

**For discussion
on 27 February 2012**

**Legislative Council
Panel on Environmental Affairs**

339DS — North District sewerage, stage 1 phase 2C and stage 2 phase 1

353DS — Outlying Islands sewerage, stage 2 — upgrading of Mui Wo village sewerage phase 2 and Mui Wo sewage treatment works

PURPOSE

This paper seeks Members' support for our proposals to —

- (a) upgrade part of **339DS — North District sewerage, stage 1 phase 2C and stage 2 phase 1** to Category A at an estimated cost of \$317.0 million; and
- (b) upgrade part of **353DS — Outlying Islands sewerage, stage 2 — upgrading of Mui Wo village sewerage phase 2 and Mui Wo sewage treatment works** to Category A at an estimated cost of \$967.7 million

in money-of-the-day (MOD) prices.

PROJECT SCOPE

339DS — North District sewerage, stage 1 phase 2C and stage 2 phase 1

2. The part of **339DS** that we propose to upgrade to Category A comprises the construction of —

- (a) about 11 kilometres (km) of sewers for three unsewered areas, namely Kau Lung Hang Lo Wai, Kau Lung Hang San Wai and Tai Hang;
- (b) about 1.5 km of gravity trunk sewers along Tai Wo Service Road West;
- (c) one sewage pumping station (SPS) at Tai Hang;

- (d) about 125 metres (m) of twin rising mains in association with construction of the SPS in (c) above; and
- (e) ancillary works.

————— A site plan showing the proposed works is at **Enclosure 1**.

353DS — Outlying Islands sewerage, stage 2 — upgrading of Mui Wo village sewerage phase 2 and Mui Wo sewage treatment works

3. The part of **353DS** that we propose to upgrade to Category A comprises —

- (a) upgrading of the existing Mui Wo sewage treatment works (STW) to a capacity of 3 700 cubic metres (m³) per day;
- (b) construction of about 2.9 km of sewers for two unsewered areas, namely Wang Tong and Yue Kwong Chuen;
- (c) upgrading of about 2.0 km of existing gravity trunk sewers in Mui Wo town centre; and
- (d) ancillary works.

————— A site plan showing the proposed works is at **Enclosure 2**.

JUSTIFICATIONS

339DS — North District sewerage, stage 1 phase 2C and stage 2 phase 1

4. At present, sewage from the village areas in Kau Lung Hang is often treated and disposed of by means of private on-site treatment facilities (such as septic tanks and soakaway (STS) systems). These facilities are however often ineffective in removing pollutants due to their proximity to watercourses¹ or inadequate maintenance. Sewage from these areas has therefore been identified as a source of water pollution to Ng Tung River as well as the receiving waters of Deep Bay.

5. The aforesaid situation will persist unless sewerage infrastructure is made available to collect and treat sewage from these areas properly. The

¹ STS systems operate by allowing the effluent to percolate through gravels whereby pollutants are removed in a natural manner. However, if a STS system is located in an area where the ground water table is high, such as an area in proximity to watercourses, it will not function properly due to ineffective percolation.

Environmental Protection Department (EPD) has formulated as a long-term measure a programme under the North District Sewerage Master Plan (SMP) to provide public sewerage in Kau Lung Hang. The programme is being implemented in phases. Under **366DS — Kau Lung Hang sewerage — trunk sewers, pumping station and rising mains**, construction of the gravity trunk sewers bridging Fanling and Kau Lung Hang is in progress for completion in the second half of 2012; whereas under **375DS — Sewerage in Ping Kong, Fu Tei Pai and Tai Wo**, sewerage improvement works in Tai Wo have also commenced for completion by November 2015. Relevant parts of the two works projects are also shown in the site plan at **Enclosure 1** for reference.

6. We now propose to take forward the village sewerage works in Kau Lung Hang Lo Wai, Kau Lung Hang San Wai and Tai Hang by upgrading part of **339DS** to Category A. Specifically, the proposed works comprise the laying of about 11 km of sewers within the three unsewered areas and about 1.5 km of gravity trunk sewers along Tai Wo Service Road West² for collection and subsequent onward conveyance of the sewage generated within these areas. We also propose to construct one SPS and about 125 m of twin rising mains at Tai Hang to provide sufficient hydraulic gradient for overcoming the topographical constraints along the proposed sewer alignment.

