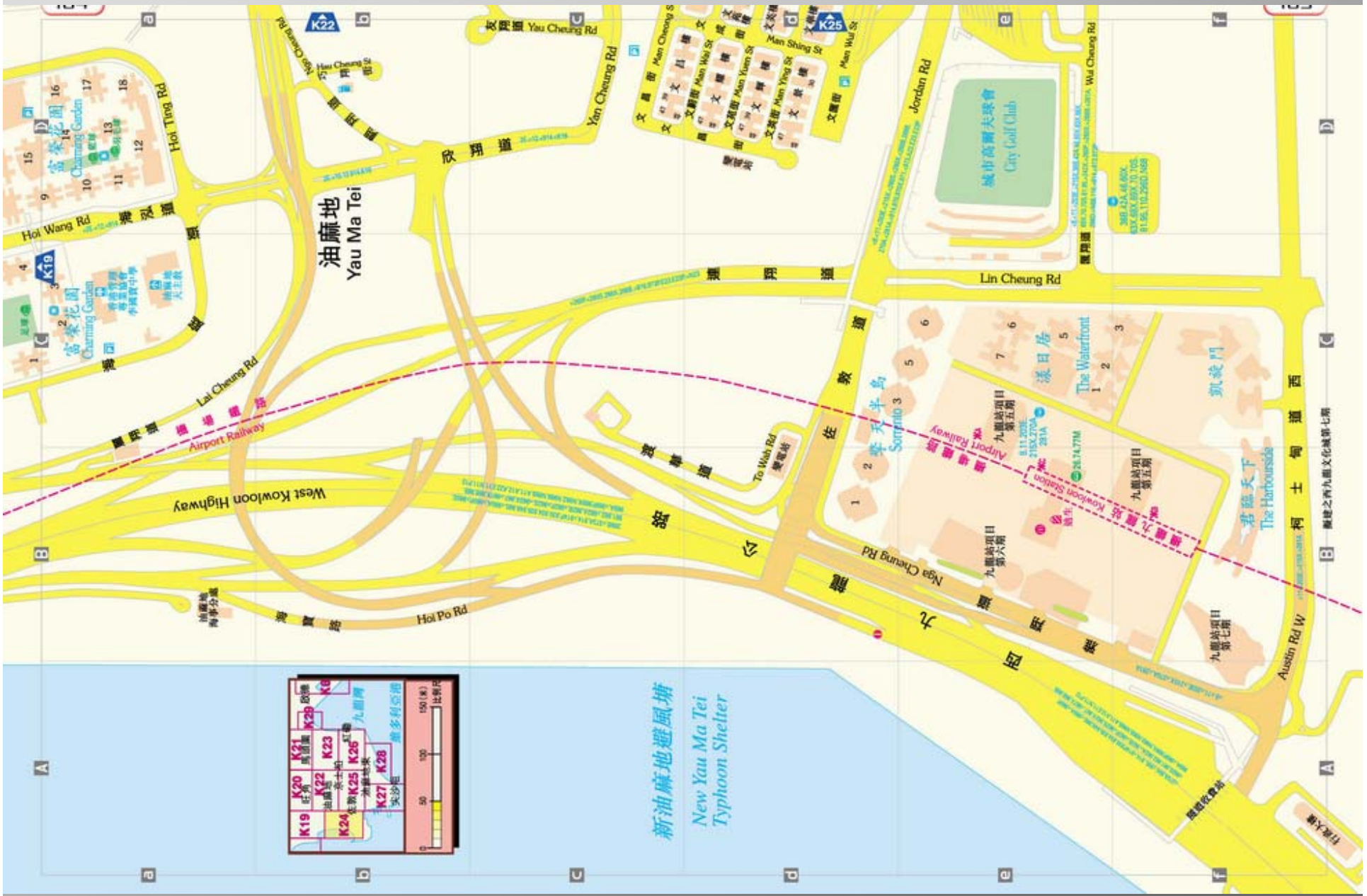
Construction of the elevated expressway using precast box-girder by portal gantry

