For discussion on 28 April 2014

Legislative Council Panel on Environmental Affairs

160DS — Tuen Mun sewerage, stage 1

346DS — Upgrading of Tuen Mun sewerage, phase 1

388DS — Shek Wu Hui sewage treatment works — further expansion phase 1A

PURPOSE

This paper seeks Members' support for our proposals to —

- (*a*) upgrade part of **160DS Tuen Mun sewerage, stage 1** to Category A at an estimated cost of \$281.5 million;
- (b) upgrade part of 346DS Upgrading of Tuen Mun sewerage, phase 1 to Category A at an estimated cost of \$431.0 million; and
- (c) upgrade part of 388DS —Shek Wu Hui sewage treatment works — further expansion phase 1A to Category A at an estimated cost of \$481.6 million.

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

PROJECT SCOPE

160DS — Tuen Mun sewerage, stage 1

2. The part of **160DS** that we propose to upgrade to Category A comprises the construction of —

- (a) about 3.7 kilometres (km) of sewers for three unsewered areas, namely Kei Lun Wai, Yeung Siu Hang and Lam Tei;
- (*b*) one sewage pumping station (SPS) at Lok Chui Street;
- (c) about 720 metres (m) of twin rising mains along Castle Peak Road – Tai Lam in association with construction of the SPS in (b) above;

- (d) about 200 m of branch sewers along Lok Yi Street and Lok Chui Street ; and
- (*e*) ancillary works.

346DS — Upgrading of Tuen Mun sewerage, phase 1

3. The part of **346DS** that we propose to upgrade to Category A comprises the construction of —

- (a) about 5.4 km of sewers for four unsewered areas, namely Tsing Shan Tsuen, Tseng Tau Sheung Tsuen, Fuk Hang Tsuen (Upper) and Fu Tei Ha Tsuen;
- (b) two SPSs at Siu Lam Psychiatric Centre and Fu Tei Ha Tsuen respectively;
- (c) about 600 m of twin rising mains in association with construction of the SPSs in (b) above;
- (*d*) about 2.8 km of gravity trunk sewers within Siu Lam area connecting to the Lok Chui Street SPS; and
- (*e*) ancillary works.

A site plan showing the proposed works for both **160DS** and **346DS** is at **Enclosure 1**.

388DS —Shek Wu Hui sewage treatment works — further expansion phase 1A

4. The part of **388DS** that we propose to upgrade to Category A comprises :

- (a) the construction of the advance works in Shek Wu Hui sewage treatment works (SWHSTW) further expansion phase 1A that includes
 - (i) the conversion of one existing bioreactor and two existing final sedimentation tanks into one membrane bioreactor to improve their performance and quality of the effluent; and
 - (ii) ancillary works;
- (b) the engagement of consultants for the main works of SWHSTW further expansion phase 1A that includes
 - (i) detailed design of sewage and sludge treatment facilities;
 - (ii) impact assessments on the environment, drainage,

geotechnical, waterworks, traffic and other aspects necessary for detailed design;

- (iii) preparation of tender documents and assessment of tenders;
- (iv) the supervision of site investigation, surveys and laboratory testing in (c) below; and
- (c) the site investigation, surveys and laboratory testing in support of the detailed design work and impact assessments.

A site plan showing the proposed works for **388DS** is at **Enclosure 2**.

JUSTIFICATIONS

160DS — Tuen Mun sewerage, stage 1 346DS — Upgrading of Tuen Mun sewerage, phase 1

5. At present, sewage from the unsewered areas in Kei Lun Wai, Yeung Siu Hang, Lam Tei, Tsing Shan Tsuen¹, Tseng Tau Sheung Tsuen¹, Fuk Hang Tsuen (Upper) and Fu Tei Ha Tsuen (the seven villages) is mostly treated and disposed of by means of private on-site treatment facilities (such as septic tank and soakaway (STS) systems). Such facilities might however be ineffective due to their close proximity to watercourses² and inadequate maintenance³. Sewage from such unsewered areas has been identified as a source of water pollution to the Tuen Mun River Channel and the receiving waters of Urmston Road. The aforesaid situation will persist unless sewerage infrastructure is made available to collect and treat sewage from the areas concerned properly.

6. The existing sewerage network in Tuen Mun is provided eastwards up to So Kwun Wat only. To cope with existing and planned developments in Tuen Mun East, extension of the sewerage infrastructure further eastward for collecting the sewage arising is necessary.

¹ Part of the areas in Tsing Shan Tsuen and Tseng Tau Sheung Tsuen would be provided with sewerage infrastructure under PWP item **371DS** "Sewerage in western Tuen Mun". The related works commenced in December 2009 for completion by December 2015.

STS systems operate by allowing the effluent to percolate through sub-soil whereby pollutants would be removed in a natural manner. However, if the STS system is located in an area where the underground water table is high, such as an area in proximity to watercourses, it will not be able to function properly due to ineffective percolation.

⁵ Inadequate maintenance of STS systems would affect their pollutant removal efficiency and might even lead to overflow of effluent.

7. The Environmental Protection Department (EPD) has formulated a long-term programme under the Tuen Mun Sewerage Master Plan to expand the public sewerage in the Tuen Mun catchment to serve unsewered areas including those mentioned in paragraphs 5 and 6 above.

8. We now propose to upgrade part of **160DS** and **346DS** to Category A for taking forward the proposed sewerage works at the seven unsewered areas and providing the required public sewers to serve the existing and planned developments in Tuen Mun East. Upon completion of the proposed sewerage works, sewage collected from these areas will be conveyed to the Pillar Point Sewage Treatment Works for proper treatment and disposal. It will also minimise the discharge of pollutants into the environment and bring about sustainable improvement to the sanitary condition in the villages and the water quality of the nearby watercourses in Tuen Mun.

9. We plan to submit the funding proposal for the proposed works under **160DS** and **346DS** to the Public Works Subcommittee (PWSC) for support in May 2014 with a view to seeking funding approval of the Finance Committee (FC) in June 2014. Subject to the approval of the FC, the proposed works are expected to commence in October 2014 for completion in December 2018. We will retain the remainder of **160DS** and **346DS** in Category B, which comprises the construction of sewers for seven other unsewered areas and 11 other unsewered areas respectively in Tuen Mun. Funding for the remainder will be sought at a later stage after completion of the design and preparatory work.

388DS — Shek Wu Hui sewage treatment works — further expansion phase 1A

10. The existing sewage treatment capacity of the SWHSTW is 93 000 m³ per day. It provides secondary treatment to sewage collected from Sheung Shui, Fanling and adjacent areas. The SWHSTW is already operating at about 90% of its design capacity, which is expected to be fully utilised by 2018 based on the flow projection derived from the latest planning data and village sewerage programme. The volume of sewage it needs to handle is expected to reach 190 000 m³ per day within 20 years as result of public and private housing developments in the Fanling, Sheung Shui and North East New Territories New Development Areas (NENT NDA) project⁴ and acceleration of the village sewerage

⁴ Subject to funding approval of the FC, the Civil Engineering and Development Department will concurrently implement Phase 1B expansion of the SWHSTW under PWP item no. 7747CL to further upgrade the STW with an additional capacity of 20 000 m³ per day to tertiary treatment level to cater for sewage from the initial phase of the NENT NDA project by 2023 and subsequent

programme in the North District as recommended in the Audit exercise in 2010. There is a need to upgrade the SWHSTW progressively in phases with these development projects.

11. The Drainage Services Department (DSD) has planned to implement the first phase of upgrading of the SWHSTW (Phase 1A) by increasing its capacity by 40 000 m³ per day to 133 000 m³ per day by 2022 to cater for the expected population growth within its catchment. To keep pace with the latest practice/standards, we also plan to further enhance the environmental performance of the SWHSTW by upgrading the sewage treatment standard from secondary to tertiary level to reduce the residual pollution loading of the treated effluent, the implementation of comprehensive odour control/mitigation measures and extensive landscaping works.

12. We now propose to upgrade part of **388DS** to Category A for the construction of the advance works of phase 1A to increase the treatment capacity of the SWHSTW (from the current 93 000 m^3 to 105 000 m^3 per day by 2017) to cater for the sewage treatment demand by then, and for engaging consultants to carry out the detailed design and associated site investigation works for the main works of phase 1A.

13. We plan to submit the funding proposal for the proposed advance works and the engagement of consultants for the main works of phase 1A under **388DS** to the PWSC for support in May 2014 with a view to seeking funding approval of the FC in June 2014. Subject to funding approval of the FC, the proposed advance works are expected to commence in September 2014 for completion in September 2017. The design work of the consultancy study and the associated site investigation works for main works of phase 1A will start from September 2014 and will be completed in stages between 2016 and 2019. We will retain the remainder of **388DS** for the main works in Category B for upgrading of the treatment capacity from 105 000 m³ to 133 000 m³ per day and the environmental enhancement of the SWHSTW⁵. Funding for the remainder will be sought at a later stage after completion of the design and preparatory work.

expansion will be implemented later in phases with the future population intake of the NENT NDA project.

⁵ The environmental enhancement works include the conversion of one existing bioreactors and two final sedimentation tanks into one new membrane bioreactor to improve their performance and quality of effluent; the full enclosure of the membrane tanks complete with deodouriser; and the rebuilding of the inlet works and sludge treatment facilities as fully enclosed and partially sunken buildings complete with deodouriser.

FINANCIAL IMPLICATIONS

14. We estimate the total capital cost of the proposed works under **160DS**, **346DS and 388DS** to be \$1,194.1 million in MOD prices made up as follows —

		\$ million (MOD)
(<i>a</i>)	160DS — Tuen Mun sewerage, stage 1 (<i>part</i>)	281.5
(<i>b</i>)	346DS – Upgrading of Tuen Mun sewerage, phase 1 (<i>part</i>)	431.0
(c)	388DS — Shek Wu Hui sewage treatment works — further expansion phase 1A (<i>part</i>)	481.6

Total 1,194.1

15. We estimate that implementation of the proposed works under **160DS**, **346DS** and **388DS** will create 81 jobs, 126 jobs and 120 jobs respectively, providing a total employment of 11 900 man-months. Detailed breakdown is as follows –

PWP item no.	(A) (B) Number of jobs to be created for		(A)+(B) Total number of	(C) Employment in	
	labourers	professional / technical staff	Jobs created	man-months	
160DS (<i>part</i>)	66	15	81	3 590	
346DS (<i>part</i>)	102	24	126	5 580	
388DS (<i>part</i>)	76	44	120	2 730	
Total	244	83	327	11 900	

PUBLIC CONSULTATION

160DS — Tuen Mun sewerage, stage 1 346DS — Upgrading of Tuen Mun sewerage, phase 1

16. We consulted the Environment, Hygiene and District Development Committee under the Tuen Mun District Council on 17 July 2009, 26 November 2010, 20 July 2012 and 24 January 2014 and obtained its support for the proposed works. We also consulted the Village Representatives of the seven villages and they expressed support to the implementation of the proposed works.

17. We gazetted the proposed sewerage works under **160DS** in accordance with the Water Pollution Control (Sewerage) Regulation under four schemes between January 2012 to November 2013. Except for the scheme covering the proposed village sewerage works at Yeung Siu Hang (the YSH Scheme), we did not receive any objection during the respective statutory objection periods. The Director of Environmental Protection authorised the proposed sewerage works except that at Yeung Siu Hang between November 2013 and February 2014.

18. An objection to the YSH Scheme concerning sewer alignment⁶ was received. We explained to the objector via telephone conversations and an objection hearing meeting to clarify details of the proposed works and associated impacts. The objection remained unresolved, and the Chief Executive in Council authorised the YSH Scheme without modification in April 2014.

19. We gazetted the proposed sewerage works under **346DS** in accordance with the Water Pollution Control (Sewerage) Regulation under three schemes⁷ between January 2013 to December 2013. No objection was received and all the three schemes were subsequently authorised between November 2013 and March 2014.

20. Residents of a private residential estate near Lok Chui Street expressed concerns on the proposed construction works for the sewerage collection system at Lok Chui Street in February 2014. Their concerns included road closure, traffic diversion and construction works impacts during the laying of the sewer as well as possible structural damage to the buildings of the estate. We met the residents in April 2014 and

⁶ The objection was submitted by a local villager claiming the sewer would bring bad luck, affect the "Fung Shui" and health of senior members of the villager's family and suggested the sewer be diverted to other places.

Out of the four unsewered areas under 346DS, the sewerage works in Tseng Tau Sheung Tsuen has been authorised by the DSD as delegated by Secretary for the Environment as minor works.

explained the mitigation measures⁸ that would be included in the construction contract for avoiding and controlling the potential impacts of the construction works. The DSD will provide further information on the detailed construction works as requested by the residents at the meeting. Resident site staff will also be employed to closely supervise the contractor's construction works for ensuring compliance with the stringent environmental performance requirements of the contract specifications.

388DS — Shek Wu Hui sewage treatment works — further expansion phase 1A

21. Since September 2013, we have engaged the public on the expansion proposal by arranging site visits to the SWHSTW for members of the North District Council, the Sheung Shui District Rural Committee, village representatives and residents of the nearby Sheung Shui Heung and Fu Tei Au, so as to enable them to gain a deeper understanding of the current mode of operation of the SWHSTW and the main aspects of the expansion proposal. We have also attended formal meetings with the above stakeholders to address any concerns that they may have.

22. The villagers from Sheung Shui Heung held strong reservations over the proposal to expand the SWHSTW. Expressing concerns about the odour and health impact of the operation of the SWHSTW on nearby residents, they requested that the STW be relocated to Sha Ling. Residents of Fu Tei Au are concerned about the quality of discharge from the SWHSTW to Ng Tung River. They further suggested that communication with the public on the operation of the SWHSTW be strengthened. Further meetings with village representatives were held on 27 February and 4 March 2014 respectively. We committed to setting up the community liaison group to address their concerns.

23. We consulted the District Minor Works and Environmental Improvement Committee of the North District Council on the proposal on 17 March 2014. Members acknowledged the need to provide sufficient sewage treatment capacity to serve the development need of the community but expressed concerns about the odour and health impact of

⁸ The existing number of traffic lanes in Lok Chui Street will be maintained to minimise traffic impacts to the local residents. Independent structural engineer will be engaged to survey the structural conditions of nearby buildings before construction commencement and keep monitoring the structural conditions throughout the construction period. Ground movement induced by the construction works will be monitored.

the operation of the current SWHSTW on nearby residents. A few asked why the SWHSTW could not be relocated to a remote place such as Sha Ling, and expressed objection to the plan to upgrade and expand the treatment capacity of the SWHSTW at its present location. The Committee requested that the concerns of the nearby residents be properly addressed when the Administration proceeds further with the proposed works.

HERITAGE IMPLICATIONS

24. The proposed works under **160DS** and **346DS** in Kei Lun Wai and Fu Tei Ha Tsuen fall within Sites of Archaeological Interest (SAI) in the area. We will conduct an archaeological watching brief in the course of the proposed sewerage works in Kei Lun Wai and Fu Tei Ha Tsuen to ensure that archaeological resources, if identified, could be properly recorded and recovered. Subject to the actual site condition, the mitigation measures for archaeological resources, including but not limited to the watching brief, will be conducted in sequence or in parallel at the same or different locations with archaeological potential.

25. The proposed works under **388DS** will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, SAI and Government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

26. We have to resume a total of 36 private agricultural lots (about 1 731 square metres (m^2)) for implementation of the proposed works. Of the 36 lots, 8 (about 515 m²) are for **160DS** and 28 (about 1 216 m²) are for **346DS**. The land resumption and clearance will not affect any households or domestic structures.

27. Land resumption is not required for the project **388DS**.

ENVIRONMENTAL IMPLICATIONS

160DS — Tuen Mun sewerage, stage 1 346DS — Upgrading of Tuen Mun sewerage, phase 1

28. The proposed Lok Shui Street sewage pumping station is a designated project under the Environmental Impact Assessment (EIA)

Ordinance (Chapter 499) (the EIA Ordinance). We have assessed its potential environmental impacts and concluded that it will not cause long term adverse environmental impacts. We obtained an environmental permit (EP) for the construction and operation of the Lok Chui Street sewage pumping station on 25 July 2000. We shall implement the mitigation measures set out in the EP.

29. Apart from the proposed Lok Chui Street sewage pumping station, the other proposed works in paragraphs 2 and 3 above are not designated projects under the EIA Ordinance. We have completed an environmental review for the proposed works and concluded that the works would not cause any long term adverse environmental impacts.

388DS — Shek Wu Hui sewage treatment works — further expansion phase 1A

30. The SWHSTW further expansion is a designated project under Schedule 2 of the EIA Ordinance, and an EP is required for its construction and operation. The EIA report of NENT NDA (the NENT NDA EIA report), which covered the SWHSTW further expansion, was approved with conditions in October 2013 under the EIA Ordinance. The NENT NDA EIA report concluded that the environmental impact of the SWHSTW further expansion can be controlled to within the criteria under the EIA Ordinance and the Technical Memorandum on the EIA We shall implement the measures recommended in the Process. approved EIA report. The key measures include the upgrading of sewage treatment level, enhancement of the architectural and landscaping design of the facilities, proper design of odour mitigation measures including installation of appropriate deodorization facilities to fully address the concerns raised by the nearby residents outlined in paragraphs 21 and 22 above.

31. Regarding short term environmental impacts arisen during the construction stage, we will implement environmental mitigation measures for both projects to control the nuisance of noise, dust and site run-off to levels within established standards and guidelines. These measures include 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 carry out Environmental Monitoring and Audit to ensure that the construction works of Designated Projects will comply with the EP Furthermore, we will carry out regular site inspections to conditions. ensure that these recommended mitigation measures and good site practices will be properly implemented on site. We have included a sum of \$3.7 million, \$2.7 million and \$4.0 million (in September 2013 prices) in the project estimates of the proposed works under **160DS**, **346DS** and **388DS** respectively for implementation of the necessary environmental mitigation measures.

32. We have considered at the planning and design stages ways to reduce generation of construction waste where possible, including optimisation of the sewerage design to minimise the extent of excavation and to avoid as far as practicable demolition of existing structure. 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/recyclable inert construction waste and non-timber formwork to further reduce the generation of construction waste.

33. 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 public fill reception facilities and landfills respectively through a trip-ticket system.

34. We estimate that proposed works will generate about 203 170 tonnes of construction waste in total (63 200 tonnes, 131 500 tonnes and 8 470 tonnes under **160DS**, **346DS** and **388DS** respectively). The total costs for accommodating construction waste at PFRF and landfill sites are estimated to be \$3.64 million (based on a unit charge rate of \$27 per tonne for disposal at PFRF and \$125 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation). Detailed breakdown is as follows —

⁹ PFRF are specified in Schedule 4 of 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.

	Inert Construction & Demolition (C&D) Materials		Non-inert C&D Materials	Costs for accommodating construction waste at PFRF and landfill sites
PWP item no.	Reuse (tonnes)	Deliver to PFRF for subsequent reuse (tonnes)	Disposal at landfill (tonnes)	(\$ million)
160DS (<i>part</i>)	33 400	26 400	3 400	1.14
346DS (<i>part</i>)	72 300	52 500	6 700	2.26
388DS (<i>part</i>)	710	7 430	330	0.24
Total	106 410	86 330	10 430	3.64

ADVICE SOUGHT

35. Members are invited to support our proposals for upgrading the proposed works under **160DS**, **346DS** and **388DS** to Category A.

Environment Bureau Drainage Services Department April 2014



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	在該鄉村的 VILLAGE A PROPOSED	範圍內擬建活 REAS INSIDE SEWERS TO E	水渠(34 E WHICH BE LAID	6DS) (346DS)	
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