

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE

Civil Engineering – Drainage and erosion protection

160CD – Happy Valley underground stormwater storage scheme

Members are invited to recommend to the Finance Committee the upgrading of **160CD** to Category A at an estimated cost of \$1,065.8 million in money-of-the-day prices for constructing an underground stormwater storage tank with a capacity of 60 000 cubic metres, a pump house and the associated drainage works at Happy Valley Recreation Ground.

PROBLEM

There have been severe flooding incidents during heavy rainstorms in Happy Valley and the adjacent areas including Sing Woo Road, Wong Nai Chung Road, Morrison Hill Road, Lap Tak Lane and the Happy Valley Racecourse and Recreation Ground.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for Development, proposes to upgrade **160CD** to Category A at an estimated cost of \$1,065.8 million in money-of-the-day (MOD) prices for implementing an underground stormwater storage scheme (the Scheme), including construction of an underground stormwater storage tank with a capacity of 60 000 cubic metres (m³), a pump house and the associated drainage works at Happy Valley Recreation Ground (the Recreation Ground).

/PROJECT

PROJECT SCOPE AND NATURE

3. The scope of works under the Scheme includes –
- (a) construction of an underground stormwater storage tank with a capacity of 60 000 m³ and a pump house with a design pumping rate of 1.5 m³ per second;
 - (b) construction of about 650 metres (m)-long twin-cell box culvert with internal cell dimensions of 2 m high and 4 m wide;
 - (c) construction of about 70 m-long twin drainage pipes of 2.1 m diameter;
 - (d) associated works including modification of an existing box culvert, and construction of a stilling basin¹, a fan room, an access manhole, drainage and sewer diversion works;
 - (e) electrical and mechanical (E&M) works; and
 - (f) reprovision of the sport pitches surface and landscaping works.

— A site layout plan of the Scheme is at Enclosure.

4. Part of the above works, namely, 250 m out of the 650 m-long twin-cell box culvert in item (b), as well as item (c) above would be funded and constructed by the Hong Kong Jockey Club (HKJC). The capital funding to be sought under **160CD** covers the remainder of the works.

5. Subject to the funding approval of the Finance Committee, we plan to commence construction in September 2011 for completion of the works in two phases. Most of the proposed works, including the part of works to be constructed by HKJC, will be completed in March 2015 to bring about early commissioning of the Scheme. The remaining works which involve enhancing the storage of the tank to the full capacity of 60 000 m³ will be completed by February 2018. The phased implementation of works would reduce the number of sport pitches to be closed in each phase² and hence minimise disturbance to the public.

/JUSTIFICATION

¹ The stilling basin is to allow flow collected to steady out and for silt trapping.

² Out of 11 pitches, no more than three will be closed during each construction phase. The pitches in the second phase will only be closed after re-opening of the pitches affected in the first phase.

JUSTIFICATION

6. During the major rainstorms in August 2000, April 2006 and June 2008, severe flooding incidents occurred at Happy Valley and adjacent areas including Sing Woo Road, Wong Nai Chung Road, Morrison Hill Road, Lap Tak Lane and the Happy Valley Racecourse and the Recreation Ground. In these busy and densely populated areas, there are limitations in carrying out extensive on-line upsizing of the existing drains, which would involve extensive road opening works. This would cause serious disruption to the public and is practically not feasible in some locations due to congested underground utilities.

7. We have been making efforts in alleviating the flooding problem in Happy Valley. The area of the catchment upstream of Happy Valley is about 270 hectares. We are now constructing the Hong Kong West Drainage Tunnel for completion by 2012 to intercept stormwater from the upstream part of the catchment (about 140 hectares) for discharge to the sea near Cyberport. However, the facility cannot completely mitigate the flooding risk of Happy Valley. Making reference to the flood storage approach adopted for Tai Hang Tung storage scheme³ and Sheung Wan Stormwater Pumping Station⁴ which have successfully alleviated the flooding problem in urban low-lying area with least disturbance to the public, we propose to adopt an underground stormwater storage scheme to serve the remaining catchment area (about 130 hectares) in Happy Valley.

