

3 PROJECT DESCRIPTION

3.1 Proposed Site

The serviced area and CBA for CT10 and 11 is located within Penny's Bay on the north eastern shore of Lantau Island, as shown on Figure 1.1. CT10 and 11 are located at the mouth of Penny's Bay and the breakwater runs in a east/west direction to the south of the container terminals. Penny's Bay is a deep inlet, separated from Sz Pak Wan and Discovery Bay by a series of small hills. Access to this remote location is presently by sea or on foot from Discovery Bay or Yam O. The characteristic steeply sloping mountains of Lantau surround Penny's Bay and descend to a rocky foreshore. The variation in sea bed level is between -3.0mPD and -5.0mPD within Penny's Bay and from previous site investigations the sea bed comprises marine deposits overlying silty clay and sand.

Approximately 60 hectares of land within Penny's Bay will be reclaimed for the serviced areas of the proposed development. On the western side of the Bay reclamation will follow the natural coastline and to the east the land will adjoin the existing seawall at the Cheoy Lee Shipyard site. To the south of the serviced area the reclamation will be extended to form the container back-up areas.

CT10 and 11 adjoin the southern boundary of the ancillary works area. Each terminal comprises 80 hectares of container yard with 4 berths of 320 metres length and 625m from front to back. CT10 is to the east and CT11 is to the west. There will be a noise bund 25m high and 70m at the base between CT10 and CT11 and there will be another noise bund of the same dimensions at the western end of CT11. The finished reclamation level for the terminals will be +5.6mPD.

The existing site seabed levels beneath the two terminals vary from as shallow as -5mPD at the eastern end to as deep as -15mPD at the western end. A layer of marine mud varying in thickness from 15m to nearly 30m in places covers the site and overlies alluvial deposits and weathered granite. Bedrock levels vary between -45mPD and -56mPD.

A small industrial development exists in the confines of Penny's Bay, consisting of Cheoy Lee Shipyards and the China Light & Power Gas Turbine Power Station (hereinafter referred to as Penny's Bay Power Station). There is also a small group of residences in the Bay. It is expected that the shipyard will be reprovisioned by the end of 1996 and the local residents relocated as a result of the proposed development of Penny's Bay.

The primary concern in providing the serviced area is to take advantage of the business and development opportunities afforded by the location of the new container terminals. The serviced area will comprise a self contained business park and industrial development. Port back-up facilities are to be provided in the land to be formed between the serviced area and the container terminals, these will include container storage, repair, packing and crating and office accommodation associated with container shipments.

On the north eastern side of Penny's Bay, industrial land has been allocated to accommodate port related as well as other general industries. Marine access to the Cheoy Lee Shipyard will be severed and consequently the shipyard will need to be relocated.

Other support services will include a health centre, police, fire ambulance stations and bus terminal.

Transport networks will include temporary haul roads, local access roads, port distributor roads, expressway and principal access roads in addition to rail links.

Seawater intakes and the sewage pumping station will be provided during Stage I for the flushing water and fire fighting purposes and will become new sensitive receivers for the latter part of the construction phase and once operations commence.

The proposed site will include the following facilities :

- (a) container back-up facilities;
- (b) business park;
- (c) industrial centre;
- (d) commercial centre;
- (e) G/IC;
- (f) open space;
- (g) container terminals.

Each of the terminals will contain the following :

- (a) container stacking area;
- (b) empty storage area;
- (c) container freight station (CFS);
- (d) main quay;
- (e) quay back reach;
- (f) administration building and
- (g) road/parking/general areas.

A large proportion of the non-stacking area within each terminal is likely to be devoted to parking and roads. Two main entrances will be required, one main entrance giving access to the container stacking areas, and a smaller entrance giving access to the administration buildings and CFS.

Baseline data for the Study Area were collected during the LAPH Studies. However, it is important to note that the existing environment and baseline conditions will rapidly be altered due to the extent and duration of the interconnected projects involved in the Lantau Port Development.

3.2 Construction Phase

3.2.1 Introduction

The construction phase characteristics are introduced in this section.

