

**For discussion
on 23 January 2018**

Legislative Council Panel on Development

196WC – Implementation of Water Intelligent Network

PURPOSE

This paper briefs Members on the proposal to upgrade part of **196WC**, entitled “**Implementation of Water Intelligent Network**” to Category A at an estimated cost of \$655.4 million in money-of-the-day (MOD) prices to implement the second stage of Water Intelligent Network (WIN).

PROJECT SCOPE

2. The part of **196WC** which we propose to upgrade to Category A comprises the construction of chambers, pipeworks and other associated works for the establishment of about 275 District Metering Areas (DMAs) and Pressure Management Areas (PMAs)¹ in Islands, Tsuen Wan, Wong Tai Sin, Kwun Tong, Sai Kung, Sha Tin and Tai Po districts² with the installation of monitoring and sensing equipment in the respective part of the water distribution network.

3. Plans showing the locations of the major water supply zones (MSZs) covering the proposed DMAs and PMAs mentioned in paragraph 2 above are at **Enclosure 1**.

¹ A DMA is defined as a discrete area of a water distribution network established by the closure of district boundary valve(s) or complete disconnection of water mains, with the quantity of water supplied to the area metered. Some of the DMAs will also serve as PMAs where there is room for pressure management without affecting the minimum supply pressure to sustain normal supply. The monitoring and sensing equipment includes among others flowmeters and pressure loggers to collect water flow and pressure data.

² The DMAs and PMAs in Islands and Tsuen Wan districts are under the coverage of the Islands major water supply zone (MSZ); those in Wong Tai Sin, Kwun Tong, and Sai Kung districts are under the coverage of Kowloon East MSZ; and those in Sha Tin and Tai Po districts are under the coverage of Sha Tin MSZ.

4. Subject to funding approval of the Finance Committee (FC), we plan to commence the proposed works in the second quarter of 2018 for completion in the second quarter of 2022.

5. We will retain the remainder of **196WC** in Category B, which mainly comprises the establishment of the remaining about 240 DMAs and PMAs and the reprovisioning of water mains which will become aged and susceptible to bursting or leakage. We will seek funding for the remainder of **196WC** at a later stage.

JUSTIFICATION

6. In the 1990s, maintenance of a considerable length of water mains approaching the end of their service life became increasingly difficult and costly. Given the poor condition of the water distribution network, replacement and rehabilitation (R&R) of the aged water mains was the most effective solution to rejuvenate the water distribution network to arrest the rapid rising trend of main bursting and leakage. A programme of R&R of water mains (R&R Programme) was launched in 2000 to replace and rehabilitate around 3 000 kilometres (km) of the aged water mains in Hong Kong. The R&R Programme was substantially completed in 2015. At present, the total length of water mains in Hong Kong is about 8 000 km.

7. Following the substantial completion of the R&R Programme, the condition of the water distribution network has been largely improved. The annual number of water main bursts has been reduced from the peak of about 2 500 in 2000 to 116 in 2016. The leakage rate has also been reduced from exceeding 25% in 2000 to about 15% in 2016.

8. Notwithstanding the completion of the R&R Programme, the water mains previously not covered in the R&R Programme will continue to age and deteriorate. Riding on the technological advancement of sensors, telemetry, network management software and data analysis in recent years, we consider it an opportune time to implement WIN to maintain the healthiness of the water distribution network. With WIN, we would be able to analyse the condition of the water distribution network and determine the most cost-effective means to maintain the healthiness of the network.

9. The essence of WIN is continuous monitoring of network performance in a holistic manner by utilising advanced technologies. Under WIN, the water distribution network will be divided into discrete DMAs and PMAs of manageable size with high-technology monitoring and sensing equipment installed in each DMA and PMA network. Implementation of WIN enables the effective execution of measures under the four pillars of network management in an integrated and coordinated manner. These four pillars include (a) active leakage detection and control through the usage of the monitoring and sensing equipment installed in the network; (b) pressure management to reduce the pressure in the network of the PMAs; (c) quality and speedy repairs to water main leaks and bursts; and (d) asset management by reprovisioning of aged water mains which are beyond economic repair. WIN also enables detection of probable unauthorised consumption from the network.

