# Study on Hong Kong Port Cargo Forecasts 2005/2006

## Executive Summary

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**Transport Branch**

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# 1 INTRODUCTION

1.1.1.1 This Executive Summary highlights the key findings and recommendations of the Study on Hong Kong Port Cargo Forecasts 2005/2006 (PCF 05-06) commissioned by the Transport and Housing Bureau (THB) and undertaken by GHK (Hong Kong) Ltd.

1.1.1.2 The study objectives are to:

- Review the demand and supply of port and related facilities and the supporting infrastructures in South China;[1]
- Review the competitiveness of Hong Kong Port (HKP) and update the port cargo forecasts;
- Update the productivity and capacity assessment of Kwai Tsing Container Terminals (KTCT); and
- Establish the demand for various port facilities and derive the timing for Container Terminal 10 (CT10).

1.1.1.3 The extensive data collection and analysis undertaken during this study has involved widespread industry consultation and close liaison with the Hong Kong Port Development Council and HKSAR Government Officials, notably those within THB. Relevant Mainland authorities have also been consulted.

# 2 HONG KONG PORT - INCREASING COMPETITION

## 2.1 Market Segments – Recent Trends

2.1.1.1 The container traffic at Hong Kong consists of three separate market segments:

- Direct ocean shipment of containers - imports and exports to and from Hong Kong and Mainland China (mainly Guangdong province);
- Transhipment of containers between ocean vessels (i.e. ocean-to-ocean transhipment);[2] and

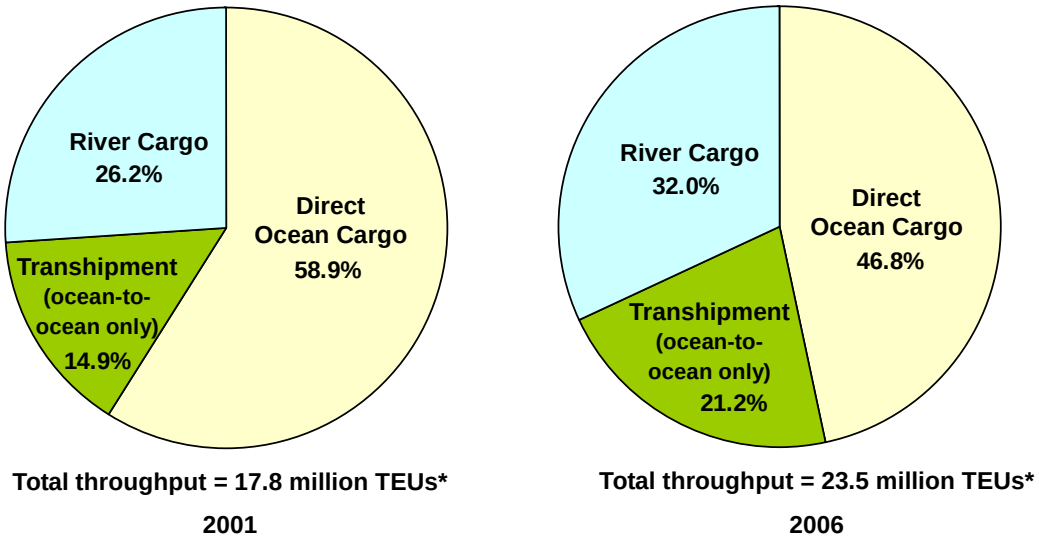
[1] For the purposes of this study, South China is defined as Hong Kong and Guangdong Province.

[2] Throughout this report, "transhipment" cargo is taken to mean ocean-to-ocean transhipment. It does not include river barge transhipment (i.e. cargo being moved in and out of Hong Kong via river under a through bill of lading).

- River cargo, which is regarded as inland transport, in the same category as road and rail transport.

2.1.1.2 The growth rate of Hong Kong's container port traffic has been slowing for several years. It averaged 12.8% p.a. in the period 1992-1997 and then fell to 5.7% p.a. in the period 2001-2006. Underlying this overall growth rate, the composition of Hong Kong's port traffic has undergone substantial changes (Figure 2-1). In recent years, whilst direct ocean cargo has seen little or no growth, transhipment of containers between ocean vessels has surged, increasing 13.5% p.a. 2001-2006. The share of ocean-to-ocean transhipment in total throughput expanded from 14.9% in 2001 to 21.2% in 2006. Also, the use of barging for inland transport increased.

**Figure 2-1 Composition of Hong Kong's Port Traffic, 2001 & 2006**




**Total throughput = 17.8 million TEUs***

**2001**

**Total throughput = 23.5 million TEUs***

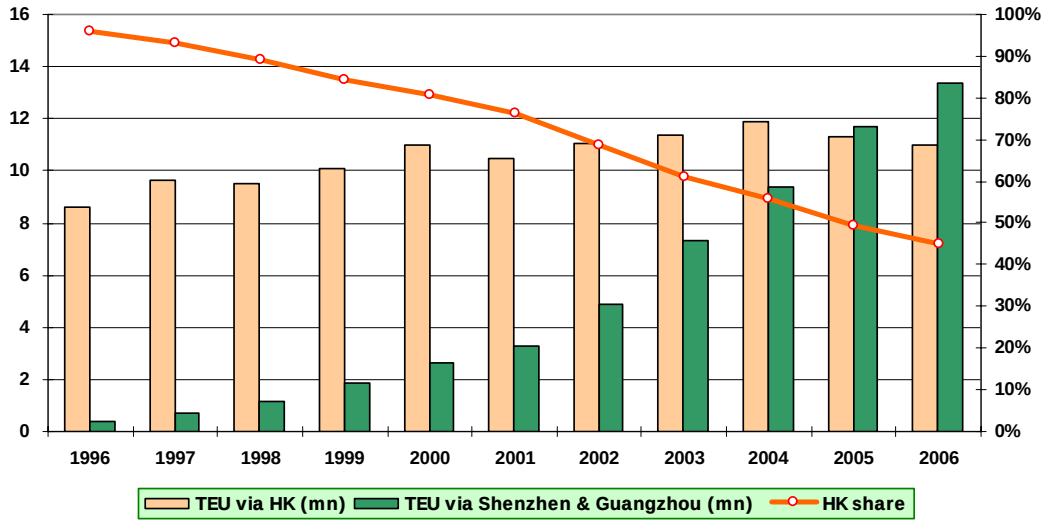
**2006**

Note: *TEU: Twenty-foot equivalent unit (a 20 foot ISO container).

2.1.1.3 HKP's Mainland competitor ports have made dramatic strides in recent years, enjoying a rapid pace of development and rising throughput – a key role being played by major Hong Kong port operators (e.g. Hutchison Port Holdings, MTL) bringing world-class operating standards to greenfield port developments. The Shenzhen ports handled 18.5 million TEUs in 2006. The growth of their traffic has been extremely high over the period 2001-2006, averaging 29.6% p.a.