7. Upon completion of the proposed works under **339DS** and the adjacent sewer segments being laid under **366DS** and **375DS**, sewage collected from the three areas concerned will be diverted away to the Shek Wui Hui STW for proper treatment and disposal. This will minimise the release of pollutants into the environment and bring about sustainable improvement to the water quality of Ng Tung River and Deep Bay.

8. Subject to funding approval of the Finance Committee (FC), Drainage Services Department (DSD) plans to commence construction of the proposed works under **339DS** in the second quarter of 2012 for completion by December 2016³. We will retain the remainder of **339DS** in Category B, which involves laying of about 28.9 km of sewers in 16 other unsewered areas

² The proposed works along Tai Wo Service Road West described in paragraph 2(b) above fall within the project boundaries of **720TH — Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling** and **13GB — Liantang/Heung Yuen Wai Boundary Control Point and associated works** which the Highways Department (HyD) and the Civil Engineering and Development Department (CEDD) intend to seek funding support for the remaining part of **720TH** and part of **13GB** respectively in mid-2012. In order to avoid repeated road openings and any interface problems that may arise from multiple contractors working on the same site, construction of the corresponding gravity trunk sewer segments under **339DS** will be entrusted to HyD or CEDD for implementation in conjunction with the roadworks under the two aforesaid works projects.

³ Subject to funding approval of the FC for the remaining part of **720TH** and part of **13GB**, the entrustment works for implementation under these two projects are also expected to be completed by around the same time.

in North District and Tai Po. Funding for the remainder will be sought at a later stage after completion of the design and preparatory work.

353DS — Outlying Islands sewerage, stage 2 — upgrading of Mui Wo village sewerage phase 2 and Mui Wo sewage treatment works

9. The existing service area of the public sewerage in Mui Wo is limited to the town centre, Chung Hau and the coastal area of Silver Mine Bay up to Tung Wan Tau. Other village areas in the hinterland are unsewered and residents often have to rely on private on-site treatment facilities for disposal of their domestic sewage. Similar to the situation in Kau Lung Hang, sewage from these unsewered areas has been identified as a source of pollution to nearby streams, as well as the receiving waters of Silver Mine Bay. The discharge also affects the water quality of the Silver Mine Bay Beach.

10. In view of the above, public sewerage should be made available at these unsewered areas as a long-term measure to better protect the water quality of Silver Mine Bay. EPD has thus formulated a programme under the Outlying Islands SMP to expand the sewerage infrastructure in Mui Wo in phases. We are now ready to take forward under the present project the first phase of expansion, which involves the laying of 2.9 km of sewers in Wang Tong and Yue Kwong Chuen. Sewage from these two areas will be collected and conveyed to the Mui Wo STW for proper treatment and disposal upon completion of the village sewerage works proposed above.

11. The sewerage infrastructure in Mui Wo was built in the late 1980s to handle sewage from its existing service area. In other words, both the Mui Wo STW and the gravity trunk sewers in the town centre do not possess spare capacity to cope with additional sewage flow from the areas to be sewered under our current programme. In addition, the volume of sewage is also expected to increase in the longer term in tandem with the projected population growth in Mui Wo and visitor-driven expansion of commercial activities. The expansion of village sewerage in Mui Wo should therefore be complemented by comprehensive upgrading of the existing sewerage infrastructure.

12. In drawing up the specifications of the proposed upgrading works, our objective is to ensure that the sewerage infrastructure in Mui Wo will be capable of supporting not only the proposed expansion of village sewerage but also the long-term potential sewerage need of the entire service area⁴. The

⁴ The design capacity of the proposed upgrading works is based on a projected residential population of 8 250 for Mui Wo (inclusive of all areas to be sewered under the full scope of **353DS**) by 2031. The

proposed upgrading works comprise the replacement of about 2.0 km of existing gravity trunk sewers in the town centre by larger pipes along the same alignment. The Mui Wo STW, which employs secondary treatment with disinfection facilities, is also proposed to be expanded from its current daily capacity of 1 190 m³ to a future design daily capacity of 3 700 m³. With the increase in plant scale, the existing Oxidation Ditch⁵ in the STW will be replaced by a Membrane Bioreactor System⁶ with a view to optimising space requirement and treatment efficiency. The quality of treated effluent will be subject to the same standard for secondary treatment being applied to the existing Mui Wo STW⁷. The opportunity is taken to fit the STW with deodourising facilities to minimise potential odour nuisances to the neighbourhood. Greening and landscaping works will also be carried out for the STW to blend in with the surrounding environment.

