

**For discussion  
on 26 March 2019**

## **Legislative Council Panel on Development**

### **Improvement of water supply facilities in Sha Tin, Sheung Wong Yi Au, Sheung Shui and Fanling, and implementation of Water Intelligent Network**

#### **PURPOSE**

This paper briefs Members on our proposals to –

- (a) upgrade the remaining part of **181WF**, entitled “**In-situ reprovisioning of Sha Tin water treatment works (South Works) – main works**”, to Category A at an estimated cost of \$7,019.9 million in money-of-the-day (MOD) prices for the main works of the in-situ reprovisioning of the South Works of Sha Tin water treatment works (WTW);
- (b) upgrade part of **353WF**, entitled “**Uprating of Sheung Wong Yi Au fresh water supply system**”, to Category A at an estimated cost of \$207.0 million in MOD prices to carry out Stage 1 uprating works for the Sheung Wong Yi Au fresh water supply system to cope with the increase in fresh water demand in Tai Po South;
- (c) upgrade **368WF**, entitled “**Improvement to Dongjiang Water Mains P4 at Sheung Shui and Fanling**”, to Category A at an estimated cost of \$1,071.4 million in MOD prices to replace sections of glass reinforced plastic (GRP) pipes of the Dongjiang (DJ) water mains P4 in Sheung Shui and Fanling; and

- (d) upgrade the remaining part of **196WC**, entitled “**Implementation of Water Intelligent Network**” to Category A at an estimated cost of \$1,236.0 million in MOD prices to implement the remaining works of Water Intelligent Network (WIN).

— 2. Details of the above four proposals are provided at **Enclosures 1 to 4** respectively.

### **WAY FORWARD**

3. We will seek support of the Public Works Subcommittee for the approval by the Finance Committee (FC) of the Legislative Council (LegCo) to upgrade the remaining part of **181WF**, part of **353WF**, **368WF** and the remaining part of **196WC** to Category A. We will invite tenders in parallel to enable early commencement of the proposed works and will only award the contracts after obtaining FC’s approval.

**Development Bureau**  
**Water Supplies Department**  
**March 2019**

**181WF – In-situ reprovisioning of Sha Tin water treatment works  
(South Works) – main works**

**PROJECT SCOPE**

The remaining part of **181WF** which we propose to upgrade to Category A comprises the following works in Sha Tin water treatment works (WTW) –

- (a) reprovisioning of the South Works pumping station and water treatment processing units including the ozone building, flocculation and sedimentation tanks, two-stage filters, ultra-violet disinfection facility, residual management facilities and associated installations;
- (b) reprovisioning of the administration building; and
- (c) associated works including environmental mitigation works, landscaping works and other engineering works.

———— The location and the photomontage of the proposed works are shown on the plan at **Annexes 1 and 2 to Enclosure 1** respectively.

2. Subject to approval of the Finance Committee (FC), we plan to commence the proposed works in the fourth quarter of 2019 for completion in the second quarter of 2025.

**JUSTIFICATION**

3. Sha Tin WTW and Tai Po WTW are the two major WTWs in Hong Kong providing fresh water supply to the metropolitan areas including a large part of Kowloon, and the Central and Western districts on Hong Kong Island, and part of the New Territories, serving a total population of around 2.6 million. It is necessary to ensure the reliability of the WTWs. In addition, as there are new public and private housing developments within the combined supply zone of Sha Tin WTW and Tai Po WTW which are being implemented progressively, it is important to ensure that the total treatment capacity of the two WTWs will be adequate to meet the increasing water demand arising from these new housing developments.

4. Sha Tin WTW comprises the South Works and the North Works. The South Works was commissioned in 1964 while the North Works was commissioned in stages from 1973. After more than 50 years of service, the South Works has deteriorated and its reliable output has been reduced significantly. Moreover, it is uneconomical to maintain its operation. Therefore, we propose to re-provision the South Works in-situ. Apart from replacing the aged treatment facilities, the re-provisioning works will also uprate the treatment capacity of the South Works from 360 000 cubic metres (m<sup>3</sup>) per day to 550 000 m<sup>3</sup> per day to meet the increasing water demand.