8. The Recreation Ground is the lowest spot in the area, which provides an ideal location for implementing the Scheme from the hydraulic point of view. Under the Scheme, if rain is not heavy, rain water in the catchment area will be collected by the existing drainage network and carried downstream for discharging to the Victoria Harbour through the box culvert underneath Canal Road. At times of heavy rainstorms, part of the stormwater collected will be diverted to the proposed storage tank for temporary storage in order not to overload the drainage network, thus preventing flooding in Happy Valley and the vicinity areas. After the rainstorms, the water in the storage tank will be released back to the box culvert underneath Canal Road for discharging to the sea. Upon completion of the works, the main drainage systems in Happy Valley and the adjacent areas will generally have a capacity to withstand a rainstorm with an intensity of a 50-year return period⁵.

/9.

³ Tai Hang Tung storage scheme, which was commissioned in year 2004, serves to alleviate the flooding situation in Mong Kok area where the existing downstream drainage systems are under capacity. It comprises an underground storage tank with storage capacity of 100 000 m³.

⁴ Sheung Wan Stormwater Pumping Station, which was commissioned in year 2009, serves to alleviate the flooding situation in Sheung Wan low-lying area where serious flooding occurred when heavy rainstorms coincided with high tide condition. Sheung Wan Stormwater Pumping Station provides a storage capacity of 9 000 m³.

⁵ A rainstorm of 50-year return period is a rainfall with intensity exceeding 130mm per hour in general.

9. The proposed stormwater storage tank underneath the Recreation Ground is encompassed by the race track of the Racecourse. To connect the existing drainage system outside the Racecourse to the proposed storage tank, drains crossing both the race track and the Recreation Ground will need to be constructed. Taking into account the views of HKJC, the current design developed by the Drainage Services Department (DSD) can minimise disruption to the racecourse operation during construction and achieve effective flood protection performance. HKJC welcomes DSD's current design. To ensure that the construction works of the drains across and near the race track can fully meet its operational requirements, HKJC offers to construct part of the works as detailed in paragraph 4 above at their own cost. These works will be scheduled to suit its racing schedule and will be handed over to DSD for maintenance after completion.

FINANCIAL IMPLICATIONS

10. We estimate the cost of the proposed works to be \$1,065.8 million in MOD (please see paragraph 12 below), broken down as follows –

		\$ million	
(a)	Construction of	546.4	
	(i) underground storage tank and pump house	505.9	
	(ii) twin-cell box culvert	34.2	
	(iii) associated works as mentioned in paragraph 3 (d)	6.3	
(b)	E&M works	86.0	
(c)	Reprovision of the sport pitches surface and landscaping works	67.0	
(d)	Environmental mitigation measures	15.5	
(e)	Contingencies	71.4	
	Sub-total	786.3	(in September 2010 prices)
(f)	Provision for price adjustment	279.5	
	Total	1,065.8	(in MOD prices)

11. The above cost does not include the works to be funded and constructed by HKJC as mentioned in paragraph 4 above.

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

Year	\$ million (Sept 2010)	Price adjustment factor	\$ million (MOD)
2011 – 2012	3.0	1.04525	3.1
2012 – 2013	56.5	1.10143	62.2
2013 – 2014	57.0	1.16201	66.2
2014 – 2015	85.5	1.22592	104.8
2015 – 2016	152.1	1.29335	196.7
2016 – 2017	148.7	1.36448	202.9
2017 – 2018	106.8	1.43953	153.7
2018 – 2019	82.2	1.51870	124.8
2019 – 2020	94.5	1.60223	151.4
	786.3		1,065.8

13. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2011 to 2020. We will deliver the works under re-measurement contracts because of the uncertain underground conditions that may affect the quantities of works. The contract will provide for price adjustments.

14. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$3.9 million of which \$46,600 comes from diversion of sewers⁶.

/PUBLIC

⁶ Based on the current level of expenditure on operation and day-to-day maintenance of sewerage facilities, the increase in the recurrent cost of providing sewage services is immaterial. Nevertheless, the recurrent expenditure will be taken into consideration when determining the sewage charges and trade effluent surcharge rates in future.

PUBLIC CONSULTATION

15. On 7 December 2010 and 18 January 2011, we consulted the District Works and Facilities Management Committee of Wan Chai District Council (WCDC) and WCDC respectively on the project. In response to a few members' concerns about the need and urgency of the project and the likely adverse traffic impact during construction, we explained that the project would be implemented immediately so that Happy Valley and adjacent areas could be provided with adequate protection against serious flooding as early as possible. We also affirmed that effective mitigation measures would be put in place to ensure that construction traffic impact would be kept to a minimum. WCDC supported the implementation of the project and passed a motion⁷ that the project be implemented as early as possible.

16. Despite the support of WCDC, some members requested further briefing to the local residents. In response, DSD conducted a series of briefing sessions for members of the public and Area Committees of Wan Chai district in May 2011. At these meetings, apart from collecting views from the public on the project, we also took the opportunity to explain to them the need for the project and to assure them that detailed mitigation measures would be adopted to minimise the impacts arising from the construction. Besides the environmental mitigation measures mentioned in paragraphs 20 to 22, we will require the contractor to install a fully enclosed conveying belt system at the work sites for carrying construction waste from the work locations to the designated unloading point (also fully enclosed) where waste will be transported away by well-covered dump trucks to minimise noise and dust nuisance to public. We will also take extra effort to minimise the traffic impacts as mentioned in paragraphs 26 and 27. The Scheme received support from the majority of the Area Committee members.

17. In January 2011, we consulted HKJC and major users of the sport pitches concerned, namely the Hong Kong Football Association and Hong Kong Rugby Football Union, on the project and the programme of temporary closure of sport pitches during construction stage of the Scheme. All of them welcomed and supported the project, and agreed to the proposed closure programme.

18. We consulted the Legislative Council Panel on Development (the Panel) on the proposed Scheme at its meeting held on 20 April 2011. Members raised no objection to the proposed works. As regards Members' request for further information including details of the storage tank and its serving areas, measures to minimise construction waste and disruptions, and traffic impacts caused by construction works, an information paper was submitted to the Panel on 17 May 2011.

/ENVIRONMENTAL

⁷ The motion was supported by nine members and objected by three members. Two members abstained.

ENVIRONMENTAL IMPLICATIONS

19. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have completed a preliminary environmental review which concluded that the project will not cause long-term environmental impact. We have included in paragraph 10(d) above a sum of \$15.5 million (in September 2010 prices) in the project estimates for implementing suitable mitigation measures to control short-term environmental impacts.

20. During construction, we will control noise, dust and site run-off nuisances to within established standards and guidelines through the implementation of mitigation measures in the relevant contract. These include the use of temporary noise barriers, quieter construction equipment and frequent cleaning and watering of the site. We will also arrange regular meetings with the Area Committees and local residents to discuss and review the mitigation measures implemented on site in addressing their concerns on the potential environmental impact of this project to the vicinity.

21. At the planning and design stages, we have considered ways to optimise the size and shape of the proposed underground drainage works in order to reduce the generation of construction waste while achieving the planned flood protection performance. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities⁸. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

22. At the construction stage, we will require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

/23.

⁸ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

23. We estimate that the project will generate in total about 430 240 tonnes of construction waste. Of these, we will reuse about 33 200 tonnes (7.7%) of inert construction waste on site and deliver 386 200 tonnes (89.8%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 10 840 tonnes (2.5%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill sites is estimated to be \$11.8 million for this project (based on a unit cost of \$27 per tonne for disposal at public fill reception facilities and \$125 per tonne⁹ at landfills).