10. Tremendous amount of flow and pressure data as well as other associated network data will be collected from the monitoring and sensing equipment of the DMAs and PMAs. An intelligent network management system (INMS) is being established for analysing the data collected for continuous monitoring of the condition of the network so as to assess the level of leakage and unauthorised consumption, and to enable timely determination of the priorities and the most effective network management measures for the DMAs and PMAs. For full implementation of WIN to cover the entire water distribution network in the territory, we will link up all DMAs and PMAs, which are either established or to be established to the INMS. By incorporating all the DMAs and PMAs into the INMS, WIN will eventually be established and will enable efficient network management to cover the water distribution network in the whole territory.

FINANCIAL IMPLICATIONS

11. We estimate the cost of the proposed works to be \$655.4 million in MOD prices.

PUBLIC CONSULTATION

12. We consulted the relevant committees of seven District Councils concerned as listed in **Enclosure 2** between September and November 2017. Members generally supported the proposed works.

ENVIRONMENTAL IMPLICATIONS

13. The proposed works are not designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The proposed works will not cause any long-term environmental impact. We have included in the project estimate the cost to implement suitable mitigation measures to control short-term environmental impacts.

14. During construction of the proposed works, we will control noise, dust and site run-off nuisances to meet established standards and guidelines through the implementation of mitigation measures in the relevant works contracts. These include the use of silencers, mufflers, acoustics lining or shields for noisy construction activities, frequent cleaning and watering of the site, and provision of wheel-washing facilities.

15. At planning and design stages for the proposed works, we have considered locations of chambers for accommodation of the proposed network monitoring and sensing equipment to reduce construction waste where possible. 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 facilities³. We will require the contractors 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.

16. At construction stage, we will require the contractors to submit for approval a plan setting out waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that day-to-day operations on site comply with the approved plan. We will require the contractors to separate 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.

17. We estimate that the construction works will generate in total 5 700 tonnes of construction waste. Of these, we will reuse about 850 tonnes (15%) of inert construction waste on site and deliver 4 550 tonnes

³ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in public filling reception facilities requires a licence issued by the Director of Civil Engineering and Development.

(80%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 300 tonnes (5%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at public fill reception facilities and landfill sites is estimated to be \$383,050 for this project (based on a unit charge rate of \$71 per tonne for disposal at public fill reception facilities and \$200 per tonne for disposal at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation) (Cap. 354N).

HERITAGE IMPLICATIONS

18. The proposed works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

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

TRAFFIC IMPLICATIONS

20. We have carried out a Traffic Impact Assessment (TIA) for the proposed works. The TIA has concluded that the proposed works would not cause any significant impact on the traffic through implementation of appropriate temporary traffic management schemes.

BACKGROUND

21. We upgraded **196WC** to Cat B in September 2014.

22. In August 2015, we engaged a consultant to undertake the investigation and detailed design for about 85 DMAs and PMAs in Kwun Tong, Sha Tin and Tai Po districts, and reprovisioning of water mains at an estimated cost of \$4.5 million in MOD prices. We charged this amount under block allocation **Subhead 9100WX** "Waterworks, studies and investigation for items in Category D of the Public Works Programme". The investigation and detailed design for the DMAs and PMAs was completed in June 2016.