13. Subject to funding approval of the FC, DSD plans to commence construction of the proposed works under **353DS** in June 2012 for completion in August 2017. We will retain the remainder of **353DS** in Category B, which involves laying of about 7.4 km of sewers in ten other unsewered areas in Mui Wo. Funding for the remainder will be sought at a later stage after completion of the design and preparatory work.

FINANCIAL IMPLICATIONS

14. We estimate the capital cost of the proposed works under **339DS** and **353DS** to be \$1,284.7 million in MOD prices made up as follows —

projected growth in visitor numbers to be brought about by the Mui Wo Facelift project proposed under the Revised Concept Plan for Lantau has also been taken into account.

⁵ An Oxidation Ditch consists of a ring-shaped channel equipped with mechanical aeration and mixing devices. After undergoing screening and degritting procedures, the effluent is combined with the suspended activated sludge in the channel for biological treatment.

⁶ In a Membrane Bioreactor System, the effluent is also treated by means of mixing with activated sludge. However, comparing with an Oxidation Ditch, a Membrane Bioreactor System supports the use of more concentrated activated sludge for attaining an expedited aeration process. The subsequent separation of effluent and solids is also carried out more efficiently with the use of highly specialised membranes. It will thus require less space to treat each unit volume of sewage as a result.

⁷ At present, the treated effluent from Mui Wo STW shall consist of not more than 30 milligrams per litre (mg/L) of Total Suspended Solids and not more than 20 mg/L of Biochemical Oxygen Demand.

	\$ million (MOD)
(a) 339DS — North District sewerage, stage 1 phase 2C and stage 2 phase 1 (<i>part</i>)	317.0 ⁸
(b) 353DS — Outlying Islands sewerage, stage 2 – upgrading of Mui Wo village sewerage phase 2 and Mui Wo sewage treatment works (<i>part</i>)	967.7
Total	1,284.7

15. We estimate that implementation of the proposed works under **339DS** and **353DS** will create a total of 83 jobs (67 for labourers and another 16 for professional / technical staff) and 176 jobs (142 for labourers and another 34 for professional / technical staff) respectively, providing a total employment of 12 240 man-months. The detailed breakdown is as follows —

PWP item no.	(A) Number of jobs to be created for labourers	(B) professional / technical staff	(A) + (B) Total number of jobs created	(C) Employment in man-months
339DS (<i>part</i>)	67	16	83	3 900
353DS (<i>part</i>)	142	34	176	8 340
Total	209	50	259	12 240

PUBLIC CONSULTATION

339DS — North District sewerage, stage 1 phase 2C and stage 2 phase 1

16. We consulted Tai Po Rural Committee on 11 May 2007 and the

⁸ This figure has incorporated the capital costs of the entrustment works for implementation under **720TH** and **13GB**, which are estimated to be \$48.8 million and \$6.2 million in MOD prices respectively.

Environment, Housing and Works Committee under Tai Po District Council on 14 September 2007. Both Committees supported the proposed works under **339DS**.