3.2.2 Construction Programme

A review of the construction programme available at the start of the Study indicated that an overall duration of 7 years is required for construction. Construction was programmed to commence in early 1995 and last until December 2002. In general the working hours will be 16 hours/day, 7 days per week for the reclamation and construction of the infrastructure. Nighttime working will be required for placing sand in the reclamation because the construction of the reclamation for the Advance Works needs to be completed within 18 months. These works comprise substantial quantities of earth works which include 5.0 M cu.m. of dredging, 9.5 M cu.m. of sand filling and the

construction of 1,250 metres of pitched slope rubble seawall. Extended working hours are inevitably required in order to complete the works within the prescribed time frame. The maintenance of a reasonable steady sand filling rate, for the sake of controlling water quality to within acceptable levels, practically translates to 24 hour operation. If the working hours for sand filling is reduced, the rate of sand filling work will have to be increased accordingly. Such increase in the sand filling rate would more than likely impose additional undesirable impact on the ambient water quality.

Figure 3.1 shows the phasing of construction activities for the Ancillary Works and Figure 3.2 shows the programme for the whole of the works up to completion of CT10 and 11.

There have been some modifications to the programme during the course of the Study and Figure 3.3 shows the programme that was available at the time of the start of the Study. This programme has been used for the environmental assessment except where stated otherwise in this report. The assessment has reviewed the implications of the modification to the programme wherever appropriate and comments on the results are included in the technical sections of this report.

A detailed breakdown of the programme is presented in Appendix B.

3.2.3 Construction Traffic and Site Access

The construction traffic will mainly consist of heavy vehicles for the transport of equipment and material to and from the work areas and internal traffic between sites and barging. Access to work areas will be either by barge or by trucks along the haul road.

3.2.4 Construction Activities

The main construction activities will comprise :

- (a) dredging;
- (b) reclamation using marine fill;
- (c) reclamation using land fill; (source still to be identified)
- (d) construction of the breakwater;
- (e) construction of culverts, drainage etc.;
- (f) construction and paving of roads; and
- (g) construction of terminals.

The Construction Phasing Diagrams (Figures 3.1 and 3.2) show the phasing of each of the work segments in the serviced land, container back up area and terminals. Each construction package refers to time taken for reclamation, construction of culverts, drainage etc. construction and paving of road networks, or construction of terminal facilities. The Advance Works will be constructed between May 1995 and September 1996. The Advance Works have been designed as a dredged reclamation where the marine deposits will be removed before placing the fill.

The reclamation and construction for the Ancillary Works will be carried out between May 1995 and early 2003. The phasing has been programmed to allow an access channel to remain open to Cheoy Lee Shipyard until the end of 1996.

The initial areas to be ready for use in time for the first berths to be opened at CT10 and 11 are the central road spine and the container back up area behind CT10.

A detailed description of the construction activities, plant, periods of operation and quantities of incoming and outgoing material is provided in Appendix C. In addition to the site specific activities itemised in that Appendix, the following activities will be carried out on all parts of the project :

- (a) **Construction Traffic** - The import and export of material from the site will generate additional vehicle movements in the vicinity of the new road. Estimates of peak vehicle movements have been made from incoming and outgoing material quantities using the following information :
 - (i) capacity of lorry;
 - (ii) total incoming/outgoing material quantity involved in each activity;
 - (iii) period over which operation requiring incoming/outgoing material extends;
 - (iv) peaking factor; and
 - (v) length of working day.
- (b) **Highway Finishes** - finishes will include traffic signs and their supports, street lighting, pavement markings, traffic barriers and fences. It is assumed that the equipment used for these items will consist of light to medium delivery trucks, small cranes etc.. However, it is not expected that many of these vehicles will be active at any given time.

It is understood that the following activities will not take place at the site at any time during the construction period :

- (a) concrete batching;
- (b) asphalt plant;
- (c) percussive piling; or
- (d) stockpiling.

3.3 Operation Activities

The port facilities and serviced area are expected to be commissioned by 2011. A design horizon of 2001/2011 has been used in this study for predicting air and noise impacts.