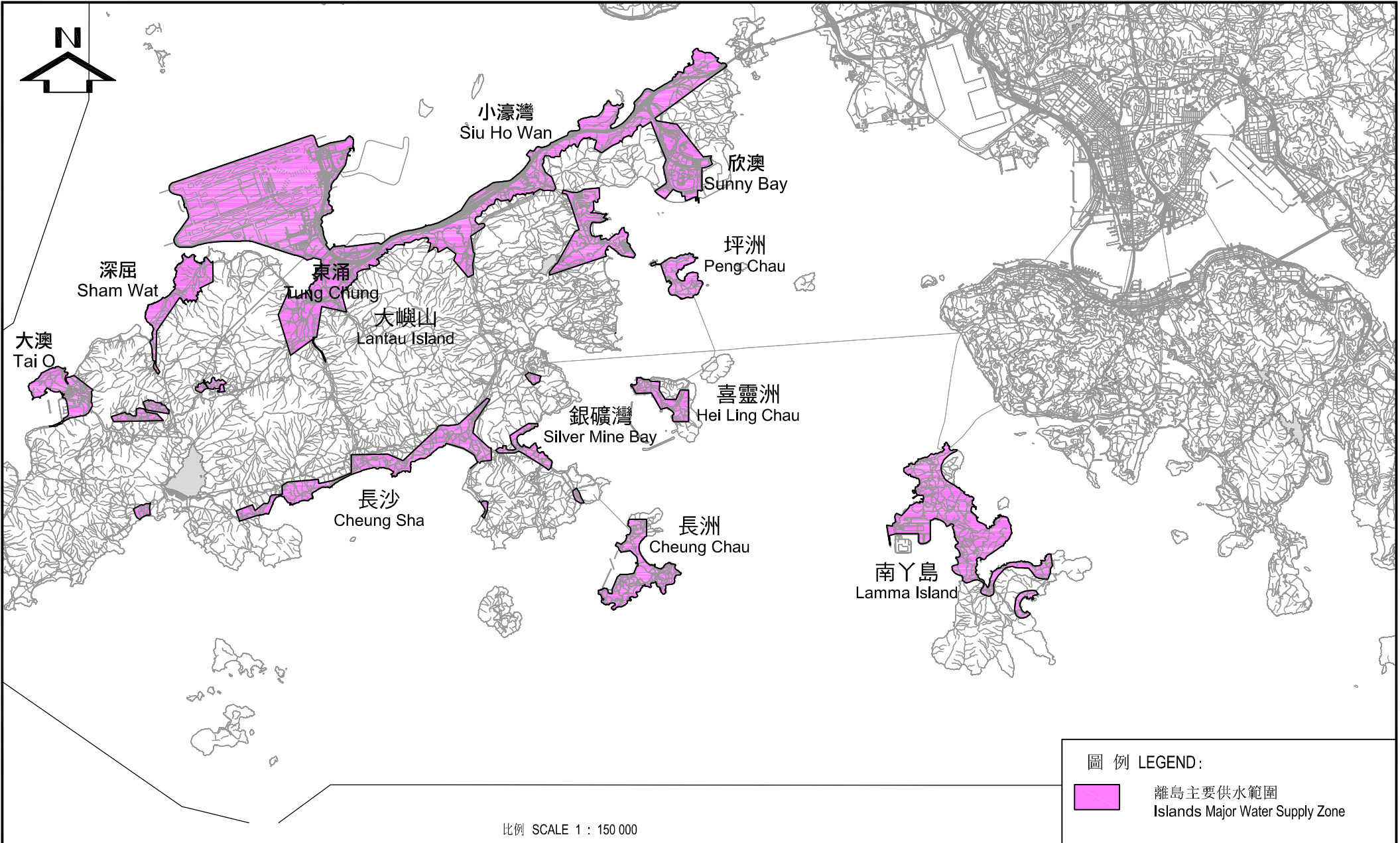
23. On 28 June 2016, we upgraded part of **196WC** to Category A as **198WC** entitled “Implementation of WIN” at an estimated cost of \$239.7 million in MOD prices to implement the first stage of WIN which mainly comprises construction of about 85 DMAs and PMAs in Kwun Tong, Sha Tin and Tai Po districts, procurement and establishment of the INMS; and investigation and detailed design for the remaining about 515 DMAs and PMAs in the territory. In December 2016, we commenced the works for the aforesaid 85 DMAs and PMAs, and commenced the consultancy on the investigation and detailed design for the aforesaid 515 DMAs and PMAs. The procurement and establishment of the INMS is being arranged for completion by end 2019 tentatively.

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

WAY FORWARD

25. We will seek support of the Public Works Sub-committee for the approval from the FC to upgrade part of **196WC** to Category A and will invite tenders in parallel to enable early commencement of the proposed works. We will only award the contract after obtaining FC’s funding approval.

**Development Bureau
Water Supplies Department
January 2018**



比例 SCALE 1 : 150 000

圖例 LEGEND:

- 離島主要供水範圍
Islands Major Water Supply Zone

工務計劃項目第196WC號 --- 建設智管網

離島主要供水範圍

P.W.P. Item No.196WC ----- Implementation of Water Intelligent Network

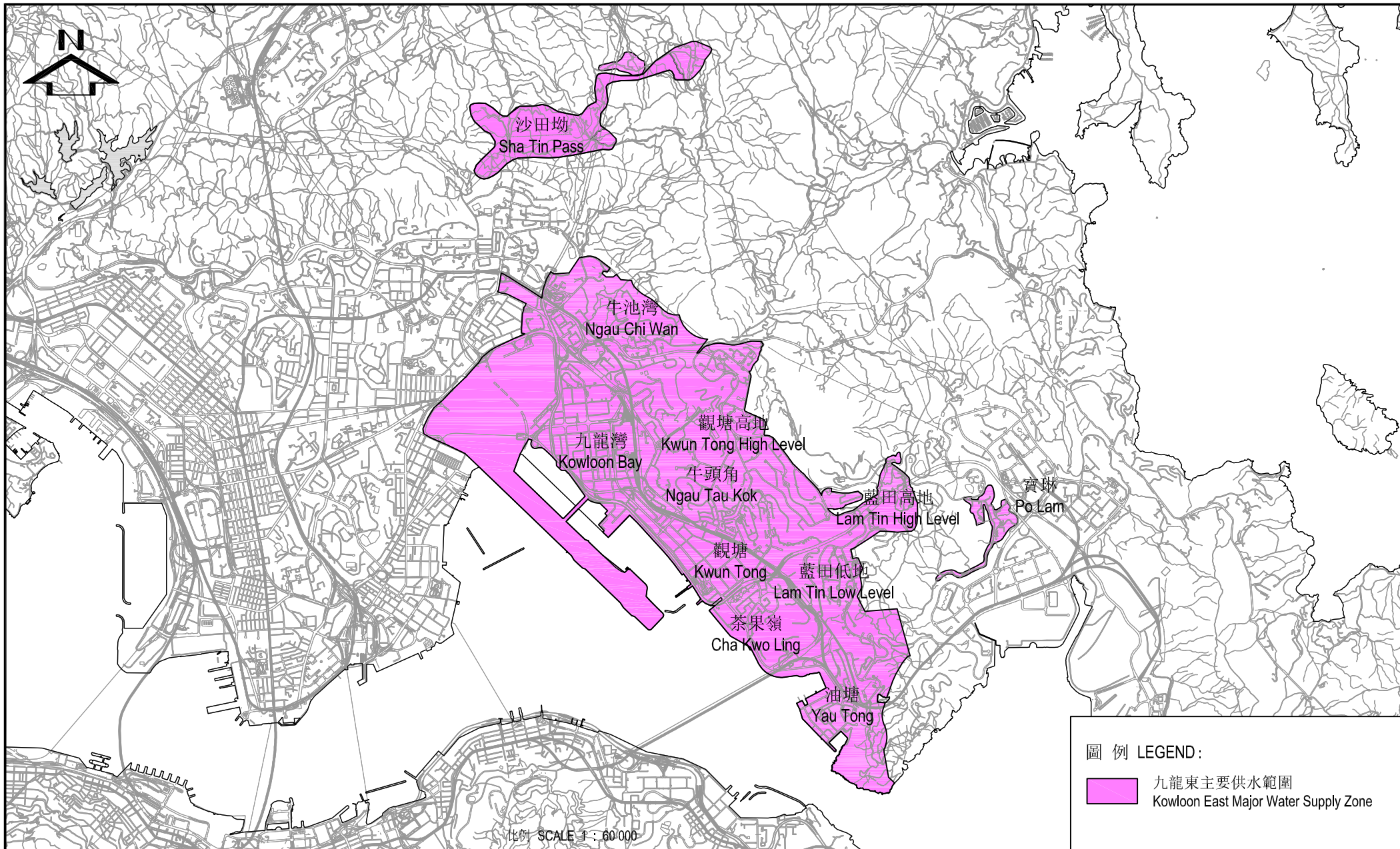
Islands Major Water Supply Zone



水務署
WATER SUPPLIES DEPARTMENT

草圖編號
SKETCH NO.

SK 62017 / 130_1



圖例 LEGEND:

 九龍東主要供水範圍
Kowloon East Major Water Supply Zone

工務計劃項目第196WC號 --- 建設智管網

九龍東主要供水範圍

P.W.P. Item No.196WC ----- Implementation of Water Intelligent Network

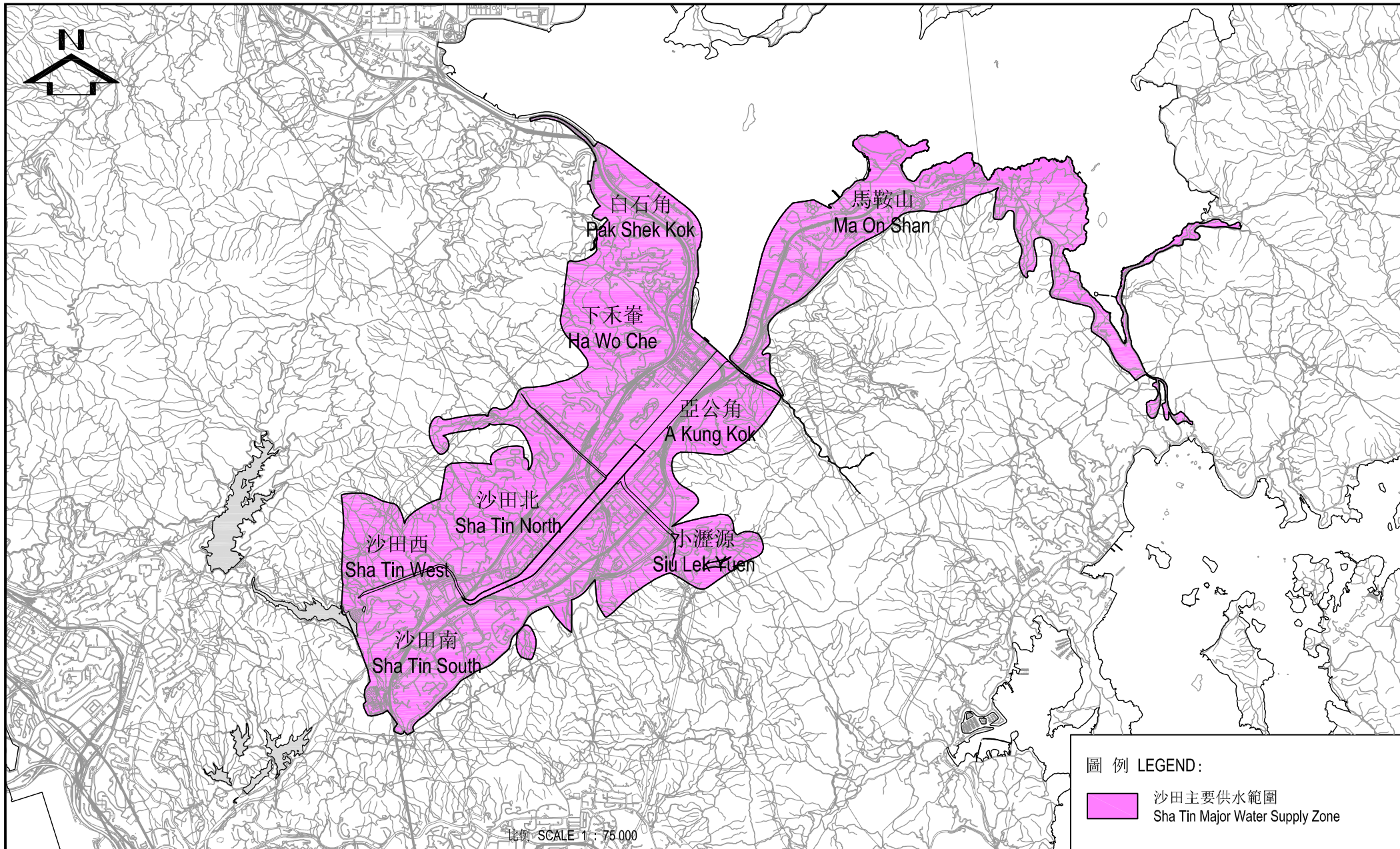
Kowloon East Major Water Supply Zone



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草圖編號
SKETCH NO.

SK 62017 / 130-2



圖例 LEGEND:

 沙田主要供水範圍
Sha Tin Major Water Supply Zone

工務計劃項目第196WC號 --- 建設智管網
沙田主要供水範圍

P.W.P. Item No. 196WC ---- Implementation of Water Intelligent Network
Sha Tin Major Water Supply Zone

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WATER SUPPLIES DEPARTMENT

草圖編號 SKETCH NO. SK 62017/130-3

196WC – Implementation of Water Intelligent Network**Consultation with District Councils**

Date of Consultation	District Council	Committee
28 September 2017	Kwun Tong	Traffic and Transport Committee
2 November 2017	Sha Tin	Development and Housing Committee
2 November 2017	Tsuen Wan	Environmental and Health Affairs Committee
8 November 2017	Tai Po	Environment, Housing and Works Committee
23 November 2017	Sai Kung	Traffic and Transport Committee
27 November 2017	Islands	Traffic and Transport Committee
28 November 2017	Wong Tai Sin	Traffic and Transport Committee