17. We gazetted the proposed works in accordance with the Water Pollution Control (Sewerage) Regulation (WPC(S)R) under three schemes between June 2009 and October 2011. No objection was received on the proposed gravity trunk sewer along Tai Wo Services Road West and the scheme was subsequently authorised in November 2011. For the other two schemes that cover the proposed sewerage works in (i) Kau Lung Hang Lo Wai and Kau Lung Hang San Wai and (ii) Tai Hang, 27 and 11 objections to the original gazette were received respectively on land resumption and sewer alignment issues. Regarding (i), we met with the objectors and prepared a total of three amendment schemes between February 2010 and August 2011 in response to their concerns. Upon gazettal of the third amendment schemes, all the objectors have withdrawn their objections (including eight and five further objections to the first and second amendment schemes respectively) unconditionally. As regards (ii), the objectors have subsequently withdrawn their objections unconditionally after several meetings with them and upon gazettal of an amendment scheme. One objection to the amendment scheme was also received but it was subsequently withdrawn unconditionally. As all the objections have been resolved, the Director of Environmental Protection (DEP) authorised the proposed works in Kau Lung Hang San Wai and Kau Lung Hang Lo Wai in October 2011 and those in Tai Hang in December 2011.

353DS — Outlying Islands sewerage, stage 2 — upgrading of Mui Wo village sewerage phase 2 and Mui Wo sewage treatment works

18. We consulted Mui Wo Rural Committee on 6 May 2008 and 9 October 2008 as well as the Tourism, Agriculture, Fisheries and Environmental Hygiene Committee under the Islands District Council on 19 January 2009. Both Committees supported the proposed works under **353DS**.

19. We gazetted the proposed works in Wang Tong and Yue Kwong Chuen in accordance with the WPC(S)R in August 2009 under a single scheme and received three objections about the proposed land resumption area. After several meetings with the objectors and considering their grounds of objections, we slightly adjusted the scheme boundary and all the objectors have withdrawn their objections unconditionally upon gazettal of the amendment scheme. As all the objections have been resolved, DEP authorised the proposed works in March 2011.

HERITAGE IMPLICATIONS

339DS — North District sewerage, stage 1 phase 2C and stage 2 phase 1

20. The proposed works under **339DS** will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interest and Government historic sites identified by the Antiquities and Monuments Office.

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21. The Mang Tong Site of Archaeological Interest will be affected by the proposed village sewerage works at Wang Tong under **353DS**. In this regard, DSD conducted both Preliminary Environmental Review and Cultural Heritage Impact Assessment for the proposed works, in which mitigation measure in the form of an archaeological watching brief to be conducted by a qualified archaeologist during the construction phase was recommended. DSD will implement the recommended mitigation measure accordingly. In addition, since the Yuen's Mansion and associated buildings (Grade 2 Historic Buildings) are located in the vicinity of the works area, adequate mitigation measures will also be implemented to ensure no adverse impact on these historic buildings during the construction phase.

LAND ACQUISITION

22. We have to resume a total of 240 private agricultural lots (about 10 961 square metres (m²)) for carrying out the proposed sewerage improvement works — 218 (about 9 511 m²) under **339DS** and 22 (about 1 449 m²) under **353DS**. The land resumption and clearance will not affect any households or structures.

ENVIRONMENTAL IMPLICATIONS

23. The proposed works under **339DS** and **353DS** are not designated projects under the Environmental Impact Assessment Ordinance (Cap. 499). We have completed the Environmental Reviews that cover the proposed works under **339DS** and **353DS** in September 2008 and February 2010 respectively. It was concluded that the proposed works would not have long-term adverse environmental impacts upon implementation of appropriate mitigation measures.

24. For short-term environmental impacts during construction, we will control noise, dust and site run-off to levels within the established standards and guidelines through implementation of environmental mitigation measures, such as the use of silenced construction equipment and noise barriers to reduce noise generation, water-spraying to reduce emission of fugitive dust, and proper treatment of site run-off before discharge. We will also carry out regular site inspections to ensure that these recommended mitigation measures and good site practices will be properly implemented on site. We have included sums of \$3.6 million and \$5.6 million (in September 2011 prices) in the project estimates of the proposed works under **339DS** and **353DS** respectively for implementing these environmental mitigation measures.

25. At the planning and design stages, we have considered ways to reduce the generation of construction waste where possible. For example, in addition to the need for meeting hydraulic and traffic requirements, we have also designed the alignment of the proposed sewerage works in such a manner that excavation and demolition of existing structures will be minimised. In addition, we will require the contractors 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 facilities (PFRF)⁹. We will encourage the contractors to maximise the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further minimise the generation of construction waste.

