

Information Paper for Legislative Council Panel on Planning, Lands and Works

Supplementary Notes on

- 92CD - Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage improvements, stage 1**
- 109CD - Drainage improvement in Sha Tin and Tai Po**
- 112CD - Drainage improvement in Northern New Territories – Package A**

INTRODUCTION

At the meeting on 23 April 2001, Panel Members requested the Administration to provide an overview of the flood control and prevention strategy for tackling the flooding problem in the territory and to provide further details about the proposed drainage improvement works under **92CD**, **109CD** and **112CD**.

AN OVERVIEW OF THE FLOOD CONTROL AND PREVENTION STRATEGY

Development of the Strategy

2. In 1990, the Government completed the phase I of the Territorial Land Drainage and Flood Control Strategy Study. Based on the recommendation of the Study, the Government endorsed a set of flood protection standards such that all new stormwater facilities have to be designed to withstand a severe flood event as described below:

	<u>Return Period</u>¹
• Urban drainage trunk systems	200
• Urban drainage branch systems	50
• Main river and rural drainage channels	50
• Village flood protection scheme	50

3. The definition of a flood event is based on the combination of rainfall intensity and tide levels. For a drainage basin, the downstream of the catchment is under influence of the sea. The capacity of the drainage network will be reduced

¹ “Return Period” means the average number of years within which a certain severity of a flood event will occur once statistically. It indicates the probability of occurrence of a certain flood severity. A larger return period represents a more severe event and a rarer occurrence, but there is always the chance that it will occur in any one year.

if the tide level is high, as the high tide prevents the free discharge of flood water to the sea. This is a natural phenomenon and occurs to every drainage network within the tidal zone. We have always taken this into account and a high tide level is used in all our designs.

4. For urban areas, a 200 years protection standard is specified for the trunk drain such that adequate protection is provided against extensive regional flooding in the urban area. For the branch networks, a protection level of 1 in 50 years is provided for cost-effectiveness consideration, bearing in mind that the catchment area served by a branch drain is relatively small.

5. Regarding the design of main river and rural drainage channels as well as village flood protection schemes, a protection level of 50 years return period is provided to achieve cost-effectiveness based on considerations such as land requirement, social and economic impacts of flooding.

6. The above strategy serves to provide general guidelines for desired flood protection standards for new stormwater drainage infrastructure. They are subject to appropriate adjustment with regard to site constraints and characteristics of individual catchments.

7. The Government also completed in 1993 the phase II of the Territorial Land Drainage and Flood Control Strategy Study. The Study provided Government with concrete plans and tools needed to make the strategy more effective in the five most flood prone basins, namely the Yuen Long, Tin Shui Wai, San Tin, Ganges and Indus Basins in the New Territories. The principal output from the Study provided a rational framework for managing the drainage systems in each basin, implementing structural and non-structural flood mitigation measures and responding to requests for development.

8. In 1994, the Government completed the West Kowloon Drainage Master Plan (DMP) study to investigate and resolve the drainage problems in the area. Since then, the Government has carried out seven more DMP studies to cover the following areas:

- a) Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai
- b) Northern Hong Kong Island
- c) Tsuen Wan, Kwai Chung and Tsing Yi
- d) Tuen Mun and Sham Tseng
- e) Northern New Territories
- f) Sha Tin and Tai Po
- g) Sai Kung, East Kowloon and Southern Lantau

9. The above studies comprehensively examined the adequacy of the

drainage systems and developed drainage improvement measures to meet the required flood protection standards and future development needs. They have taken into consideration a number of constraints and factors including social and economic pressures, financial and legal constraints, geographical and environmental conditions, institutional and management constraints as well as known development plans when formulating the required drainage improvement measures.

Drainage Improvement Measures in the New Territories

10. In the New Territories, the capacities of some existing rivers are inadequate and need to be improved to cope with the rapid development and changes in land use. River channels are the primary choice for drainage networks in the New Territories where the catchment areas to be drained are large and the river channel can more easily blend with the natural environment. Providing a box culvert in place of an open river channel will require a much larger land intake because of the need to compensate the corresponding reduction in the flow area for conveying the floodwater and to construct the supporting walls and deckings. Box culverts will be used when the drainage basin is small. Box culvert will also be used in urban areas when the decked area is required for other land use purpose.

11. Being constrained by the natural topography and existing development, existing villages in some low-lying areas are still susceptible to flooding even after the construction of river channels. Village flood protection schemes are therefore required. The scheme is to protect the low-lying village by constructing a perimeter bund to prevent the ingress of floodwater from outside and installing a floodwater pumping station to discharge the stormwater collected within the bunded area to the nearby river channel.

12. Based on the above strategy, we have completed improvement to about 10 km downstream sections of the major river channels in the Yuen Long and Kam Tin areas in the North-western New Territories. Construction works for about 9 km midstream sections of the river channels in Yuen Long, Kam Tin and Ngau Tam Mei areas have also been in progress since 1999. In the Northern New Territories, Stages I and II works of the Shenzhen River Regulation Project have been completed. Corresponding improvement works for the River Beas and River Indus have also been in progress. In addition to the river training works, 19 village flood protection schemes have also been constructed and are now in operation.

13. Planning and design for further improvements to midstream and upstream sections of the river channels and tributaries and further village flood protection schemes in the New Territories are actively underway. Some are now ready for construction, subject to approval of funding, works could commence in end 2001/early 2002.

Drainage Improvement Measures in Urban Areas

14. In urban areas like the West Kowloon, Northern Hong Kong Island, Tsuen Wan and Kwai Chung, the stormwater drainage systems were built many years ago. There is a need to upgrade the flood protection level to the current flood protection standard. However, conventional drainage improvement works involving road opening works for the installation of new drains of larger size are always subject to constraints due to the presence of congested underground utilities, traffic diversion problems and public concern over the nuisances and inconveniences resulting from the construction activities. In this regard, a combination of the following alternatives will be explored in order to minimise these impacts:

- (a) the application of no-dig technology to minimise road opening works;
- (b) the provision of underground storage tanks for floodwater to reduce peak flows and hence reduce the extent of conventional drainage improvement works in the urban areas;
- (c) the construction of tunnel systems to collect rain water from upland areas for discharge directly into the sea. By employing this method, less rain water would enter the old drainage systems within the urbanised districts and therefore, the flood protection level of the systems could be improved with much less requirement for the construction of conventional drainage works in busy streets, thus minimizing the disruption to the public.

15. In accordance with above strategy, we have already commenced Stage I and Stage II drainage improvement works in West Kowloon including constructing a flood storage tank of a capacity of 100,000 m³ underneath the Tai Hang Tung Recreation Ground and a 1.5 km stormwater transfer tunnel from Kowloon Tong to the Kai Tak Nullah.

16. To improve the existing drainage systems in other urban areas including

Northern Hong Kong Island, Lai Chi Kok, Sham Shui Po, Tsuen Wan and Kwai Chung areas, construction of drainage tunnels of about 20 km in length to intercept and transfer stormwater from the upper catchments directly to the sea have been recommended. These tunnels aim to upgrade the flood protection standards of the lower urban areas while minimizing public disruption and avoiding practical difficulties/constraints associated with conventional drainage improvement works in heavily built-up areas. Preliminary feasibility studies for these drainage tunnels have been completed. Besides these tunnels which are under planning, we do not envisage the necessity for further drainage tunnels to meet the present planned development scenarios in Hong Kong.

FURTHER DETAILS ABOUT PROPOSED DRAINAGE IMPROVEMENT WORKS UNDER 92CD, 109CD AND 112CD

92CD – Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai Drainage Improvements, Stage 1, Phase 1

17. In December 1998, we completed the Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai Drainage Master Plan study and identified the following drainage improvement works to be carried out under **92CD** Phase 1:

- (a) To improve the drainage systems in Yuen Long town, Ping Shan and Hung Shui Kiu areas

The study revealed that the present capacities of some aged drains in the areas could only provide flood protection of 1 in 2 to 1 in 20 years. Flooding in these areas were recorded on 14 April last year. We propose to construct about 8 km of stormwater drains to bring the systems up to the required 1 in 50 years flood protection standard. Upon completion of the works in 2005, the risk of flooding in the areas concerned will be substantially reduced.

- (b) To upgrade the drainage capacities of Hung Shui Kiu Channel and Ha Tsuen Channel

The study also identified that the upstream section of these two channels (about 2.5 km) is inadequate in capacity to meet the future development, e.g. Hung Shui Kiu Strategic Growth Area. Therefore, we propose to construct solid parapets (about 5 km) to replace the existing metal handrails so as to achieve a flood protection level of 1 in 50 years.

109CD - Drainage Improvement Works in Sha Tin and Tai Po

18. Sha Tin and Tai Po Drainage Master Plan study was completed in October 1999. The study reviewed comprehensively the entire catchments and drainage facilities in Sha Tin and Tai Po and proposed to carry out under **109CD** the following drainage improvement works for the drains and rivers in old towns and rural areas:

- (a) To improve the hydraulic capacities of Lam Tsuen River, She Shan River, Tai Po River and Kwun Hang River

These natural rivers at present have only a level of protection of 1 in 2 to 1 in 20 years. Floodings were recorded on 9 August 1998 in Kwun Hang area and on 25 August 1999 in Lam Tsuen area. Besides, some of the river banks are badly eroded and in need of protection.

We propose to carry out river channel upgrading works at these locations to improve land drainage as well as to cope with the planned development. Upon completion of the proposed river improvement, the flood protection level will be brought up to 1 in 50 years and hence the risk of flooding in the affected areas during heavy rainstorms will be substantially reduced. The river banks will at the same time be properly protected against erosion.

- (b) To tackle existing flooding spots

Recurrent flooding during heavy rainstorms occurs in low-lying Shuen Wan and Tai Po Kau Hui in Tai Po and Tin Liu to Pau Tau areas in Sha Tin. The level of protection in Shuen Wan, for example, is only 1 in 2 years, flooding was recorded on 12 August 1997. We propose to upgrade the concerned stormwater drains and construct floodwater pumping stations to bring the flood protection level of these areas up to 1 in 50 years.

112CD – Drainage improvement in Northern New Territories – package A

19. In October 1999, we completed the Northern New Territories Drainage Master Plan study and identified the following drainage improvement works to be carried out under **112CD** package A:

- (a) To improve the hydraulic capacity of existing streamcourses in Ma Wat River (about 4 km) around Kau Lung Hang and Nam Wa Po in Fanling

These natural streamcourses at present have only a level of protection of

less than 1 in 20 years. Upon completion of the proposed river improvement works, the flood protection level will be brought up to 1 in 50 years and the flooding risk in the areas will be substantially reduced.

(b) To tackle existing flooding spots

Flooding in low-lying Shek Wu Wai near San Tin Highway and in Ping Kong Tsuen due to the narrow streamcourses has long been problematic during heavy rainfall.

The proposed San Tin Western (about 2 km) and Ping Kong (about 1 km) drainage channels will provide a flooding protection level of 1 in 50 years in the areas concerned.

(c) To upgrade existing drains to meet the required flood protection standards

Some existing drains (about 8km) in the old town areas of Fanling and Sheung Shui are inadequate in capacity. In addition, the closed circuit television surveys have identified that the conditions of some of the drains (about 4.5 km) are deteriorating and in need of repair.

Upon completion of the proposed drainage improvement works, the Sheung Shui and Fanling towns will be provided with adequate flood protection standards. The improvement could also cope with the additional run-off generated from future developments in the areas, such as the Fanling North Strategic Growth Area.

Works Bureau

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