HERITAGE IMPLICATIONS

24. There is no existing or proposed historic building partly or wholly within the site areas of the project. However, the City of Victoria Boundary Stone (which is the Government Historic Site) and St. Paul's Primary Catholic School (which is a grade 2¹⁰ historic building) are located within 50 m of the project site boundary. We have consulted Antiquities and Monuments Office (AMO) who confirmed that a Heritage Impact Assessment is not required for this project. Nevertheless, we will incorporate protective measures and monitoring system to minimise disturbance to the adjacent historic structures during the course of the works. We will require the contractor to submit the design and method statement for precautionary measures on protection of these historic structures to AMO for comment before construction. We will also inform AMO of the condition of the historic structures before and after the works.

25. The then Wong Nai Chung Village in Happy Valley was one of the few early villages on Hong Kong Island. As the site is located close to Wong Nai Chung Village and that the archaeological value of the village had not been examined during the development of racecourse, an archaeological impact assessment (AIA) in accordance with Guidelines for Cultural Heritage Impact Assessment has been conducted to ascertain the archaeological impact of the works. The AIA concluded that the site area is considered to have low archaeological potential. Pursuant to the Antiquities and Monuments Ordinance, we will inform AMO immediately in case of discovery of antiquities or supposed antiquities while carrying out excavation.

/TRAFFIC

⁹ 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 per m³), nor the cost to provide new landfills (which is likely to be more expensive), when the existing ones are filled.

¹⁰ Grade 2 historic buildings are those of special merit in Hong Kong. Efforts should be made to selectively preserve these buildings.

TRAFFIC IMPLICATIONS

26. We have completed a traffic impact assessment (TIA) for the Scheme. The TIA study has taken into account the forecast traffic condition in Happy Valley during the construction period known at the time of the study, and concluded that the estimated maximum number of 15 dump trucks per hour during the peak construction period will generate no adverse traffic impact. To respond to public concerns and further minimise possible disruption to existing traffic at Wong Nai Chung Road during construction, we have recommended in the TIA that disposal of construction waste will only be allowed during non-peak hours (i.e. 09:30 to 17:00 in weekdays and 08:00 to 12:00 on Saturdays). We will maintain all existing vehicular entry and exit points, pedestrian routes and pedestrian crossing facilities, and will also design temporary traffic arrangements in compliance with required standards.

27. During the construction period, we will establish a Traffic Management Liaison Group to discuss, scrutinise and review the proposed temporary traffic arrangements. We will maintain close contact with the Transport Department, various public transport operators, the Hong Kong Police Force and relevant government departments to review the situation so as to minimise any disruption. We will also closely liaise with the Area Committees and local residents to hear their views on the temporary traffic arrangement and mitigation measures during the regular meetings.

LAND ACQUISITION

28. The proposed works do not require any land acquisition.

BACKGROUND INFORMATION

29. In October 2009, we upgraded **160CD** to Category B.

30. In July 2010, we engaged contractors to undertake site investigation works, which was completed in February 2011. Since September 2010, we employed consultants to undertake tree survey, traffic impact assessment, architectural and landscape design. The consultancy works are being carried out by phases. The estimated cost of the site investigation and consultancy agreements is \$6.8 million in MOD prices. We charged this amount to block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme".