2.1.1.4 Of particular significance is the Shenzhen and Guangzhou ports' share of the South China Cargo Base (Guangdong and Hong Kong generated import/export cargo). This has increased rapidly from 24% in 2001 to 55% in 2006. Conversely, Hong Kong's share declined from 76% in 2001 to 45% in 2006[3] (Figure 2-2).

**Figure 2-2 Hong Kong Port's Share of South China Direct Ocean Container Traffic**




Source: THB, HKSAR and GHK

2.1.1.5 **In absolute terms, Hong Kong has not secured any significant increase in terms of the South China Cargo Base**. Indeed, in 2005, Hong Kong's volumes declined, from 11.9 million TEUs the previous year to 11.3 million TEUs. The fall continued in 2006, dropping to 11.0 million but in 2007 there was some recovery - HKP handled a total of 11.3 million TEUs of direct ocean shipment, a rise of 250,000 TEUs compared with 2006. **Retaining this core traffic is crucial to Hong Kong's future connectivity and competitiveness**.

## 2.2 South China Container Terminal Development

2.2.1.1 At the end of 2006, there were 61 container berths in the Pearl River Delta (PRD), including Hong Kong's 24 berths. Figure 2-3 shows the

[3] The respective market shares of the South China Cargo Base for Shenzhen and Guangdong on the one hand and Hong Kong on the other as quoted in the paragraph are preliminary estimates taken from Working Paper 3 - Port Cargo Forecasts. After the production of Working Paper 3, the estimate for Hong Kong's market share was finalised at 47% in 2006. The share for 2007 is preliminarily estimated at 44%. Conversely, the corresponding shares for Shenzhen and Guangdong are 53% in 2006 and 56% in 2007.

location of existing and planned container ports. The Tonggu Channel and Lingding Channel developments are also highlighted as they will likely have a significant impact on port competition. An indicative location for the Hong Kong Zhuhai Macao Bridge (HZMB) is also presented.

2.2.1.2 The number of berths in South China, including Hong Kong, is expected to reach 89 by 2010 and probably 120-122 berths in the longer term. **In the next 5-10 years competition for container traffic will likely continue to be intense**.

## 2.3 Port Competitiveness

### *2.3.1 HKP Total Through Costs Still too High*

2.3.1.1 Hong Kong's main problems remain the same as those faced for the past ten years:

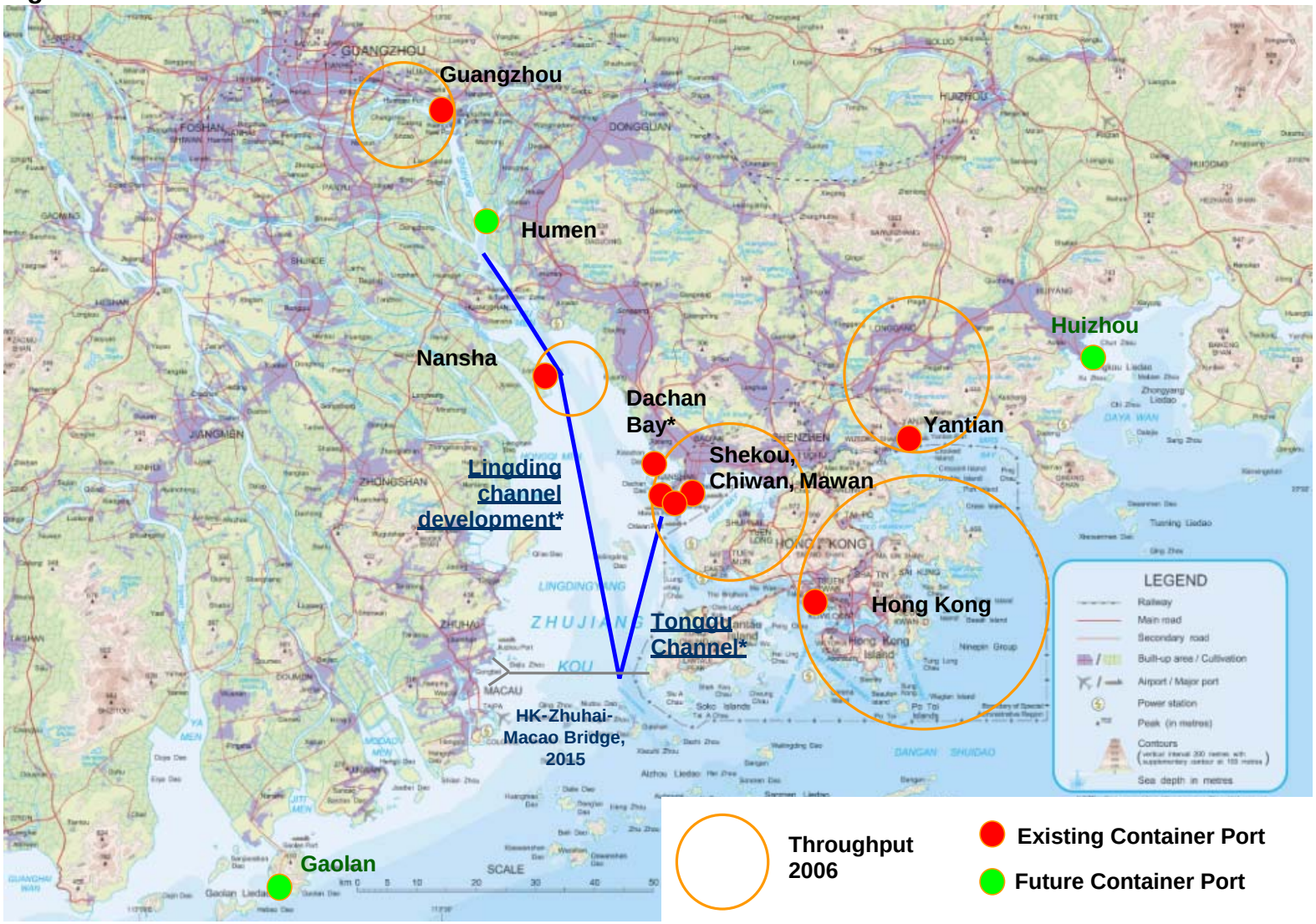
- **High road haulage tariffs** (around 50% of the South China direct containers are moved by truck); and
- **High Terminal Handling Charges (THCs)**.

