For information **PWSCI(2000-01)32**

NOTE FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

Supplementary Information on

22CD – North West New Territories development – main drainage channels for Yuen Long and Kam Tin – remainder, phase 4 and 81CD – Main drainage channels for Yuen Long and Kam Tin stage 2 – remainder

INTRODUCTION

At the PWSC meeting on 25 October 2000, Members considered PWSC(2000-01)49 on **22CD** "North West New Territories development – main drainage channels for Yuen Long and Kam Tin – remainder, phase 4" and PWSC(2000-01)50 on **81CD** "Main drainage channels for Yuen Long and Kam Tin stage 2 – remainder" and requested the Administration to –

(a) examine whether terms such as "50-year return period rainstorm" and "100-year return period rainstorm", etc. commonly used to represent drainage design capacity could be quantified or expressed in laymen terms; and

(b) provide further information to explain the difference in the estimated construction cost of the drainage channels under the two proposals.

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THE ADMINISTRATION'S RESPONSE

50-year return period rainstorm

2. The term "return period of a rainstorm" means the average number of years within which a certain specified intensity of rainfall for a rainstorm of a given duration will occur once statistically. A table illustrating the relationship between the duration of rainstorm and intensity of rainfall for return periods of 10, 50, 100 and 200 years is given below -

Duration of rainstorm	Intensity (mm/hr) of rainfall for various return periods			
	10-year return period	50-year return period	100-year return period	200-year return period
30 minutes	132	167	181	196
1 hour	103	132	144	156
2 hours	73	96	105	114
4 hours	48	65	72	79
6 hours	39	53	59	64
8 hours	32	44	49	54
12 hours	24	33	36	40

The above figures, which are Hong Kong specific, are derived from historical records as well as extrapolation of rainfall patterns based on internationally-accepted probability theory.

3. The design capacity of a drainage channel depends not only on the design return period but also on other specific factors such as the size and the surface characteristics of the catchment area. In general, the capacity of a drainage channel designed for a 100-year return period is about 10% higher than that for a 50-year return period of the same catchment.

4. To achieve cost-effectiveness, we normally adopt a design return period based on such considerations as future land use, topography, social and economic impacts of flooding. In general, a lower design return period will be adopted for a trunk drainage channel in agricultural land and rural areas and a higher return period, wherever possible, for urban and strategic areas. The 50-year design return period for **22CD** and **81CD** is comparable with the international practices for trunk rural drainage channels.

/*Cost* …..

Cost of works

5. The design of a drainage channel takes into account the desired flow capacity and the area of land required. At the preliminary layout design stage of a project, we carry out an appraisal of future land use, land availability, flow capacity and channel appearance. In general, open trapezoidal channels provide a more efficient and economical cross-section for the conveyance of runoff in terms of construction and maintenance costs, as compared with other design options, including rectangular channels with the same flow capacity. However, rectangular channels may be preferred in some cases if available land cannot accommodate a trapezoidal channel.

6. For **81CD**, a trapezoidal channel has been adopted except for a section of the Shek Tau Wai Channel. For this particular section of the Channel, a rectangular shape is adopted since available land is limited. For **22CD**, the volume of runoff to be conveyed is comparatively small; hence a rectangular shaped channel is adopted to minimize land resumption.

7. The cost of works will vary according to the length, width and depth of the channel, and the quantities of earthworks involved. Simple comparison of the cost per unit length of channels of different size involving different types of construction as in **22CD** and **81CD** is not entirely appropriate.

8. For an assessment of cost-effectiveness, one should compare the construction cost against the design flow capacity. A detailed breakdown of such costs for **22CD** and **81CD** is given in the following table. It indicates that the unit construction costs of the drainage channels in both projects are comparable.

	Cost of earthworks ($M) (a)	Cost of channel lining ($M) (b)	Total cost of channel ($M) (c) = (a)+(b)	Design flow capacity (m^3/sec) (d)	Cost per design flow capacity ($M/$m^3$/sec) (e) = (c)÷(d)
22CD	6	44	50	63	**0.79**
81CD	27	112	139	164	**0.85**

Works Bureau
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