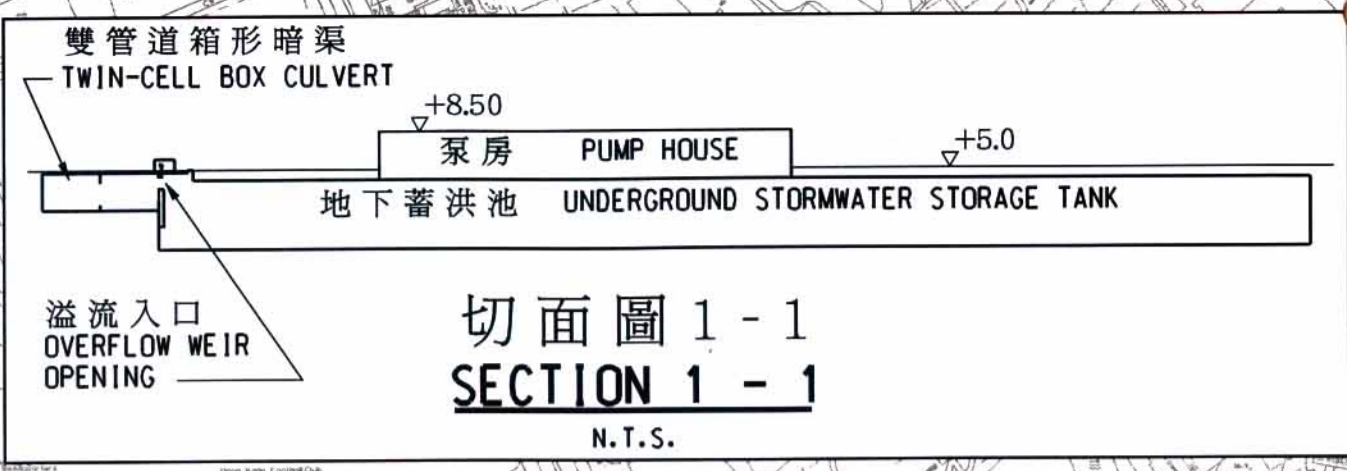
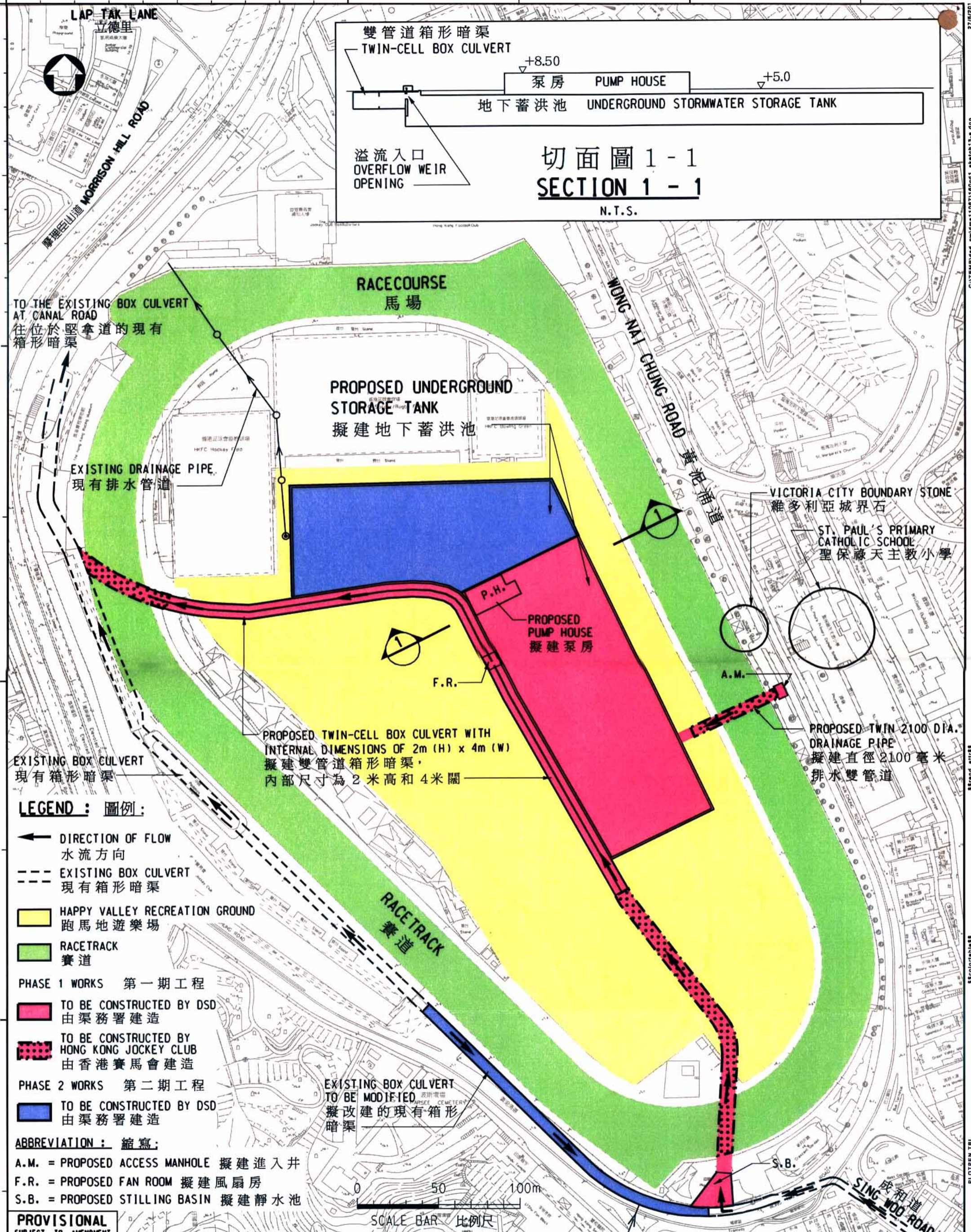
31. Of the 81 trees within the project boundary, 77 trees will be preserved. The proposed works will involve transplantation of four trees within the site. All trees to be transplanted are not important trees¹¹.