26. At the construction stage, we will require the contractors 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 contractors 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 PFRF and landfills respectively through a trip-ticket system.

27. We estimate that the proposed works will generate about 195 446 tonnes of construction waste in total (110 646 tonnes and 84 800 tonnes for the proposed works under **339DS** and **353DS** respectively). Of these, we will reuse 92 120 tonnes (47%) of the inert construction waste on site and deliver

⁹ PFRF are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in PFRF requires a licence issued by the Director of Civil Engineering and Development.

another 89 723 tonnes (46%) to PFRF for subsequent reuse. We will dispose of the remaining 13 604 tonnes (7%) of non-inert construction waste at landfills. The total cost of accommodating construction waste at PFRF and landfill sites is estimated to be about \$1.88 million and \$2.2 million for the proposed works under **339DS** and **353DS** respectively (based on a unit cost of \$27 per tonne for disposal at PFRF and \$125 per tonne¹⁰ at landfills).











ADVICE SOUGHT

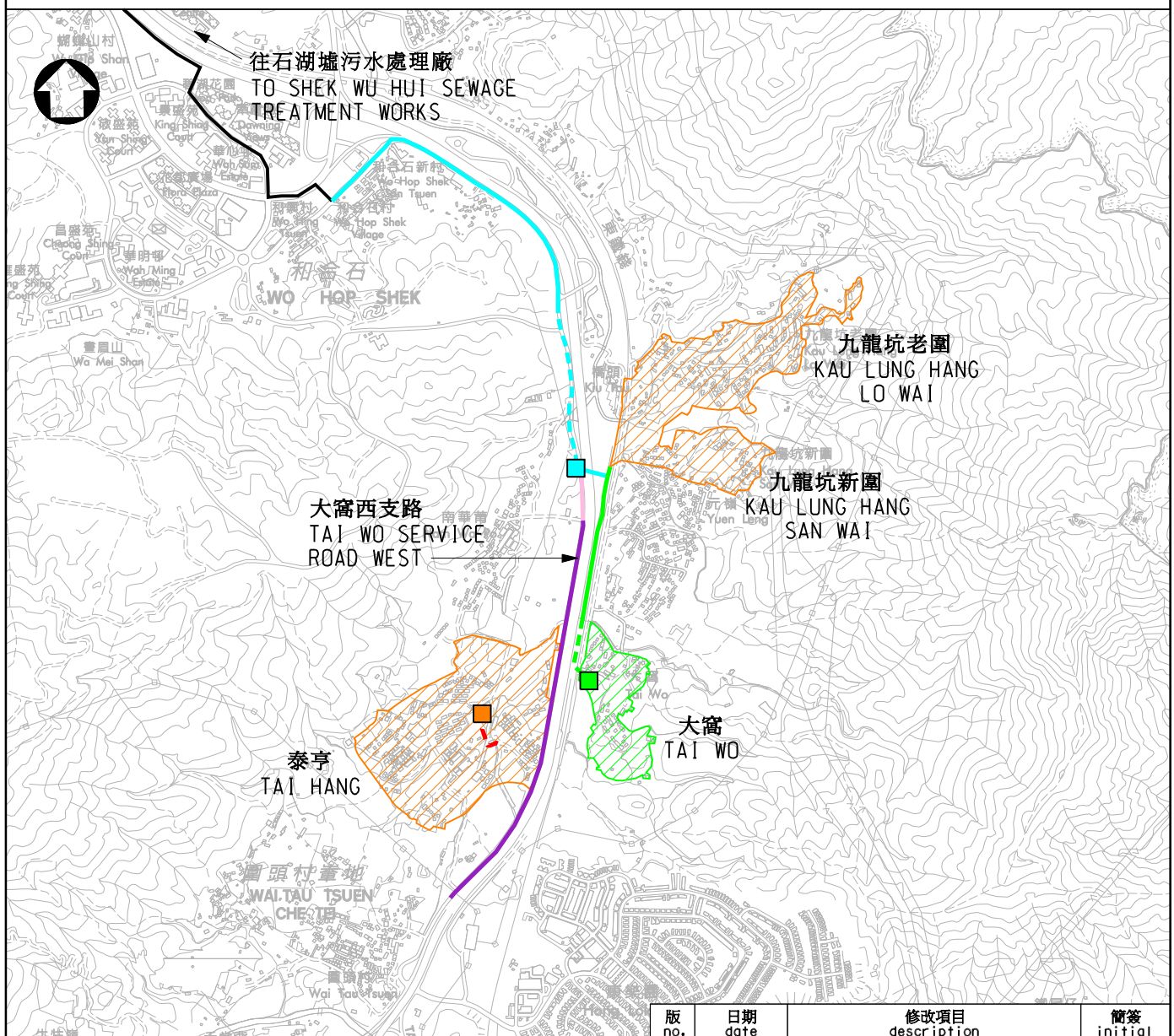
28. Members are invited to support our proposals for upgrading the proposed works under **339DS** and **353DS** to Category A. Subject to Members' advice, we plan to submit our proposals for endorsement by the Public Works Subcommittee in April 2012 with a view to seeking FC's funding approval in May 2012.