5. During the in-situ re-provisioning of the South Works, the South Works has to be taken out of service, which will reduce the total treatment capacity of the Sha Tin WTW and the Tai Po WTW. Based on the demand assessment, the proposed works need to be completed in 2025 before the temporarily reduced treatment capacity becomes inadequate to meet the water demand.

6. The Sha Tin WTW (South Works) re-provisioning project also provides an opportunity to adopt the latest advanced water treatment technologies in WTW. The proposed ozone building will provide two-stage ozonation for removal of manganese, iron, taste, odour and dissolved organic compound in the raw water. Inclined plate settlers will be installed in the sedimentation tanks to enhance the efficiency of sedimentation. The proposed two-stage filters will provide biological filtration as the first stage filtration to remove organics and ammonia in the raw water and granular media filtration as the second stage filtration to remove remaining suspended solids and to finally polish the biologically treated water. Ultra-violet disinfection facility will be installed on the downstream side of the filters to inactivate micro-organisms in the filtered water. The proposed residual management facilities will adopt dissolved air flotation to clarify backwash wastes from the filters. The proposed new administration building encompasses administration offices, control rooms, laboratories and other ancillary facilities.

## **FINANCIAL IMPLICATIONS**

7. We estimate the cost of the proposed works to be \$7,019.9 million in money-of-the-day (MOD) prices.

## **PUBLIC CONSULTATION**

8. We consulted the Development and Housing Committee of the Sha Tin District Council on 1 November 2018. Members supported the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

9. The Sha Tin WTW (South Works) reprovisioning project is a designated project (DP) under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) which requires an environmental permit (EP) for its construction and operation. The Director of Environmental Protection approved the EIA report and issued an EP for the construction and operation of the project in January 2015. With the implementation of the recommended mitigation measures and an environmental monitoring and audit (EM&A) programme, the approved EIA report concluded that the environmental impacts of both the advance works and the main works under the Sha Tin WTW (South Works) reprovisioning project could be controlled to within the criteria under the EIA Ordinance and the Technical Memorandum on EIA Process. We shall implement the environmental mitigation measures and the EM&A programme recommended in the approved EIA report and as required under the EP. The mitigation measures include frequent cleaning and watering of the site, provision of wheel washing facilities, covering of materials on trucks, use of silenced construction plant, temporary noise barriers and acoustic enclosures for noisy construction activities. We have included in the project estimate the cost for the implementation of the environmental mitigation measures and the EM&A programme.

10. At the planning and design stages, we have considered design and layout optimisation to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or other suitable construction site as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities<sup>1</sup>. 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.

---

<sup>1</sup> 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 fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

11. 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 and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

12. We estimate that the proposed works will generate in total about 324 288 tonnes of construction waste. Of these, we will reuse about 14 100 tonnes (4.3%) of inert construction waste on site and deliver 300 508 tonnes (92.7%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 9 680 tonnes (3.0%) 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 \$23.3 million for the proposed works (based on a unit charge rate of \$71 per tonne for disposal at public fill reception facilities and \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

## **HERITAGE IMPLICATIONS**

13. 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**

14. The proposed works do not involve resumption of private land.

## TRAFFIC IMPLICATIONS

15. We have carried out a Traffic Impact Assessment (TIA) for the proposed works. The TIA concluded that the proposed works would not cause any significant impact on the traffic. We will carry out a traffic review at the construction stage to revisit the temporary traffic arrangements for meeting the latest traffic condition before implementation of appropriate temporary traffic arrangement.