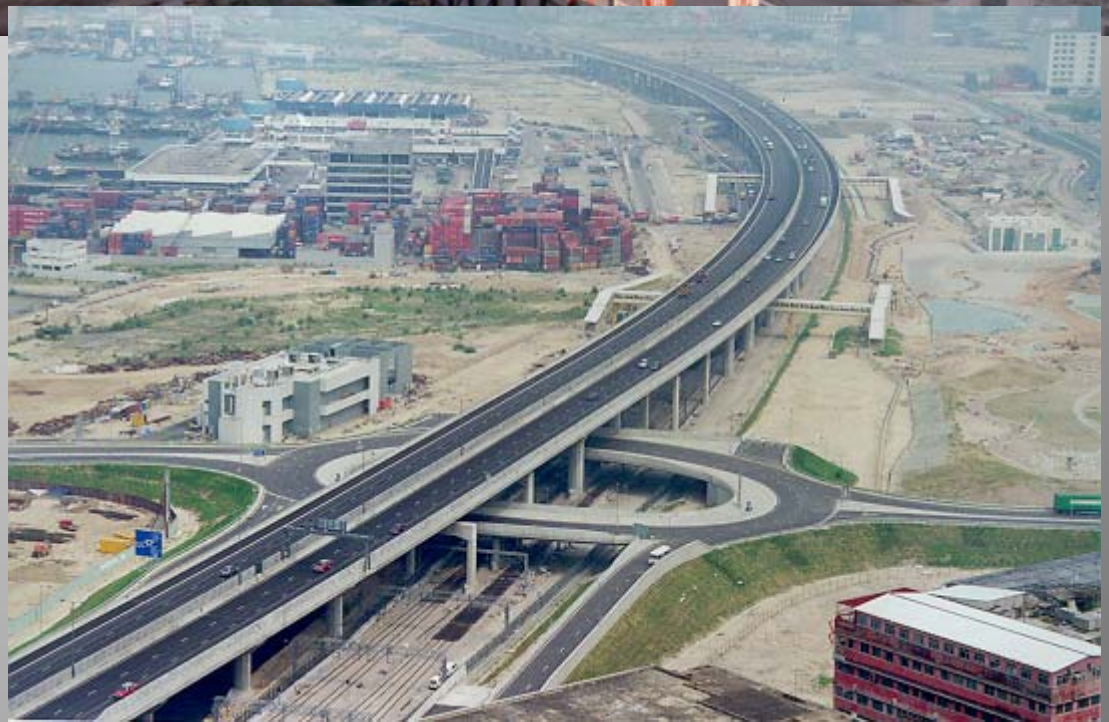
West Kowloon
Expressway at
Tai Kok Tsui
near Olympus Station