2.3.1.2 It is generally believed that Hong Kong continued to lose traffic in 2006 because it has a **cost disadvantage**. According to information gathered from shippers, shipping lines and trucking companies, **it costs US$280 more per FEU[4] for East PRD cargo moved inland by road via HKP to US West** compared with via Yantian or 7% of total through costs (Table 2-1a). In brief, the inland transport cost is typically two-thirds of the problem for containers moved by truck. However, for containers moved by barge, the THC accounts for two-thirds of Hong Kong's cost disadvantage.

2.3.1.3 Table 2-1b shows that for West PRD cargoes, barging via HKP is cost competitive when compared with trucking the same cargo via Yantian. However, barging via the West Shenzhen ports of Shekou and Chiwan still offers a US$160 cost advantage versus HKP, primarily because Hong Kong's THC is about US$100 more expensive.

[4] FEU: Forty-foot equivalent unit (a 40 foot ISO container).

**Figure 2-3 South China Container Ports – Current and Planned**




Note: *Completed / opened in 2007 Source: GHK

**Table 2-1a Total Through Cost Comparisons of Moving a FEU* Container: East PRD (Dongguan) to US West Coast**

| Industry data, 2006, US$ | By Truck | | | By Barge | |
|---|---|---|---|---|---|
| | Via HKP | Via Yantian | Via Shekou / Chiwan | Via HKP | Via Shekou / Chiwan |
| Ocean Freight Rate (Basic) +/- $50** | 1,850 | 1,850 | 1,850 | 1,850 | 1,850 |
| Fees# | 1,377 | 1,377 | 1,377 | 1,377 | 1,377 |
| Terminal Handling Charge (THC) | 366 | 269 | 269 | 366 | 269 |
| Truck to Port Terminal | 300 | 120 | 120 | N.A. | N.A. |
| Truck to Barge Terminal | N.A. | N.A. | N.A. | 52 | 52 |
| Barge Freight (all-in rate) | N.A. | N.A. | N.A. | 154 | 103 |
| **Total** | **3,893** | **3,616** | **3,616** | **3,799** | **3,651** |
| **Versus HKP** | | **-277** | **-277** | | **-148** |

**Table 2-1b Total Through Cost Comparisons of Moving a FEU* Container: West PRD (Zhongshan) to US West Coast**

| Industry data, 2006, US$ | By Truck | | | By Barge | |
|---|---|---|---|---|---|
| | Via HKP | Via Yantian | Via Shekou / Chiwan | Via HKP | Via Shekou / Chiwan |
| Ocean Freight Rate (Basic) +/- $50** | 1,850 | 1,850 | 1,850 | 1,850 | 1,850 |
| Fees# | 1,377 | 1,377 | 1,377 | 1,377 | 1,377 |
| Terminal Handling Charge (THC) | 366 | 269 | 269 | 366 | 269 |
| Truck to Port Terminal | 515 | 280 | 280 | N.A. | N.A. |
| Truck to Barge Terminal | N.A. | N.A. | N.A. | 52 | 52 |
| Barge Freight (all-in rate) | N.A. | N.A. | N.A. | 180 | 118 |
| **Total** | **4,108** | **3,776** | **3,776** | **3,825** | **3,666** |
| **Versus HKP** | | **-332** | **-332** | | **-159** |

Notes: *FEU: Forty-foot equivalent unit (a 40 foot ISO container).

**Average* based on consultation with shipping lines – agreed rates between a specific shipping line and specific customer may diverge from this figure.

# Includes: Destination Delivery Charge (DDC), Fuel Adjustment Factor (FAF), documentation and declaration fees

Source: GHK estimated based on consultations with major logistics companies, including major shipping lines, terminal operators, trucking companies and the HK Shippers Council

2.3.1.4 HKP has traditionally been able to offer a number of service advantages – or "intangible cost advantages" – to its customers, for example, service frequency, high productivity, short vessel turnaround time, streamlined Customs, free port status, etc. This intangible cost advantage has been significant enough to offset the tangible cost disadvantages of HKP versus Shenzhen ports – notably higher inland transport costs and THCs. However, the South China competitor ports have developed quickly and gradually eroded Hong Kong's intangible

cost advantage. Meanwhile although some progress has been made in reducing HKP's tangible cost disadvantages, this has not been enough to maintain competitiveness. As the difference in service level quality has narrowed, the port choice decision has become more and more sensitive to tangible costs. **Saddled with high THCs and high cross-boundary trucking costs, HKP has struggled to secure growth in throughput in the critical South China import / export trades**.

2.3.1.5 HKP's high shipping line connectivity remains, but Shenzhen has been catching up quickly. For the America and Europe related trades, there are 61 and 58 calls per week respectively at Shenzhen as compared with 59 and 63 calls in Hong Kong. On this basis, Shenzhen's shipping line connectivity for the key trades has already caught up with HKP's, though HKP still has much higher connectivity for Asia and other routes. Currently, most long-haul vessels call both Hong Kong and Shenzhen ports. But the concern is that if the high cost of using HKP continues, shipping lines could add more services at Shenzhen and decrease their presence at HKP. At this point, HKP's remaining intangible cost advantages may be swamped by the greater shipping line connectivity offered by the Shenzhen ports. This is a key determinant of port choice, not just for South China import/export cargo but also for transhipment competitiveness.

2.3.1.6 Therefore, as repeatedly highlighted in the Study on Hong Kong Port – Master Plan 2020 (HKP2020), there is an urgent need for action to address Hong Kong's cost disadvantages. Put simply, **the longer the delay before implementing a change, the lower its impact**.

### *2.3.2 Reducing Cross-Boundary Trucking Costs*

2.3.2.1 Although road haulage costs have fallen by about 40% in the last 5 – 6 years, they are still higher than that for HKP's immediate competitors (and more than twice as high as costs per TEU/km in most other countries).[5] The main reasons for high inland transport costs have been identified in a number of studies. These can be categorised into four groups:

- Low utilisation of trucks, because of delays at several points on the routes;
- Wasteful movement of empties, resulting in low load factors and redundant truck moves;

[5] Trucking costs tend to average about US$1.25 per trailer km in other industrialised countries, well below Hong Kong's at ~US$2.5 per trailer km one-way.

- High operating costs for Hong Kong based truckers;[6] and
- Limited use of potential operational efficiencies – for example, switching to Mainland trucks for the Mainland part of the journey.

2.3.2.2 It must be re-emphasised that the problem of **high inland transport costs is *not* a consequence of physical factors – such as long distances**, rivers or mountain ranges. **It is institutional**. The high costs are a result of over-regulation and operational inefficiencies, in an age when deregulation and optimisation is accepted as a pre-condition for economic efficiency.

2.3.2.3 The Hong Kong and Guangdong governments have made certain infrastructure investments and introduced various reforms, for example, the ending of the "4-up-4-down" rule, which should reduce Hong Kong's road haulage cost disadvantage. However, so far these initiatives have yet to impact markedly on Hong Kong's trucking tariffs. Besides, the inefficiencies stemming from wasteful movement of empties which add significantly to the cost of cross-boundary trucking have yet to be addressed. This requires the co-ordinated effort of shipping lines, shippers and trucking companies.

### *2.3.3 Raising the Efficiency of Barging*

2.3.3.1 Given its advantageous location relative to Yantian, HKP has been competitive for accessing the West (and Central) PRD cargo base via barging services. The West Shenzhen ports are also advantageously positioned, although *until recently*, their lower level of development has meant they have posed less of a threat to Hong Kong in this market.

2.3.3.2 The main ways of enhancing the competitiveness of river transport would be:

- More organised barge handling facilities at KTCT;
- More modern barge services with greater economies of scale;
- Provision of assembly/consolidation points in the West PRD; and
- Reform of Chinese customs procedures for barge traffic.

2.3.3.3 The container terminal (CT) operators have introduced a number of measures to enhance the efficiency of HKP's barge services, including extensive and reliable connections between PRD river ports and the Hong Kong terminals and ensuring that higher volumes of cargo are exchanged per barge call at KTCT. The Hong Kong Government has

[6] Although higher salaries for HK cross-boundary drivers relative to their Mainland counterparts are a factor, it should be noted that in global terms, HK's drivers' salaries are relatively low.

also introduced measures to facilitate river transport, including the introduction of multiple entry permits for river trade vessels in January 2007, reducing the licence fees for local vessels and providing more back-up land and barge handling facilities.

2.3.3.4 However, whilst desirable in terms of overall South China supply chain efficiency, several of the measures to enhance barging are not unique to HKP, but rather, could either be easily copied by competitor ports (e.g. expanding barge facilities) or would also deliver benefits to competitor ports (e.g. reform of Chinese customs procedures). In other words, the scope for enhancing HKP's competitiveness relative to other South China ports is limited.

### *2.3.4 Reducing Container Port Handling Tariffs and THCs*

2.3.4.1 There are no published or fixed tariffs for HKP - in practice they are negotiated on a case-by-case basis, varying with the volumes offered by the customer and the type of service (deep-sea, Intra-Asia or transhipment). However, in recent years, tariffs at KTCT are generally acknowledged to have fallen by around 30%. There are differing views on the significance of the decline and whether it is driven by changes in cargo mix or like-for-like reductions by terminal operators. Nonetheless, average tariffs at HKP *no longer* appear to be far out of line with international benchmarks.

2.3.4.2 This tariff reduction should have helped Hong Kong to attract more cargo. However, **the port's ability to compete on price is undermined by the THCs**. These are charged by the shipping line to the consignor/consignee and are supposed to cover port costs and some other minor items such as documentation and exchange risk. **Hong Kong's THCs are amongst the highest in the world** (Table 2-2). Furthermore, they have not fallen over the past decade, despite the decline in port tariffs mentioned above. The THCs therefore have a negative impact on Hong Kong – because they magnify the cost disadvantage of Hong Kong.

2.3.4.3 The THC has recently been criticised as a form of price fixing by the Mainland Government. Indeed there are countries which actually forbid THCs (e.g. Vietnam). It is questionable whether this type of legislation would adequately address the issue of high THCs at HKP, as the lines might find other ways of applying the same charges. However, given the importance of enhancing the competitiveness of HKP, the government should do as much as possible to remove the obstacle of the THCs. The most plausible route could be via the introduction of a competition law in Hong Kong, such that the THC would have to be negotiated and set individually between lines and their customers.

**Table 2-2 Terminal Handling Charges in Hong Kong and Other Locations, 2006**

| | Transpacific Eastbound | | Asia / Europe | | Intra Asia | |
|---|---|---|---|---|---|---|
| **2006** | T S A | | FEFC | | IADA | |
| US$ | TEU | FEU | TEU | FEU | TEU | FEU |
| Hong Kong | $274 | $366 | $265 | $353 | $231 | $340 |
| Shenzhen | $141 | $269 | $141 | $269 | $45 | $68 |
| China Ports | $45 | $68 | $45 | $68 | $45 | $68 |
| Shanghai | $66 | $88 | $45 | $68 | $45 | $68 |
| Taiwan | $171 | $214 | $171 | $214 | $171 | $214 |
| Singapore | $108 | $161 | $108 | $161 | $108 | $161 |
| South Korea | $97 | $132 | $96 | $131 | $97 | $132 |

Notes: Freight between Japan-North America and Japan-Europe are under different conferences.
TSA: Transpacific Stabilization Agreement; FEFC: Far Eastern Freight Conference;
IADA: Intra-Asia Discussion Agreement
TEU: Twenty-foot Equivalent Unit; FEU: Forty-foot Equivalent Unit

Source: Commercial Management Ltd., and Hong Kong Shippers' Council.

2.3.4.4 In summary, the **strengthening of competitiveness by Hong Kong will require complete liberalisation of the South China trucking market and a reduction in THCs**. Complete liberalisation would include a combination of minimal regulation, including abolition of the cross-boundary truck licence fee charged by the Mainland authorities (or its replacement with a minimal fee), delay-free movement of trucks, and free access of licensed Mainland drivers to the port of Hong Kong. There can be no guarantee that the Mainland authorities would be willing to concede full deregulation, but the offer of open access to HKP for Mainland drivers should be a strong bargaining point.

# 3 HKP CARGO FORECASTS

## 3.1 Scenarios

3.1.1.1 5 Scenarios – A, B, B+, C and D – of future cargo throughput are built up via a number of stages. The first is to develop a projection of container traffic assuming a continuation of existing trends in terms of competition between HKP and the other South China ports – Scenario A. The other scenarios are then built onto this Base Case Scenario primarily assuming different degrees of liberalisation in cross-boundary trucking, changes in THCs and assumptions about the ability of Mainland ports to efficiently handle ocean-to-ocean transhipment.

## 3.2 Analysis of Demand and Container Terminal Supply

3.2.1.1 On the demand side, globalisation and related trade liberalisation will continue to be key drivers of global economic performance. World trade growth has averaged 6 – 7% p.a. in each of the last three decades and the main international agencies and forecasting bodies remain optimistic about the future. Even given the weaknesses in the US economy, strong growth in the economies of India and Mainland China should provide some buffer, although not enough to fully offset the impact from a US downturn.

3.2.1.2 Guangdong's export growth rates are forecast to slow down, primarily as the economy continues to mature and assuming some impact from the recent regulatory changes targeting labour-intensive and highly polluting export processing industries, as well as the recent reform in the Labour Contract Law. Nonetheless, growth rates are still expected to remain solid – though slowing from 10.3% in 2006-10 to 5.0% by the end of the forecast (2020-30). Under Scenario B+ "West PRD Boom", higher growth is assumed for the West PRD and for Guangdong as a whole.

3.2.1.3 Hong Kong's prospects for transhipment appear particularly good for Chinese cargoes at least in the near future, for two reasons. First, the Mainland Customs are not competitive in terms of facilitating transhipment and there are restrictions on foreign lines running feeder services between Mainland ports. Secondly, Kaohsiung, a potentially strong competitor for HKP is heavily constrained in its ability to handle Mainland liner services before full Mainland/Taiwan direct trade links are established.

3.2.1.4 On the other hand, the overall role of transhipment for Mainland China traffic is declining, as more services are now calling directly at Chinese ports.

3.2.1.5 Moreover, transhipment can only replace direct traffic to a limited extent. If the direct ocean traffic declines, the network of connections, which is one of Hong Kong's great advantages for transhipment, will decline, and transhipment will decline along with it. On this basis, total transhipment via Hong Kong is assumed to continue to rise steadily but only on the assumptions of continued highly competitive pricing, high shipping line connectivity and no immediate easing of the restrictions on transhipment at Mainland ports.

3.2.1.6 In the case of the supply of CT capacity, by 2010 the combination of new facilities and productivity improvements at existing facilities is projected to provide an additional 20 million TEUs of capacity over the level at the end of 2005. By 2020, a further additional 26 million TEUs of capacity is

projected (including Huizhou). In other words, the CT capacity in the PRD, not counting Hong Kong, is planned to increase by over 45 million TEUs over 2005-20. The past two years have already seen the addition of about 8 million TEUs of capacity.

3.2.1.7 When set against the estimates of demand generated by the regional cargo base, it is clear that **South China has moved from a position of highly constrained CT supply to one of surplus capacity, which is likely to continue until at least the first half of the next decade**. Significant excess capacity will be chasing cargo, which will likely put downward pressure on tariffs. Additionally, it seems fair to assume that South China ports will also be keen to "top-up" by handling transhipment cargo and hence compete with HKP in this market.

## 3.3 Forecast Results

3.3.1.1 Table 3-1 provides a summary of the key features for each of the five scenarios along with the forecast results.

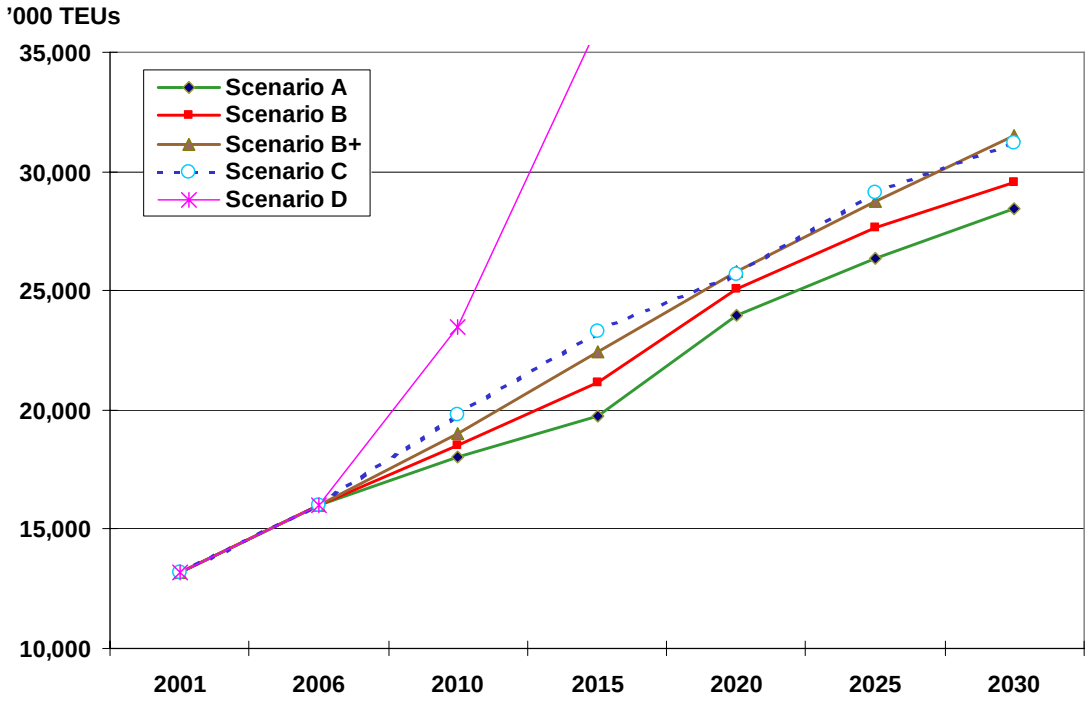
## Table 3-1 Future Port Traffic Scenarios

| Scenario | Key Parameters | Average Annual Growth | | Total Volume in Mn TEUs | | |
|---|---|---|---|---|---|---|
| | | 06-20 | 20-30 | 2010 | 2020 | 2030 |
| Scenario A<br>No major additional policy intervention<br>(Base Case) | Gap between HK and Shenzhen ports' inland road transport costs continues to narrow, but only at the same gradual rate as in recent years<br>HK THC cost disadvantage remains<br>Some continued reduction in HKP barging costs, but W Shenzhen ports' barge services also continue to develop<br>Mainland ports able to handle transhipment efficiently by 2012<br>S China surplus terminal capacity decreases 2010 onwards | 2.4% | 1.7% | 24.9 | 32.7 | 38.7 |
| Scenario B<br>Slow partial liberalisation | Built on Scn A, but with competitive enhancement measures:<br>- Reform of cross-boundary licence fee; streamlining of inland customs and boundary crossing; reduction of wasteful movements of empties. Transition completes by 2012 with cross-boundary trucking costs about 40% lower than Scn A<br>- HK THC cost disadvantage versus Shenzhen ports reduces by 50% by 2012<br>Mainland ports able to handle transhipment efficiently by 2010 | 2.8% | 1.6% | 25.4 | 34.7 | 40.8 |
| Scenario B+<br>"West PRD Boom" | As Scn B, but higher growth for W PRD and for S China overall | 3.2% | 2.0% | 26.3 | 36.5 | 44.6 |
| Scenario C<br>Rapid partial liberalisation | As Scn B, but:<br>- cross-boundary trucking transition completes by 2010 with cross-boundary trucking costs about 40% lower than Scn A<br>- HK THC cost disadvantage reduces by 50% by 2009 and disappears by 2010 | 3.0% | 2.0% | 27.2 | 35.5 | 43.2 |
| Scenario D<br>Rapid full liberalisation | As Scn B, but:<br>- cross-boundary trucking transition completes by 2009 and includes opening up cross-boundary trucking to Mainland drivers, with cross-boundary trucking costs about 60% lower than Scn A<br>- HK THC cost disadvantage disappears by 2009 | 7.6% | 3.4% | 33.8 | 65.8 | 92.1 |

3.3.1.2 Figure 3-1 shows the comparison for ocean cargo in graphical form. The similarity of the first four scenarios is clear, as is the much greater throughput projected under Scenario D, where rapid liberalisation of cross-boundary trucking, enhanced triangulation and harmonisation of THCs generate a considerable competitive spur to HKP. The likelihood of achieving such changes in such a short-term is unlikely, however the analysis does serve to emphasise the **importance of reducing Hong Kong's tangible costs, while its intangible cost advantages** – notably service connectivity and base-load of direct ocean cargo – **still exist**.