Traffic volumes and corresponding percentages of vehicle types in 2011 and speeds have been estimated based on the latest development projections. Peak morning hour traffic flows have been used for this assessment.

Traffic speeds and the flow characteristics are important in assessing the noise pollution. The noise from vehicles varies according to the speed (assuming that other factors such as gradient and road surfacing are constant). The transport model data show that the road will be operating at high volume/capacity ratios and speeds will reduce below design speeds, in some cases quite dramatically.

Traffic volumes and percentage of heavy goods vehicles on the main roads have been estimated through consideration of the predicted traffic levels for the surrounding roads.

Twelve hour and 24 hour operation of the container back up area have been assessed due to the expression of interest by port operators to ensure 24 hour operation.

For 24 hour operation it was assumed that the same number of TEU's are handled and therefore the amount of powered mechanical equipment is reduced accordingly.

The inventory of equipment was established in accordance with maximum capacity requirements. The powered mechanical equipment are assumed to be all operated at the same time, i.e. 100% utilization during the day time for assessment purposes. It has been assumed that 50% utilization of equipment will occur in the night time.

The powered mechanical equipment from each Container Backup Area (CBA) are assumed to be operated and located at the notional source centre. Due to the large distance separating the source and the NSRs, two notional source centres with one along the eastern boundary (affecting NSR 1 & 2) and the other one located along the western boundary (affecting other NSRs) are adopted for each CBA. Refer to Figures 5.1 and 5.2 for locational plans of the CBA at 2001 and 2011. The corrected noise level from respective CBA's are summed up at the NSR with due consideration given to topographical barriers and acoustic screens. The screening effect has been calculated in accordance with standard acoustic principles.

25m high noise barriers are assumed to be built along the south west sides of both CT10 and 11. One noise barrier has been assumed at the south west end of CT10 at 2001.

Tasks associated with the normal operation of the terminals are outlined below. Port activities are assumed to continue 24 hours a day.

- (a) container ships will arrive at the berth and moor alongside;
- (b) rail mounted dedicated container cranes will load and unload container from berthed ships onto container trucks;
- (c) containers will be stacked in lines within a holding area behind the berth. Transtainers will carry out the container stacking and retrieval. In addition to the transtainers, forklifts can be used to manoeuvre empty containers in the stacks;
- (d) external trucks will enter the terminal to deposit and collect containers. Queuing areas will be provided at the rear of the terminal with associated security and control systems; and
- (e) barges working between berthed container ships may be used to ferry containers to waiting lighters.

Figure 3.1
Construction Phasing Diagram

Legend :

Area	Period of Reclamation and Construction
Adv	Advance Works 1/5/95 - 1/10/96
1	1/12/95 - 29/8/97
3	6/2/96 - 2/5/03
6	1/12/95 - 5/8/99
7	1/12/95 - 1/10/99
8	1/12/95 - 1/6/00
9	4/10/96 - 29/12/97
11	1/12/95 - 4/11/99
12	4/1/99 - 19/3/03
20	31/12/96 - 20/1/98
21	1/12/95 - 30/7/97
22	31/12/96 - 28/7/98
23	31/12/96 - 31/5/00
24	25/10/96 - 20/1/98
25	4/1/99 - 11/12/02
27	4/1/99 - 3/6/02
28	4/1/99 - 3/6/02
29	1/12/95 - 16/8/01

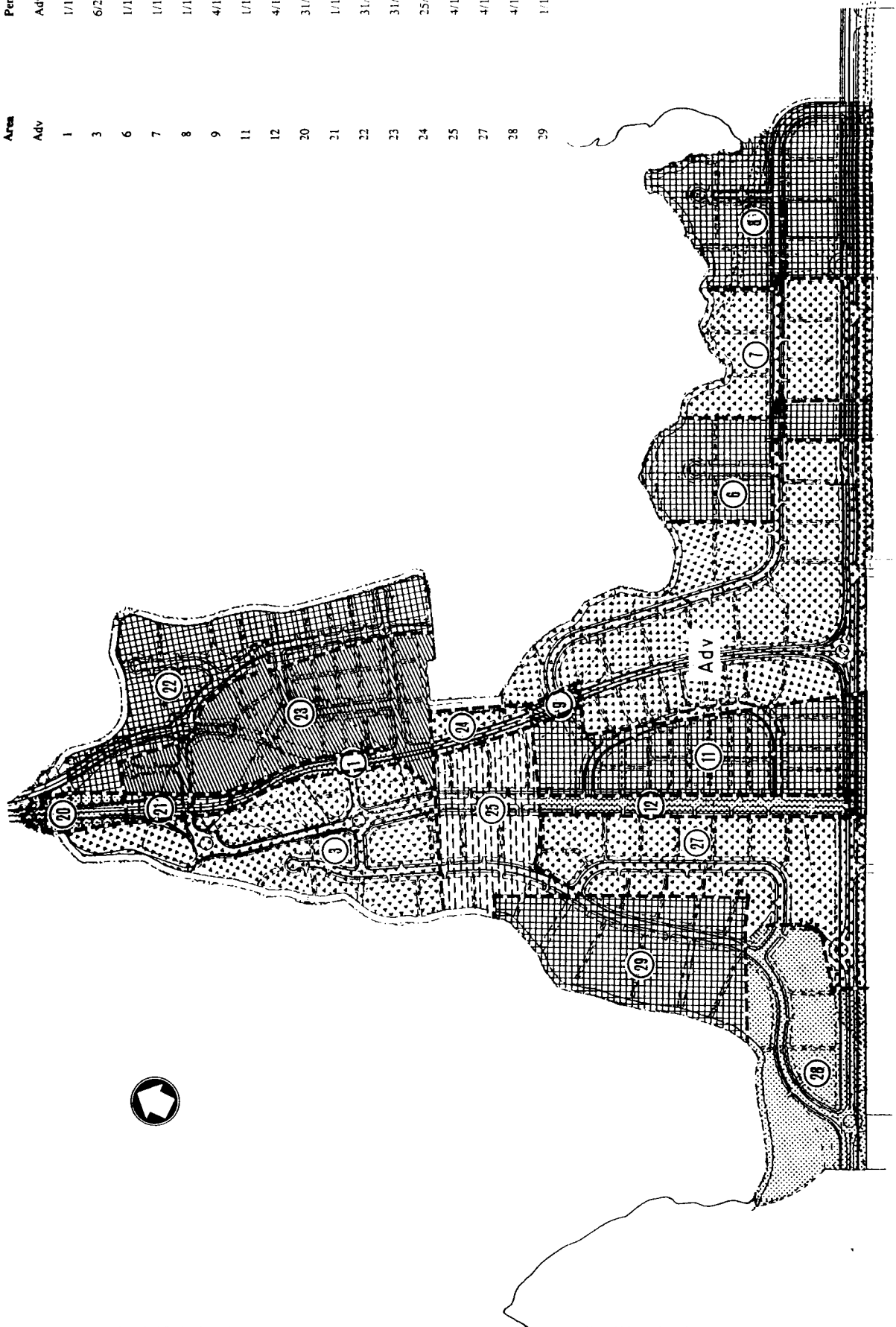


Figure 3.2 Construction Programme

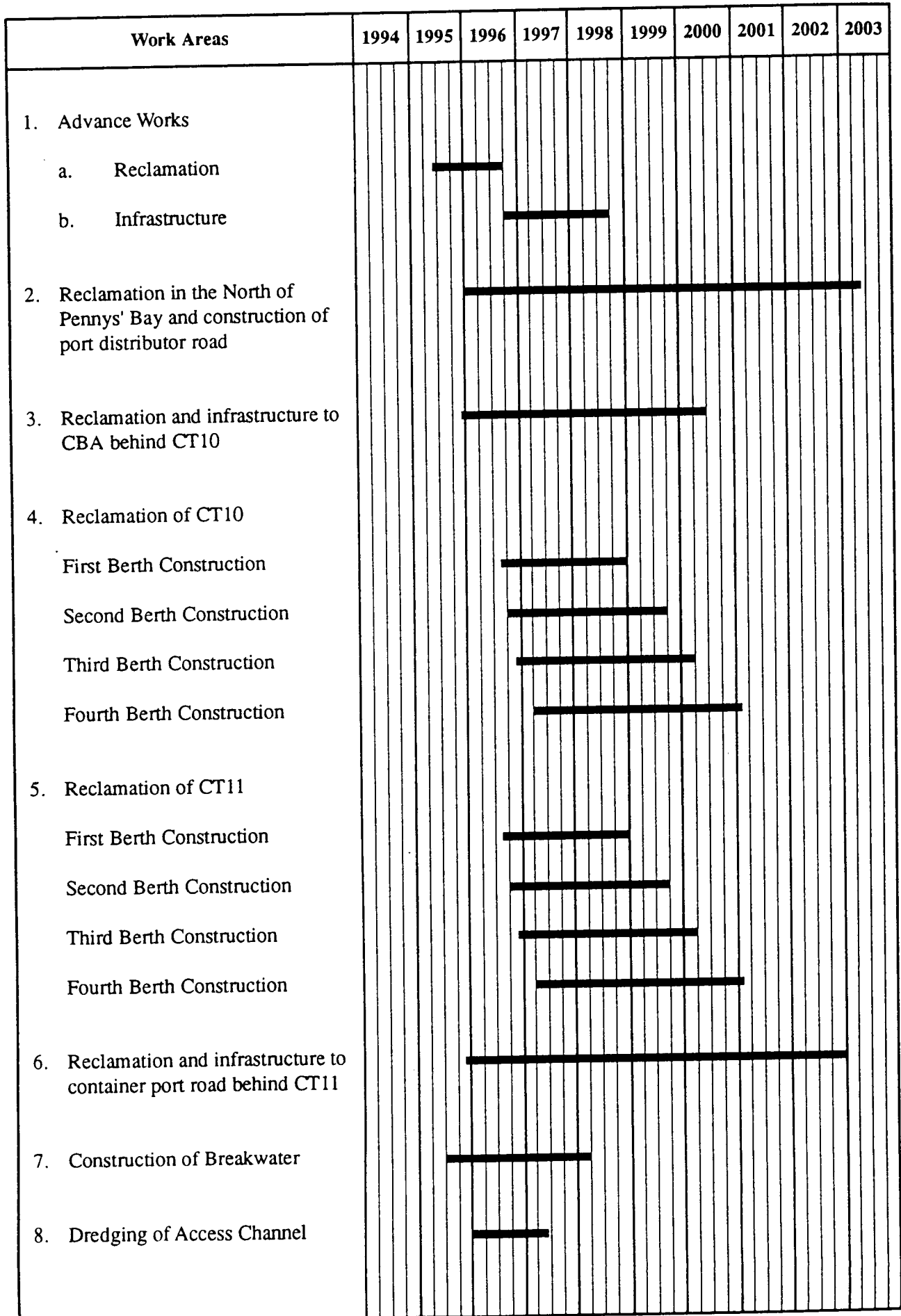


Figure 3.3
Original Construction Phasing Diagram

Legend :

TKB	Ting Kau Bridge Works Area 3/1/95
Adv	Advance Works 3/1/95 - 29/7/96
Area :	Period of Reclamation and Construction :
1	3/1/95 - 29/7/96
2	3/1/95 - 15/8/97
3	3/1/97 - 15/8/97
4	10/2/97 - 27/2/98
5	10/2/97 - 27/2/98
6	3/1/95 - 7/2/97
7	3/1/95 - 7/2/97
8	3/1/95 - 7/2/97
9	3/1/95 - 24/4/96
10	3/1/95 - 24/4/96
11	3/1/95 - 15/8/97
12	3/1/95 - 27/2/98
13	3/1/95 - 15/8/97
14	3/1/95 - 29/7/96
15	3/1/95 - 29/7/96
20	2/1/96 - 17/1/97
21	2/1/96 - 23/4/97
22	2/1/96 - 17/1/97
23	2/1/96 - 10/12/98
24	10/8/97 - 10/12/98
25	10/8/97 - 21/16/99
26	24/4/97 - 1/6/99
27	24/4/97 - 17/11/98
28	24/4/97 - 1/6/99