Layout of WKE South Section showing the YMT Interchange



YMT Interchange & other new developments





West Kowloon Expressway as seen after its opening in early 1998

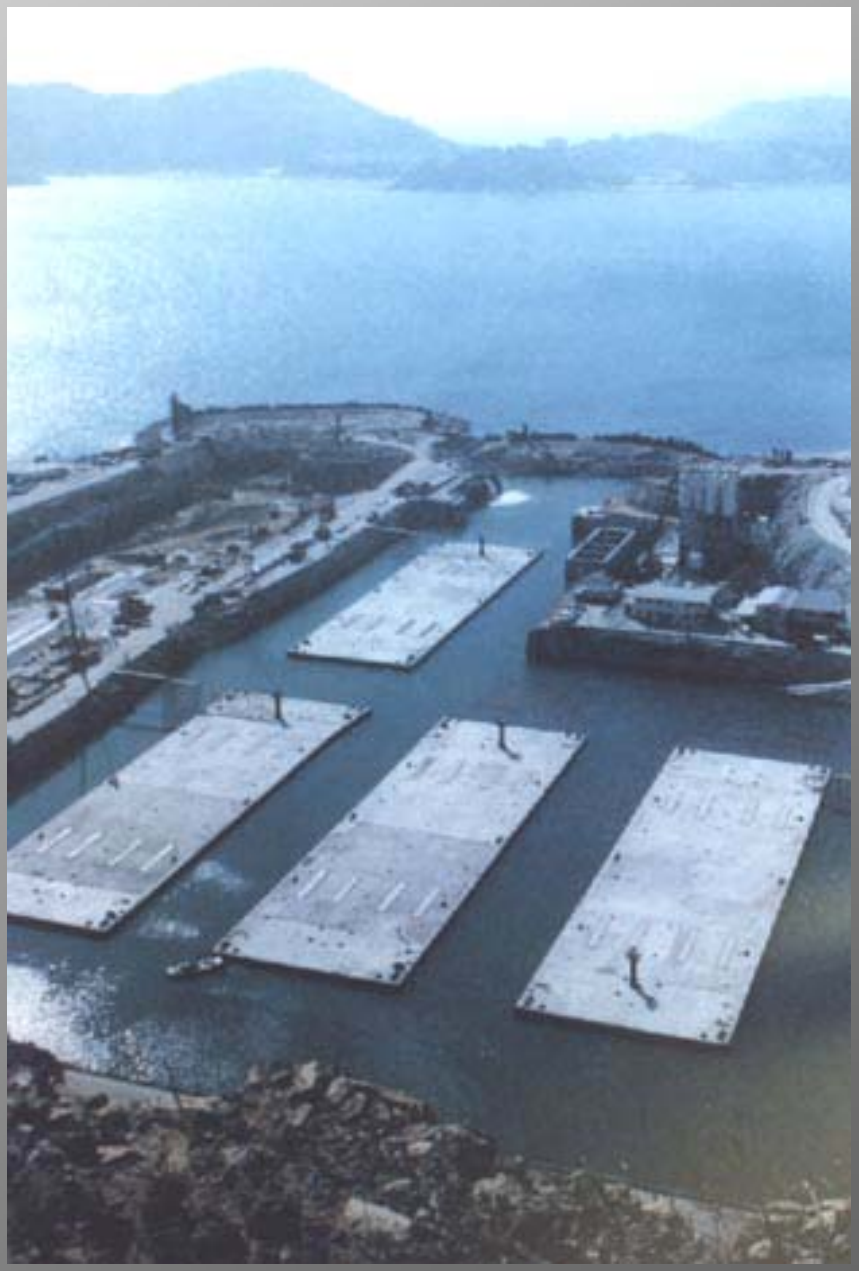
Western Harbour Crossing

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)