32. We estimate that the proposed works will create about 270 jobs (240 for labourers and another 30 for professional/technical staff), providing a total employment of 14 500 man-months.

Development Bureau
June 2011

¹¹ An “important tree” refers to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –

- (a) trees of 100 years old or above;
- (b) trees of cultural, historical or memorable significance e.g. Fung Shui tree, tree as landmark of monastery or heritage monument, and trees in memory of an important person or event;
- (c) trees of precious or rare species;
- (d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
- (e) trees with trunk diameter equal or exceeding 1.0 metre (m) (measured at 1.3 m above ground level), or with height/canopy spread equal or exceeding 25 m.



LEGEND : 圖例:

- ← DIRECTION OF FLOW
水流方向
- EXISTING BOX CULVERT
現有箱形暗渠
- HAPPY VALLEY RECREATION GROUND
跑馬地遊樂場
- RACETRACK
賽道
- PHASE 1 WORKS 第一期工程
 - TO BE CONSTRUCTED BY DSD
由渠務署建造
 - TO BE CONSTRUCTED BY HONG KONG JOCKEY CLUB
由香港賽馬會建造
- PHASE 2 WORKS 第二期工程
 - TO BE CONSTRUCTED BY DSD
由渠務署建造
- ABBREVIATION : 縮寫:
 - A.M. = PROPOSED ACCESS MANHOLE 擬建進入井
 - F.R. = PROPOSED FAN ROOM 擬建風扇房
 - S.B. = PROPOSED STILLING BASIN 擬建靜水池

EXISTING BOX CULVERT TO BE MODIFIED
擬改建的現有箱形暗渠

SCALE BAR 比例尺

PROVISIONAL
SUBJECT TO AMENDMENT

圖則名稱 drawing title
工務計劃項目第160CD號跑馬地地下蓄洪計劃 - 工程施工安排
PWP ITEM NO. 160CD HAPPY VALLEY
UNDERGROUND STORMWATER STORAGE SCHEME
- CONSTRUCTION PROGRAMME

繪畫 drawn	C. K. WONG	日期 date	23.02.11
核對 checked	Y. H. LEUNG	日期 date	23.02.11
批核 approved	Y. H. LEUNG	日期 date	23.02.11
部門 office	排水工程 部 DRAINAGE PROJECTS DIVISION		

圖則編號 drawing no.	比例 scale
160CD-SK-13A	N.T.S.
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