## BACKGROUND

16. We upgraded **181WF** to Category B in February 2002.

17. In January 2003, we engaged consultants to carry out the investigation study for the in-situ reprovisioning of Sha Tin WTW at a cost of about \$10.2 million in MOD prices. We have charged the study under block allocation **Subhead 9100WX** “Waterworks, studies and investigations for items in Category D of the Public Works Programme”. The investigation study was completed in September 2004. It recommended an outline design scheme for the in-situ reprovisioning of Sha Tin WTW, which was used as the basis for further design development of the proposed works.

18. We submitted an information paper [LC Paper No. CB(1)86/07-08(01)] regarding the implementation strategy for the in-situ reprovisioning of Sha Tin WTW to the LegCo Panel on Development in October 2007. On 2 July 2010, we upgraded part of **181WF** to Category A as **344WF** “In-situ reprovisioning of Sha Tin water treatment works – South Works – design and site investigation” at an approved project estimate (APE) of \$149.1 million in MOD prices. In August 2010, we engaged consultants to undertake the design and site investigation work. The consultants have completed the detailed design of the proposed works.

19. On 10 July 2015, we upgraded part of **181WF** to Category A as **358WF** “In-situ reprovisioning of Sha Tin water treatment works (South Works) – advance works” at an APE of \$1,658 million in MOD prices to implement the advance works which comprise primarily the construction of a logistics centre for relocating the existing chemical house, alum saturation tanks, mechanical and electrical workshops, and offices of the South Works with their original sites freed up to pave the way for the construction of the main works. The advance works commenced in October 2015 and will be completed in the second half of 2019.

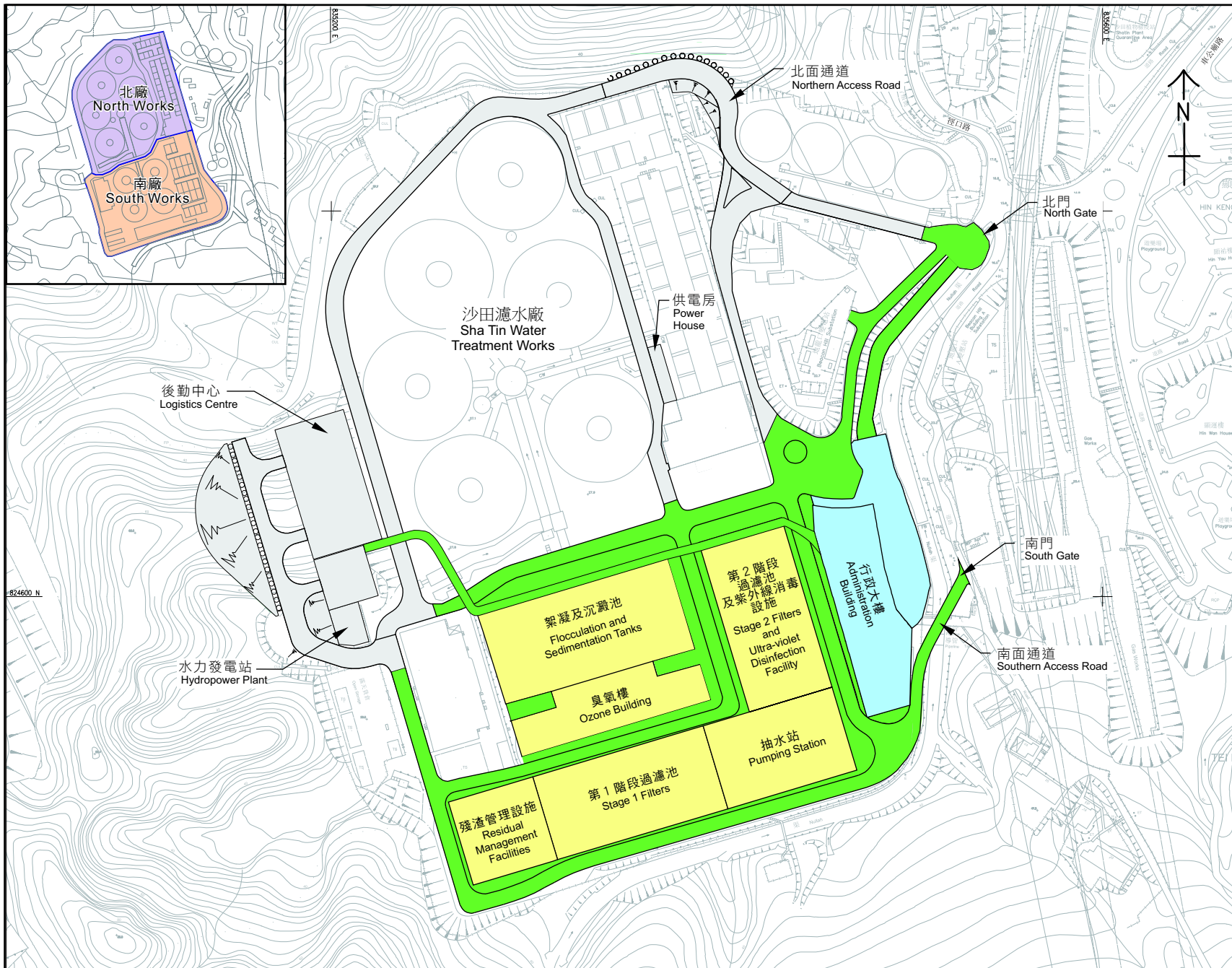
20. Of the 193 trees within the project boundary of the proposed works, 63 trees will be preserved. The proposed works will involve the removal of 130 trees, including 105 trees to be felled and 25 trees to be replanted within the project site. All trees to be removed are not important trees<sup>2</sup>. We will incorporate planting proposals as part of the proposed works, including planting of 151 trees and formation of 4 500 square metres of grassed area.