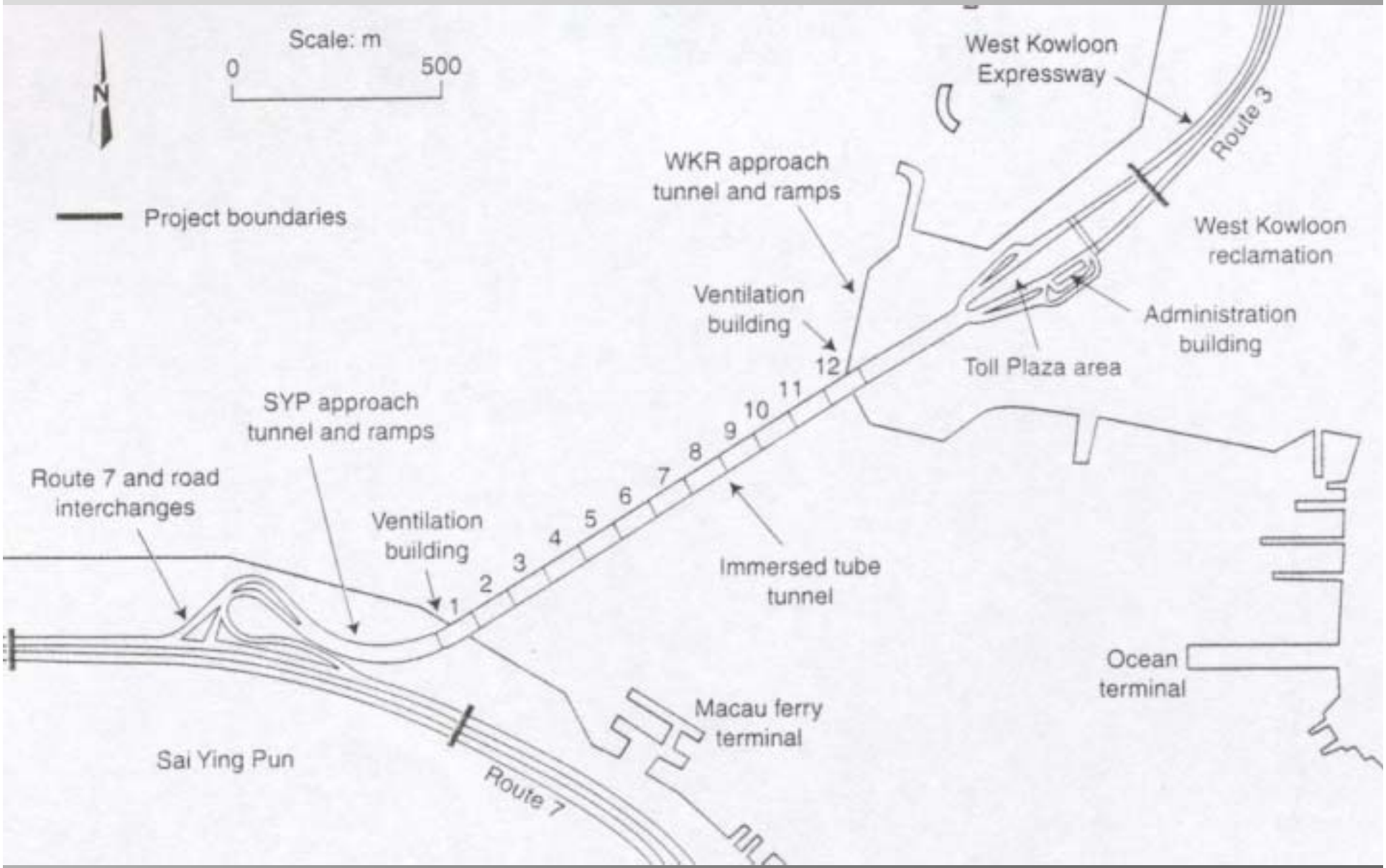


Transport the submerge-tube by barges and place them onto pre-arranged position

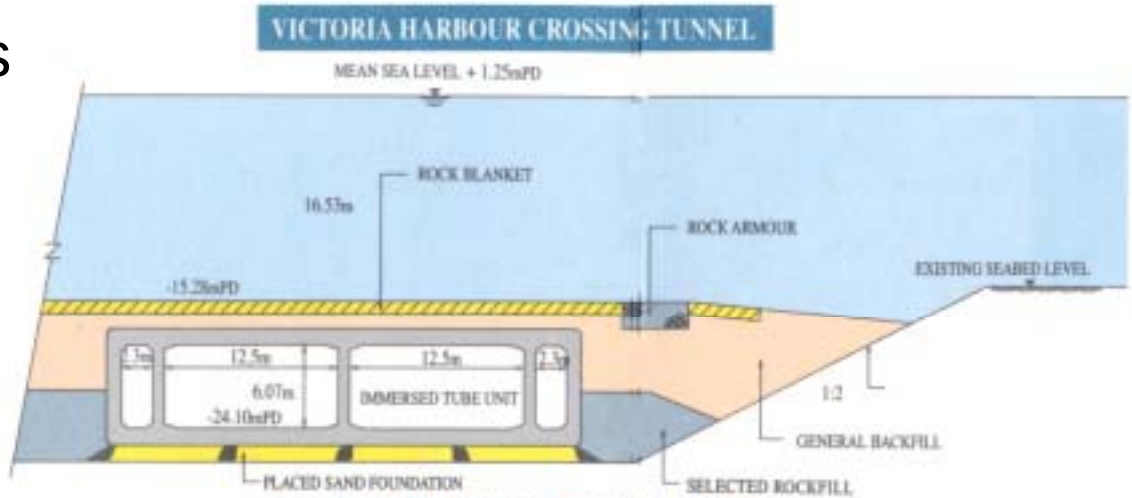
Connecting the submerge-tube to the tunnel approach

Forming the tunnel approach using cut-and-cover arrangement

Layout of the Immersed Tunnel and the Tunnel Concourse

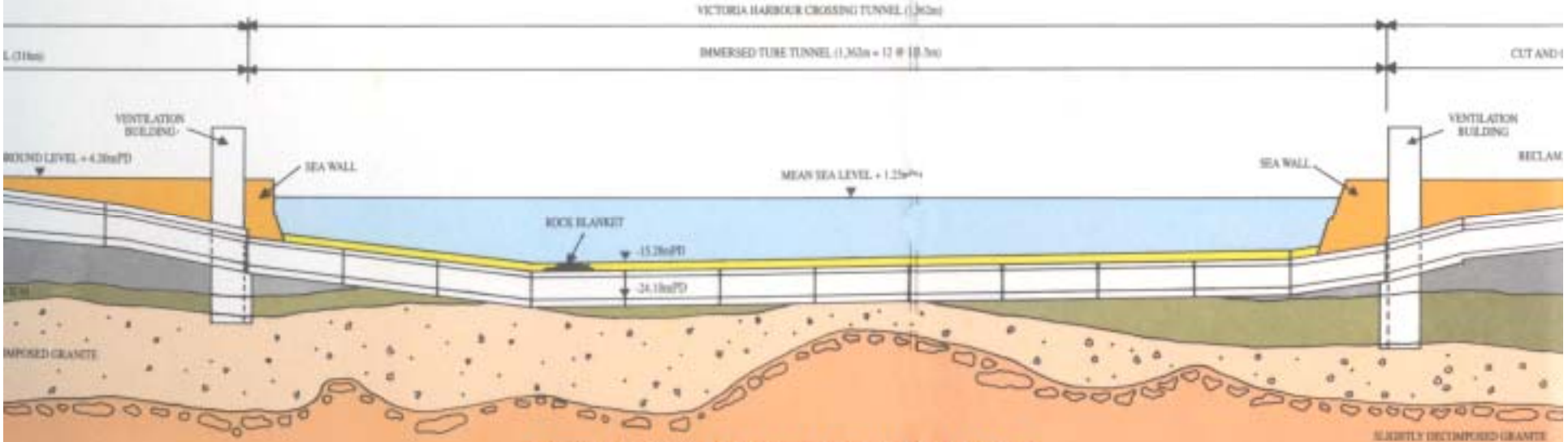


Tunnel sections



IMMERSED TUBE TUNNEL-CROSS SECTION

TOTAL LENGTH	113.5m X 12 Nos. = 1,362m	DREDGING	1,400,000 m³
TUNNEL SECTION	9.25m X 39.56m	BACKFILL	520,000 m³
		REINFORCING BAR	30,000 t
		CONCRETE	160,000 m³



WESTERN HARBOUR CROSSING-LONGITUDINAL SECTION

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 Jordon 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

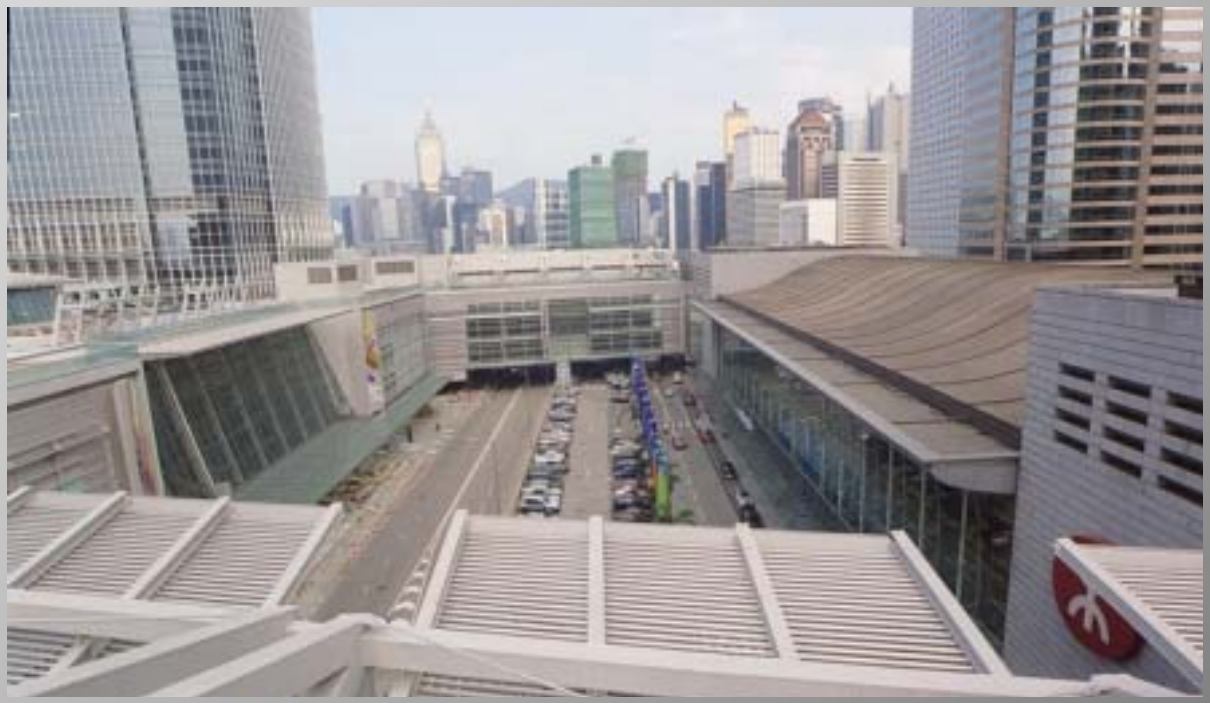
Gradual completion of the reclamation for handing over for commencement of other facilities

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.

Highlights of the benefits of ACPs (continue)

West Kowloon Reclamation and Expressway – produce 340 hectares of land as an important resource to support future urban development (new land supply, thinning out, replacement of aged facilities, restructuring opportunity of tightly developed metro areas etc)

Central Reclamation – provide precious land supply to densely occupied Central district, served as an important planning phase to enhance the future transportation network (Island North Expressway, Wanchai-Central Bypass, North Island Line and Shatin-Central Line etc) and greening (Leisure Area, harbour Promenade and public space) of the northern part of Hong Kong Island.

Any uncertain?

Hong Kong has experienced unprecedented drift in economical and social structure, the blue print as set in the 90's may not meet the needs and new conditions as faced today. These factors mainly include:

1. Economical restructure happened in HK since the end of 1990s
2. Rapid growth of China's economic in all aspects
3. The rapid development of HK's neighbourhood
4. And ……

This issue will be discussed in more detail in the coming seminar meeting

Thanks for coming.

See you in the next Seminar Session