Environmental Protection Department
Drainage Services Department
February 2012

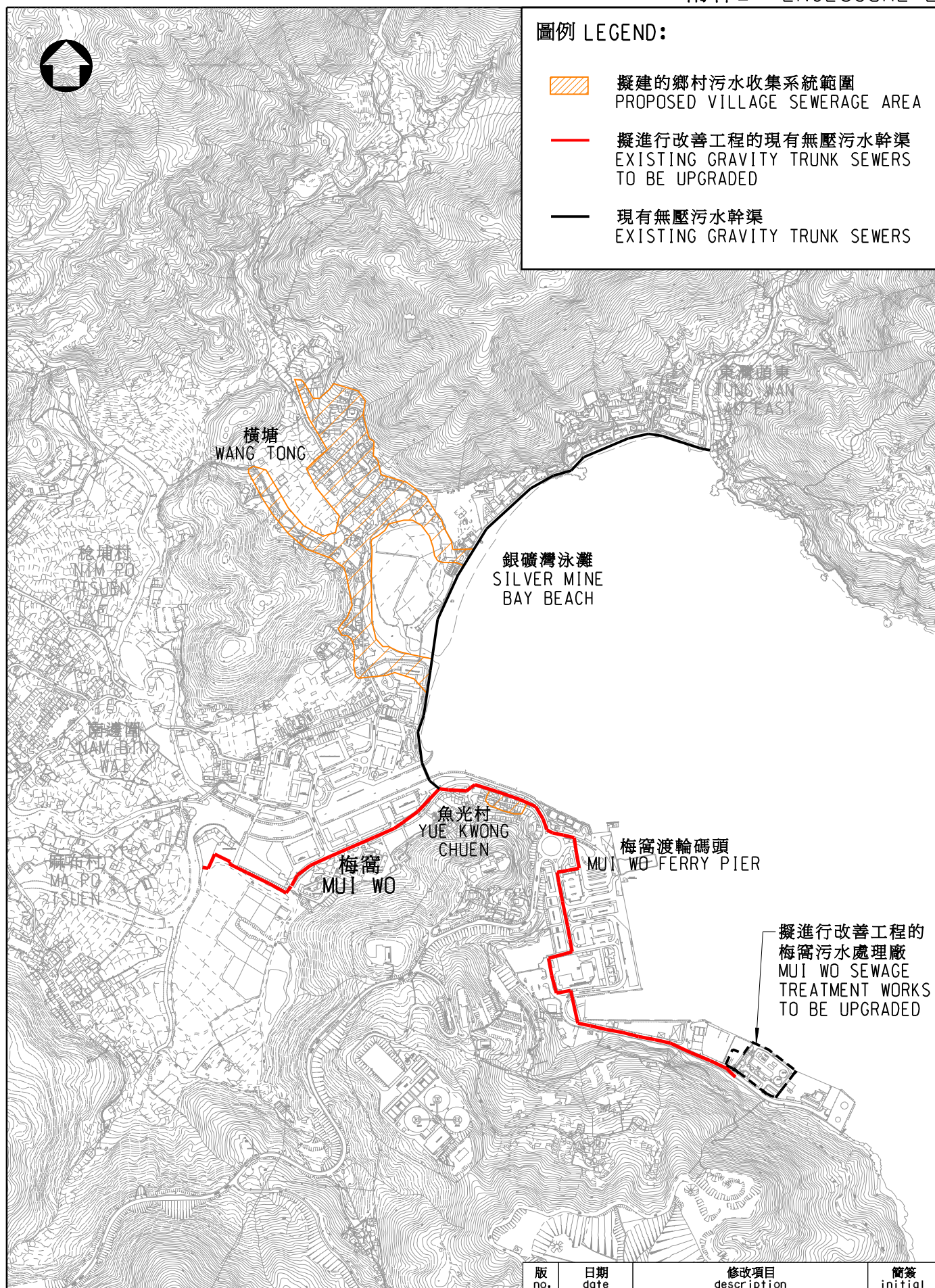
¹⁰ The estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90 per m³), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.