---

<sup>2</sup> “Important trees” 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 trees, trees as landmark of monastery or heritage monument, and trees in memory of important persons or events;
- (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.





圖例 Legend:

主項工程 Main Works

- 濾水及抽水設施  
Water Treatment and Pumping Facilities
- 通道和相關工程  
Access Roads and Associated Works
- 行政大樓和相關工程  
Administration Building and Associated Works

前期工程 Advance Works

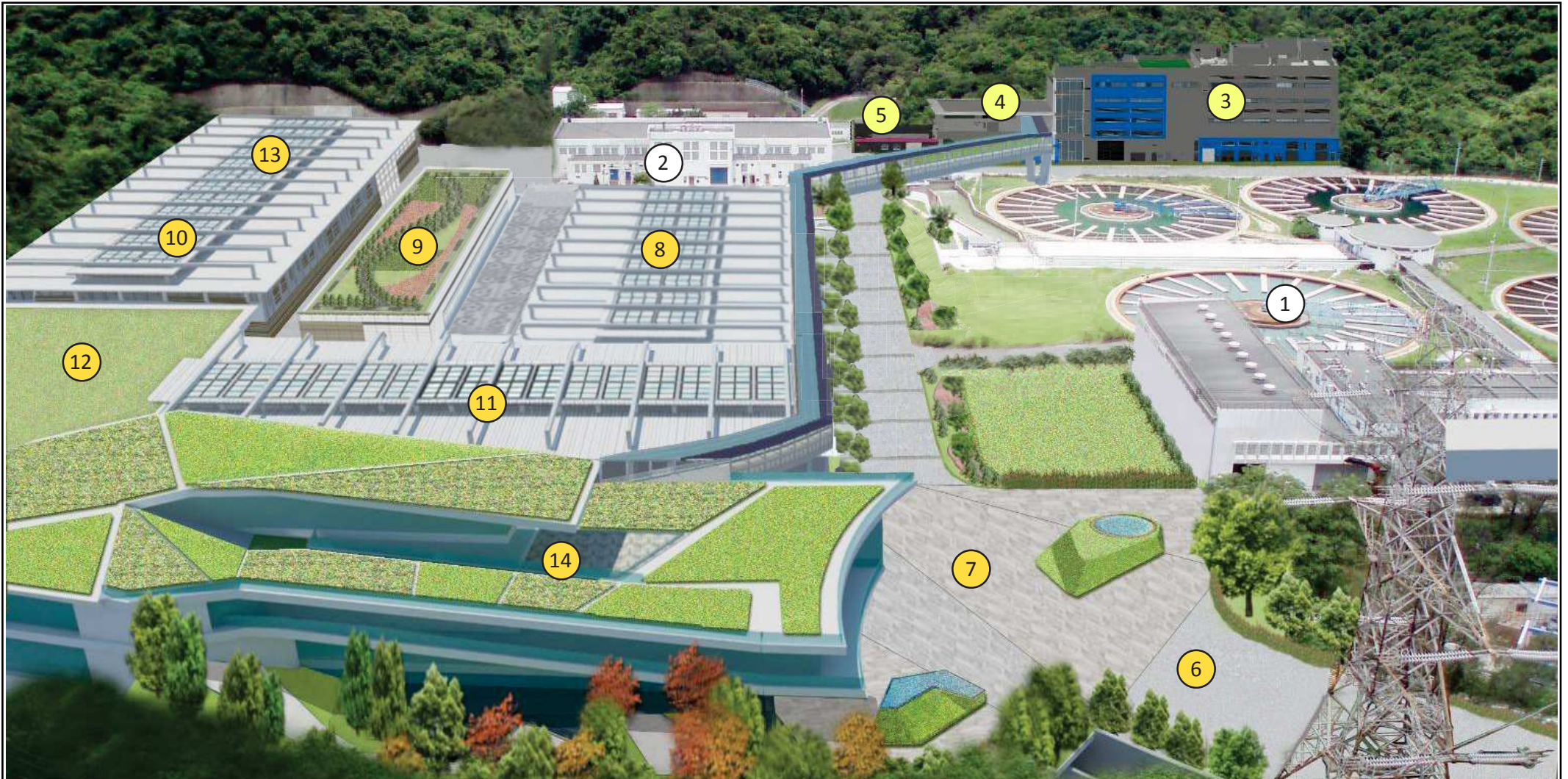
合約編號 Contract No. 3/WSD/15

- 在358WF下建造中的前期工程  
Advance Works under 358WF In Progress

工務計劃項目第181WF號 — 沙田濾水廠原地重置工程(南廠) — 主項工程  
PWP ITEM NO. 181WF — In-situ reprovisioning of Sha Tin water treatment works (South Works) - main works