3.3.1.3 The substantially larger West PRD (and Guangdong) cargo base assumed under the B+ scenario generates some additional throughput for Hong Kong, however a booming West PRD is of less significance to the future of HKP than measures to address Hong Kong's cost disadvantages.

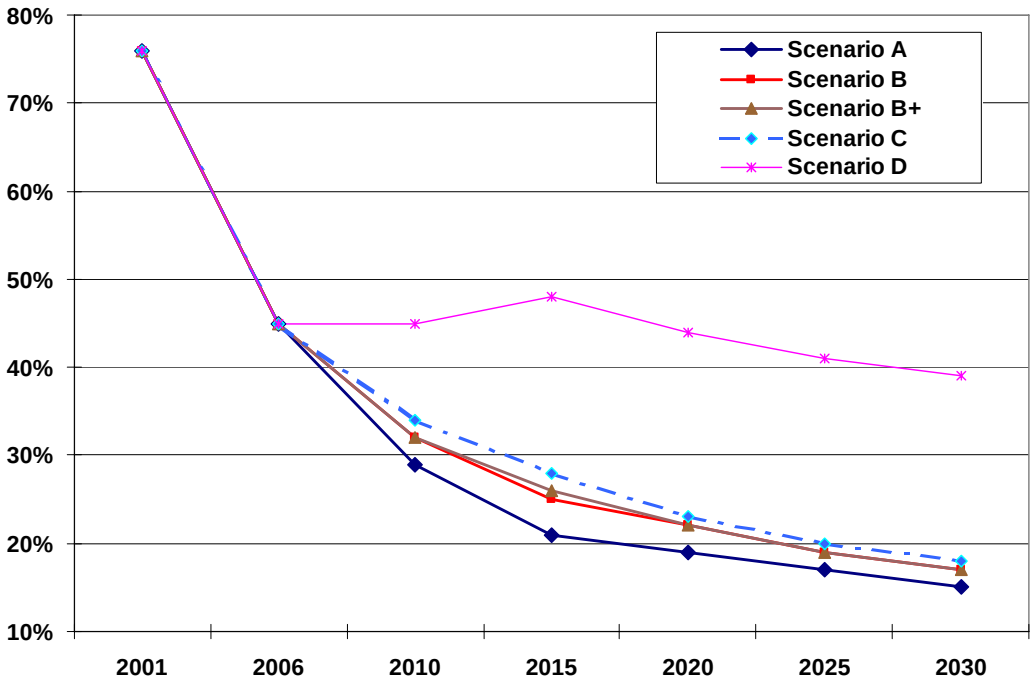
**Figure 3-1 HKP Ocean Cargo Forecast, 2010-30**




Source: THB, HKSAR; GHK

3.3.1.4 Hong Kong's share of the South China cargo base was projected to decline under all the scenarios. For Scenario A, it is projected to fall from a preliminary estimate of 45% in 2006 to 29% in 2010, 19% in 2020 and 15% in 2030. The steeper decline in Hong Kong's share of the South China cargo base under Scenario A (and also B, B+ and C) versus Scenario D are due to lack of progress in addressing HKP's total through cost disadvantages (Figure 3-2).

**Figure 3-2 Hong Kong Forecast Share of South China Market, 2010-30**




Source: THB, HKSAR; GHK

3.3.1.5 If Mainland Customs and related regulatory reform continues to the extent that Mainland ports are able to handle ocean-to-ocean transhipment efficiently, then HKP will face intense pressure in this market – a market that it has been targeting to supplement volumes as it faces increasingly intensive competition in its primary and higher revenue market of direct ocean cargo. **HKP's ability to compete for this 'footloose' transhipment will be severely compromised if it continues to see a decline in its prime, South China direct ocean cargo** – the baseload cargo that provides a major incentive for shipping lines to call.

## 3.4 Impact of Future Infrastructure Projects

3.4.1.1 All the scenarios include the impacts from future committed infrastructure, specifically the HZMB and Lantau Logistics Park (LLP). The possible impacts generated by the proposed Liantang Crossing (Eastern Shenzhen crossing) have also been assessed.

3.4.1.2 Of the projects examined, the HZMB is the only major committed investment which is likely to have some measurable effect on traffic – attracting about 0.4% of additional South China traffic to HKP shortly after commencement of operation. It would also generate additional benefits via its impact on PRD economic development, especially the West PRD.

Nevertheless, the impacts diminish over time and the benefits of the project are extremely small compared to the "pull factor" at the competitor South China Ports - reliance on new infrastructure to defend Hong Kong against competition from Shenzhen ports would not be advisable.

### 3.5 Additional Measures to Attract Cargo

3.5.1.1 Additional measures to attract cargo that might be applied to all scenarios were also considered, specifically measures to "lock-in" major port customers via leasing terminals to shipping lines. However the willingness of lines to come would be partly a function of Hong Kong's dense network of services, which will in turn depend on Hong Kong handling a significant volume of South China cargo, and related to this, transhipment traffic.

## 4 PRODUCTIVITY AND CAPACITY OF KTCT

### 4.1 Capacity Drivers - Increasing Size and Spread of Vessel Sizes

4.1.1.1 Sizes of container vessels have undergone several generations of changes, leading up to the current 8th Generation - the "Suezmax" with capacity of 12,500+ TEUs and 15.5m draft. In order to compete, major South China ports must be ready to meet emerging customer demands, both in terms of efficient handling of these larger vessels and handling a wider variety of vessel sizes (feeders and mother ships).

4.1.1.2 The importance of the transhipment business and intra–Asia trade for HKP impacts on the sizes of ocean vessels calling at Hong Kong. KTCT is increasingly having to handle a wider variety of vessel sizes, from the largest Suezmax vessels to short-sea feeders with a capacity of 2,000 – 2,500 TEUs and river barges. This **variety of traffic and vessel size mix poses several challenges in terms of efficient cargo handling and overall capacity**. By way of comparison, Yantian does not handle such a wide variety of traffic and hence receives a smaller share of calls from the smaller vessels.

4.1.1.3 Vessel size distribution typically affects port capacity via its impact on average number of TEUs moved per ocean vessel call. **All else being equal, a higher average number of TEUs moved per vessel call drives up quay face capacity**.

## 4.2 Capacity Scenarios

4.2.1.1 A number of capacity scenarios were developed, but two were adopted as more likely in terms of planning assumptions: Reference / Trends and A2 Scenarios. The latter projects an increase in the average size of vessels calling at HKP and an increase in total TEUs moved per vessel call by 5.1% per annum over 2007-15.

4.2.1.2 Under the Reference / Trends Scenario, KTCT ocean cargo capacity is estimated at just over 17.7 million TEUs. Under the A2 Scenario, this rises to 22.6 million TEUs by 2015. The estimated river barge capacity at KTCT under both scenarios was projected at 2.6 million TEUs per year by 2015. Taken together, this gives a total KTCT capacity of **20.3 million TEUs** and **25.1 million TEUs** respectively by 2015 under the **Reference / Trends** and **A2 Scenarios**.

4.2.1.3 HKP's mid-stream sites (MSS) also provide additional, relatively flexible, capacity. However, in recent years some cargo using these facilities has migrated to KTCT due to the better service quality, the faster turnaround and the lower rates now offered by terminal operators.

4.2.1.4 Table 4-1 provides a summary comparison of the capacity estimates with the earlier estimates prepared in HKP2020. The productivity and capacity assessments undertaken in PCF 05-06 are more detailed than those in HKP2020 and have in particular sought to address changes in HKP's role, especially those relating to changing traffic mixes and TEUs exchanged per vessel call. In addition, the increased volume of transhipment has been factored into the assessment which reduces the yard constraints relative to the assumptions in HKP2020.

**Table 4-1 HKP2020 Capacity Estimates and PCF 05-06 Capacity Estimates for KTCT (million TEUs per year)**

| | | PCF 05-06 (Ocean + River*) | |
|---|---|---|---|
| | HKP2020 (Ocean + River) | Reference / Trends | A2 |
| 2005 | 18.563 | 18.913 | 18.913 |
| 2010 | 19.777 | 19.816 | 22.246# |
| 2015 | 20.948 | 20.285 | 25.146 |
| 2020 | 21.695 | 20.285 | 25.146 |
| 2030 | 23.019 | 20.285 | 25.146 |

Notes: *The ocean capacity includes the ocean leg of a river movement transhipping through KTCT but not the barge leg, which is separately assessed. PCF 05-06 estimates river capacity as 1.208 million TEUs per year in 2005, 2.111 million TEUs in 2010 and 2.580 million TEUs in 2015.
#The 2010 ocean capacity is based on interpolation of the changes in vessel sizes, moves per vessels, etc. between 2005 and 2015.
All ocean and barge handling capacities outside KTCT are excluded from the capacity figures in this Table.

Source: HKP2020; GHK

4.2.1.5 Although the move to transhipment through Hong Kong has delayed the need for additional land, it has not removed this requirement in the longer term if the throughput of the existing terminals is to be maximised – an additional 32 and 113 hectares respectively would be required for the capacity estimates under the Reference / Trends and A2 Scenarios to be reached.[7] It is therefore **vital to provide additional land around Kwai Chung and Tsing Yi for container terminal and related uses as a first priority** - HKP2020's Power Port Initiative (PPI). **In the short-term this provides additional capacity at lower overall cost.**

4.2.1.6 Yet even with the incorporation of the much needed additional land to support container terminal operations, **changes in the sizes of the vessels calling HKP and average TEUs moved per vessel call remain critical in determining KTCT's ultimate level of capacity** (see 4.2.1.1 above).

# 5 UPDATED MASTERPLAN

## 5.1 Timing of New Facilities

5.1.1.1 The updated masterplan includes a review of all facilities: CTs, River Trade Terminal, Public Cargo Working Areas (PCWAs), MSS, Special Bulk Terminals, buoys, anchorages, and port backup land.

### *5.1.2 Container Terminals*

5.1.2.1 On the basis of the Scenario A demand forecasts, **new container berths would be required by 2015 under the Reference / Trends Capacity Scenario** and **2020 under the A2 Capacity Scenario**. River barge capacity is expected to be reached by 2017-18 at which point additional facilities and/or operational efficiency enhancements will be required.

*Location for Terminal Expansion*

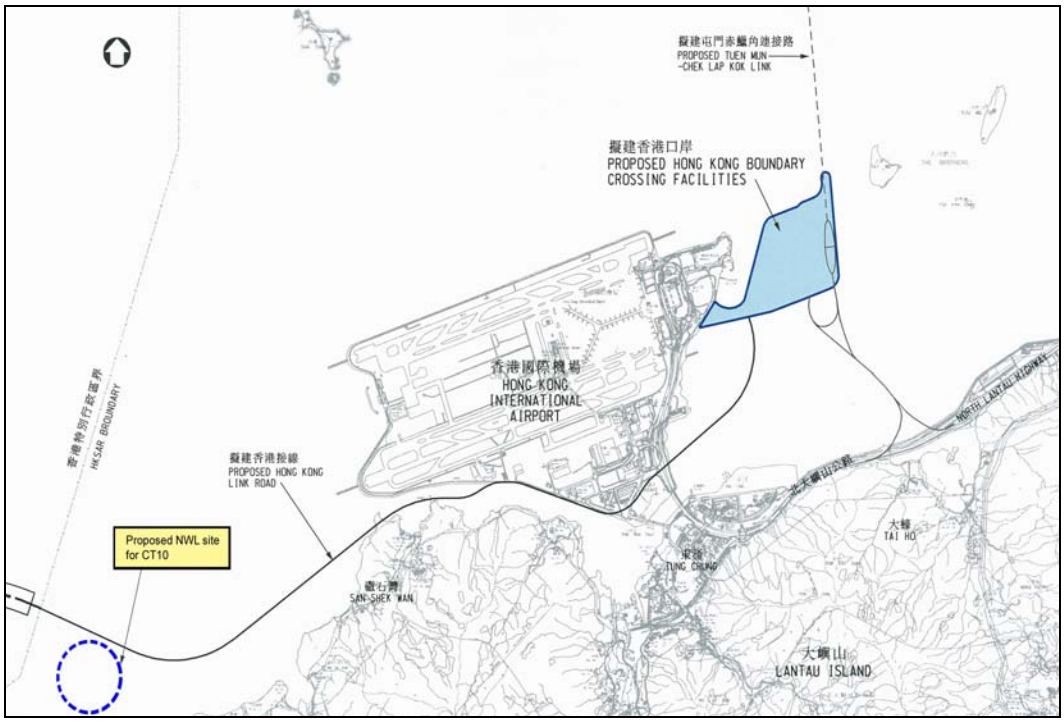
5.1.2.2 Two potential sites for new container terminal developments were recommended in HKP2020:

- North-west Lantau (NWL); and
- South-west Tsing Yi (SWTY).

[7] If no additional land is made available for KTCT then ocean capacity will likely be constrained at 15.9 million TEUs under the Reference / Trends Scenario or 16.2 million TEUs under Scenario A2. These limits would be reached at 2009/10 or 2010/11 respectively under the two scenarios. In other words, the port development programme cannot be met – additional capacity from CT10 cannot be introduced quickly enough to meet the projected demand.

5.1.2.3 Revisions to these layouts needed as a result of changes since HKP2020 were considered. In this respect the alignment of the proposed HZMB is of particular concern (Figure 5-1). HKP2020 had assumed that boundary crossing facilities (BCF) would be located west of CT10. Now Hong Kong BCF are recommended east of airport platform. The latest alignment would likely require separate road access for port use with security separation from HZMB. The costs of providing this would be very high and could render the NWL site not financially viable.

**Figure 5-1 Latest Tentative Route of Hong Kong-Zhuhai-Macao Bridge**




Source: Highways Department

5.1.2.4 The "Ecological, Fisheries and Water Quality Impact Assessment Study for the Proposed Port Development at Northwest Lantau" as recommended in HKP2020 has been completed. At this stage there is no conclusion regarding the environmental acceptability of port development at NWL. However, the study has not ruled out the NWL site as a "non-starter". Further assessment was recommended to investigate the potential effectiveness and feasibility of possible mitigation measures.

5.1.2.5 **As a number of concerns remain for the NWL option, it would therefore be prudent to work in parallel on the SWTY option.** As noted in HKP2020, expansion at this site avoids splitting the port and provides a better opportunity to phase development as compared with having to

create critical mass at NWL from nothing. If progress can be made in addressing the environmental concerns and the costs of re-provisioning the current site uses, then SWTY could provide HKP with a viable expansion option.

*Port Planning*

5.1.2.6 In order to establish a **facility significant enough to generate a critical mass and be attractive to potential operators as large, efficient and flexible terminals**, the proposed port layout for A2 Capacity Scenario comprises two 4-berth terminals, similar to HKP2020, but only the first 4-berth terminal and first berth of a second 4-berth terminal will be required by 2030. For the Reference / Trends Capacity Scenario, twelve 400m berths will be required by 2030 and therefore three 4-berth terminals are proposed to meet the demand.

5.1.2.7 Given the complex environmental and planning procedures required, including the time required for public consultation, a total lead time of 7 years up to the commissioning of the first new berth is recommended. This means that **a decision** to proceed will probably be needed by **2008** (2015 - 7) under the **Reference / Trends Scenario** and **2013** (2020 - 7) under the **A2 Scenario**. A lead time of at least seven years would also apply to SWTY, given the added complications of relocating existing oil depots and other affected facilities and dealing with possible decontamination before new construction could begin.

5.1.2.8 Moving forward, it will be necessary to keep monitoring developments, in particular whether the vessel size mix and TEUs moved per vessel call start to trend upwards, or remain within the Reference / Trends Scenario bands. Either way, **given the long timescale for new CT development, HKP must have expansion options that are "ready to go"**.

5.1.2.9 The final decision on whether to invest in new terminals in Hong Kong will be made if and when bids / proposals are invited for the new port development. The role of Government is to ensure the necessary infrastructure would be put in place for the benefits of the port community and Hong Kong economy as a whole. It must be remembered that the **demand projections in Scenario A are not a given**. The actual demand may be significantly higher, conversely **there are considerable risks in terms of HKP's future competitiveness and its ability to attract increased volumes of cargo**.

5.1.2.10 It is also recommended that the **Rambler Channel and approaches be urgently dredged by Government to at least –16.5m Chart Datum** to accommodate the new largest container vessels without undue restrictions and maintain HKP's competitive position.

### *5.1.3 Other Facilities*

*River Trade Terminal*

5.1.3.1 As the existing capacity is adequate for the study period, no additional facility would be required.

*Public Cargo Working Areas*

5.1.3.2 Along with the gradual decline in throughput and land requirement for infrastructure development and competing uses, further PCWAs can be decommissioned and redeveloped for other uses by 2011, subject to the agreement of relevant government departments and statutory procedures. Cha Kwo Ling PCWA is suggested to be decommissioned first to provide for construction of Trunk Road T2 related to the Kai Tak Development. It is understood that government also plans to decommission Kwun Tong PCWA for the development of a planned waterfront promenade.

5.1.3.3 However, the forecast indicates that the remaining six PCWAs are not sufficient to cope with the demand after 2020 and it is also unlikely that any new PCWA will become available to provide additional capacity. Therefore it is suggested to conduct a review around 2010 on the trend of PCWA demand and capacity.

*Mid-stream Sites*

5.1.3.4 As the existing capacity is adequate for the study period, no additional facilities would be required. The spare capacity at the MSS may assist in handling barge traffic for KTCT.

*Buoys*

5.1.3.5 Due to a decline in the use of Government Mooring Buoys, a further 12 can be decommissioned to save on maintenance costs, whilst still leaving a sufficient margin to handle fluctuations or differences in forecasts.

*Anchorages*

5.1.3.6 As with buoys, the demand for anchorages is not predicted to exceed demand in the study period. No extensions or new anchorage areas are therefore required.

*Port backup land*

5.1.3.7 PCF 05-06 has reviewed progress on the PPI and stressed the importance of providing the additional land identified around Kwai Chung and Tsing Yi for container terminal and related uses as a first priority. The permanent loss of further areas should be avoided. The land situation is less critical

on Tsing Yi behind Container Terminal 9 due to the more generous provision of areas for port back-up uses.

5.1.3.8 In addition the shortage of dedicated barge berths in Kwai Tsing is a concern, and all suitable waterfront should be preserved for possible port use. Ideally the areas that can be directly linked to the terminals are of greatest benefit because they allow the use of terminal off-road vehicles to transfer containers and reduce costs and dwell times.

## 5.2 Port Masterplan

5.2.1.1 Figure 5-2 shows the indicative Port Masterplan at 2030.

5.2.1.2 PCF 05-06 has highlighted the need **to strengthen the competitiveness of HKP by enhancing the efficiency of inland transportation** (notably barging and trucking) **and addressing the high THCs**. This is important not just for HKP but for the development of competitive logistics for the whole of South China.

## Figure 5-2 Indicative Port Master Plan at 2030