LEGEND:

- | 建造中相關工程 (項目375DS)
RELATED WORKS UNDER CONSTRUCTION
(ITEM 375DS) | | 建造中相關工程 (項目366DS)
RELATED WORKS UNDER CONSTRUCTION
(ITEM 366DS) | |
|---|---|---|--|
|  | 擬建的鄉村污水收集系統範圍
PROPOSED VILLAGE SEWERAGE AREA |  | 大窩鄉村污水收集系統範圍
TAI WO VILLAGE SEWERAGE AREA |
|  | 擬建的泰亨污水泵房
PROPOSED TAI HANG SEWAGE PUMPING STATION |  | 南華莆污水泵房
NAM WA PO SEWAGE PUMPING STATION |
|  | 擬建的加壓污水管
PROPOSED RISING MAINS |  | 無壓污水幹渠
GRAVITY TRUNK SEWERS |
|  | 擬委託土木工程拓展署13GB項目
下敷設的無壓污水幹渠
PROPOSED GRAVITY TRUNK SEWERS TO
BE ENTRUSTED TO CIVIL ENGINEERING
AND DEVELOPMENT DEPARTMENT UNDER
13GB |  | 加壓污水管
RISING MAINS |
|  | 擬委託路政署720TH項目下敷設
的無壓污水幹渠
PROPOSED GRAVITY TRUNK SEWERS TO
BE ENTRUSTED TO HIGHWAYS
DEPARTMENT UNDER 720TH | | |
|  | 現有的無壓污水幹渠
EXISTING GRAVITY TRUNK SEWERS | | |



圖則名稱 drawing title 工務計劃項目第339DS號 - 北區污水收集系統第2階段第1期 PWP ITEM No. 339DS - NORTH DISTRICT SEWERAGE, STAGE 2 PHASE 1	繪畫 drawn	W. Y. HUI	日期 date	28 DEC 2011	圖則編號 drawing no.	DCM/2011/166	比例 scale	N.T.S.
	核對 checked	S. C. WONG	日期 date	28 DEC 2011				
	批核 approved	H. L. WONG	日期 date	28 DEC 2011	保留版權 COPYRIGHT RESERVED			
	部門 office 顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION				 香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION			



版 no.		日期 date	修改項目 description	簡簽 initial
圖則名稱 drawing title		日期 date	圖則編號 drawing no.	比例 scale
工務計劃項目第353DS號		28 DEC 2011	DCM/2011/167	N.T.S.
-離島污水收集系統第2階段 梅窩鄉村污水收集系統第2期及梅窩污水處理廠改善工程		日期 date	保留版權 COPYRIGHT RESERVED	
PWP ITEM No.353DS		28 DEC 2011	 香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION	
-OUTLYING ISLANDS SEWERAGE STAGE 2		日期 date		
-UPGRADING OF MUI WO VILLAGE SEWERAGE PHASE 2 AND MUI WO SEWAGE TREATMENT WORKS		28 DEC 2011		
部門 office				
繪畫 drawn		W. Y. HUI		
核對 checked		W. M. LEUNG		
批核 approved		W. Y. CHAN		
顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION				