

## ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

### HEAD 709 -WATERWORKS

#### Water Supplies – Fresh water supplies

#### 330WF – Remedial works for the rip-rap at the main dam of Plover Cove Reservoir

Members are invited to recommend to Finance Committee the upgrading of **330WF** to Category A at an estimated cost of \$51.4 million in money-of-the-day prices for carrying out remedial works to the main dam of Plover Cove Reservoir.

### PROBLEM

The rip-rap protection on the upstream face<sup>1</sup> of the main dam of Plover Cove Reservoir is showing signs of erosion and deterioration. It is necessary to carry out remedial works as soon as possible.

### PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **330WF** to Category A at an estimated cost of \$51.4 million in money-of-the-day (MOD) prices for carrying out remedial works to the main dam of Plover Cove Reservoir.

**/PROJECT .....**

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<sup>1</sup> “Upstream face” is the face of the main dam facing Plover Cove Reservoir.

## PROJECT SCOPE AND NATURE

3. The scope of the proposed works comprises –
- (a) placement of about 80 000 cubic metres of large rocks weighing from 1 tonne to 6.5 tonnes to the eroded rip-rap areas in the lower part of the rip-rap protection layer of the main dam; and
  - (b) infilling of gaps between large rip-rap rocks with small stones of sizes ranging from 150 millimetres (mm) to 300 mm in the upper part of the rip-rap protection layer of the main dam and grouting with flexible cementitious materials.

\_\_\_\_\_ A site plan and a cross section of the main dam showing the proposed works are at Enclosures 1 and 2 respectively.

4. We plan to commence the proposed remedial works in June 2006 for completion in December 2008. We will supervise the proposed works using in-house staff.

## JUSTIFICATION

5. Plover Cove Reservoir was commissioned in 1968. The 2 kilometres long main dam of Plover Cove Reservoir is protected by a layer of large rocks called rip-rap. Having been attacked by strong waves during typhoon periods in the last 38 years with no protection by any nearby natural landscape, the rip-rap rocks of the upstream face have shown signs of displacement and erosion. An investigation of the dam in 2002 concluded that erosion had extended to the whole rip-rap above 4 m PD (i.e. metres above Principal Datum<sup>2</sup>) with varying degrees of severity, including the displacement of the rip-rap rocks of the upstream face resulting in a thinner and weaker protective

/surface .....

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<sup>2</sup> Principal Datum is the vertical or height datum used for land surveying in Hong Kong. It is based on the Mean Sea Level (MSL) derived from 19 years (1965 - 1983) of tidal observations taken at the automatic tide gauge at North Point, Victoria Harbour and is 1.23 m below MSL.

surface. The thickness of the rip-rap protection layer has been reduced from 3.5 metres (m) to about 1 m at the most severe locations. If the rip-rap is not repaired, there is a risk that it will be eroded further during typhoons in the coming seasons leading to the erosion of the dam itself, and the integrity of the main dam will be endangered.

6. Upon completion of the proposed works, the integrity of the rip-rap protection layer of the main dam will be restored.

### FINANCIAL IMPLICATIONS

7. We estimate the capital cost of the proposed works to be \$51.4 million in MOD prices (see paragraph 8 below), made up as follows –

	<b>\$ million</b>	
(a) Remedial works	46.2	
(i) placement of rip-rap rocks	37.9	
(ii) infilling of gaps with small stones and grout	8.3	
(b) Environmental mitigation measures	0.5	
(c) Contingencies	4.7	
	Sub-total	51.4 (in September 2005 prices)
(d) Provision for price adjustment	0.0	
	Total	51.4 (in MOD prices)

8. Subject to approval, we will phase the expenditure as follows –

/2006 – 07.....

Year	\$ million (Sept 2005)	Price adjustment factor	\$ million (MOD)
2006 – 2007	2.2	1.00125	2.2
2007 – 2008	20.0	1.00125	20.0
2008 – 2009	28.0	1.00125	28.0
2009 – 2010	1.2	1.00125	1.2
	51.4		51.4

9. We have derived the MOD estimates on the basis of the Government's latest forecast of trend rate of change in the prices of public sector building and construction output for the period 2006 to 2010. We will tender the works on a remeasurement basis because the quantities of works are subject to variation during construction to suit the actual site conditions. The contract will provide for price adjustment as the contract period will exceed 21 months.

10. The project will not give rise to additional annual recurrent expenditure.

11. The project by itself would lead to an increase in production cost of water by 0.01% in real terms by 2010<sup>3</sup>.

## **PUBLIC CONSULTATION**

12. We consulted the Environment, Housing and Works Committee of the Tai Po District Council on 15 July 2005. The Committee supported the project.

13. We consulted the Legislative Council Panel on Planning, Lands and Works by circulation of an information paper in December 2005 on the proposed works. Members had no objection to the proposal.

/ENVIRONMENTAL .....

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<sup>3</sup> The increase in production cost of water is calculated at the present price level and on the assumption that the water demand remains static during the period from 2006 to 2010.

## ENVIRONMENTAL IMPLICATIONS

14. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The project would not have any long term environmental impacts. We have included \$0.5 million (in September 2005 prices) in the project estimates to implement suitable mitigation measures to control short term environmental impacts. Since the proposed remedial works mainly involve the placing of rip-rap rocks on the protection layer on the upstream face of the dam, the effect on water quality in the reservoir will be minimal. We will nonetheless implement appropriate precautionary measures, such as floating boom and silt curtains.

15. We have considered the design of the proposed remedial works in the planning and design stages to reduce the generation of construction and demolition (C&D) materials where possible. We will encourage the contractor to maximise the use of recycled or recyclable C&D materials, as well as the use of non-timber formwork to further minimise the generation of construction waste.

16. We will also require the contractor to submit a waste management plan (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reduce, reuse and recycle C&D materials. We will ensure that the day-to-day operations on site comply with the approved WMP. We will control the disposal of public fill and C&D waste to public fill reception facilities and landfills respectively through a trip-ticket system. We will require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

17. We estimate that the project will generate about 1 484 tonnes of C&D materials. Of these, we will deliver 1 413 tonnes (95.2%) to public fill reception facilities<sup>4</sup> for subsequent reuse. In addition, we will dispose of 71 tonnes (4.8%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites is estimated to be \$47,026 for this project (based on an unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne<sup>5</sup> at landfills).

**/TRAFFIC .....**

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<sup>4</sup> Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of public fill in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

<sup>5</sup> This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90/m<sup>3</sup>), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

**TRAFFIC IMPACTS**

18. The main dam crest road will not be used for transporting rocks and will remain open throughout the construction period. We will require the contractor to transport the rocks by sea. The traffic implications arising from the project will be minimal.

**LAND ACQUISITION**

19. The project does not require any land acquisition.

**BACKGROUND INFORMATION**

20. In October 2004, we upgraded **330WF** to Category B.

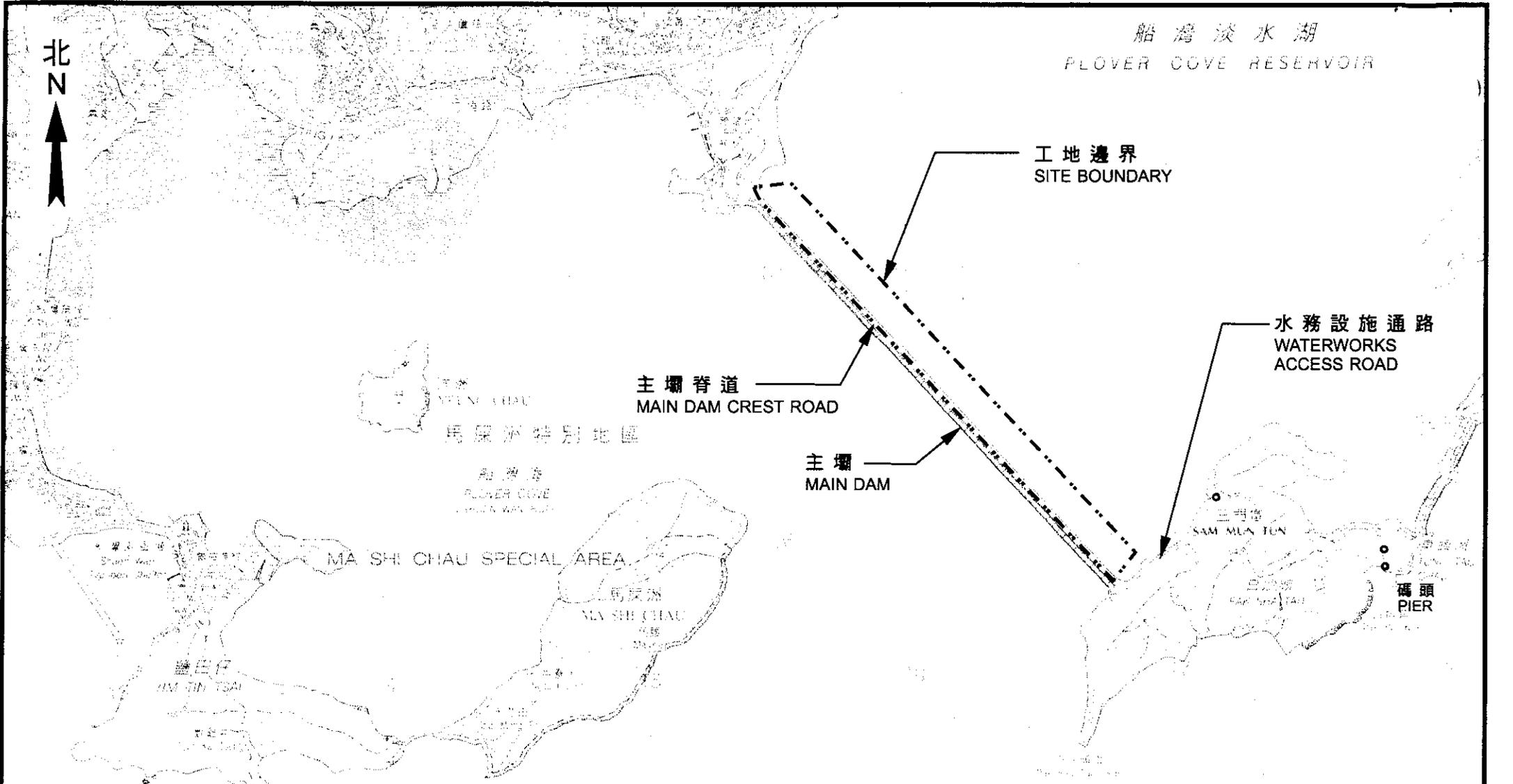
21. We have substantially completed the detailed design for the proposed works using in-house resources.

22. The proposed remedial works will not involve any tree removal or planting proposals.

23. We estimate that the proposed works will create 35 jobs (30 for labourers and another five for professional/technical staff) providing a total employment of 750 man-months.

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船灣淡水湖  
PLOVER COVE RESERVOIR

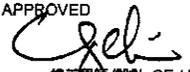


圖例 LEGEND :

-  施工地點  
WORKS SITE
-  臨時施工地  
TEMPORARY WORKS AREA

工地平面圖  
SITE PLAN

比例尺 SCALE 1 : 20 000

核准 APPROVED  
  
總工程師/設計 CE / DES  
5 / 11 / 2005

工務計劃項目第 9330 WF 號 — 船灣淡水湖主壩拋石護坡修葺工程  
P.W.P. item no.9330WF — Remedial works for the rip-rap at the  
main dam of Plover Cove Reservoir

 水務署  
WATER SUPPLIES DEPT.  
草圖編號 SK 62005 / 091 / 001  
SKETCH NO.

(2 之 1)  
(SHEET 1 OF 2)

附件 1  
ENCLOSURE 1

工地邊界  
SITE BOUNDARY

米 主水平基準  
m PD

主壩脊道  
MAIN DAM CREST ROAD

防浪牆  
WAVE WALL

完工剖面  
FINISHED PROFILE

現有剖面  
EXISTING PROFILE

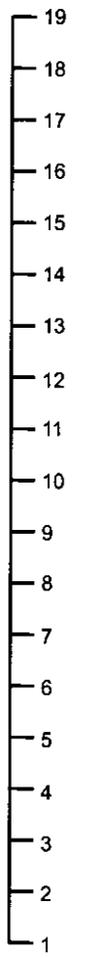
頂水位  
TOP WATER LEVEL 13.41m PD

拋石保護層  
RIP-RAP PROTECTION LAYER

船灣淡水湖  
PLOVER COVE RESERVOIR

風化石填料  
DECOMPOSED ROCK FILL

中央石芯  
CENTRAL  
ROCK CORE

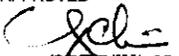


擬議修葺工程圖例：  
LEGEND OF PROPOSED REMEDIAL WORKS：

-  新放置的拋石  
NEWLY PLACED RIP-RAP STONES
-  以碎石填實在大型拋石之間的空隙並灌漿  
INFILLING GAP BETWEEN LARGE RIP-RAP STONES WITH SMALL ROCKS AND GROUTING

### 主壩橫切面圖 CROSS SECTION OF THE MAIN DAM

比例尺 SCALE 1 : 150

核准 APPROVED  
  
總工程師/設計 CE / DES  
5/11/2005

工務計劃項目第 9330 WF 號 — 船灣淡水湖主壩拋石護坡修葺工程  
P.W.P. item no.9330WF — Remedial works for the rip-rap at the main dam of Plover Cove Reservoir

(甲級工程)  
(CAT 'A' Submission)

 水務署  
WATER SUPPLIES DEPT.

草圖編號 SKETCH NO. SK 62005 / 091 / 002

(2 之 2)  
(SHEET 2 OF 2)

附件2  
ENCLOSURE 2