水務署  
WATER SUPPLIES DEPT.

草圖編號 SK 62019 / 014  
SKETCH NO.



圖例 LEGEND :  
現有設施 EXISTING FACILITIES

- ① 現有北廠  
EXISTING NORTH WORKS
- ② 現有加氯設施  
EXISTING CHLORINATION FACILITY

前期工程 ADVANCE WORKS CONTRACT

- ③ 後勤中心  
LOGISTICS CENTRE
- ④ 明礬池  
ALUM TANKS
- ⑤ 水力發電站  
HYDROPOWER PLANT

主項工程 MAIN WORKS CONTRACTS

- ⑥ 廣場通道  
PIAZZA AVENUE
- ⑦ 中央廣場  
CENTRAL PIAZZA
- ⑧ 絮凝及沉澱池  
FLOCCULATION AND SEDIMENTATION TANKS

- ⑨ 臭氧樓  
OZONE BUILDING
- ⑩ 第一階段過濾池  
STAGE 1 FILTERS
- ⑪ 第二階段過濾池  
STAGE 2 FILTERS

- ⑫ 南廠抽水站  
SOUTH WORKS PUMPING STATION
- ⑬ 殘渣管理設施  
RESIDUAL MANAGEMENT FACILITIES
- ⑭ 行政大樓  
ADMINISTRATION BUILDING

工務計劃項目第181WF號 — 沙田濾水廠原地重置工程(南廠) — 主項工程  
PWP ITEM NO. 181WF — In-situ reprovisioning of Sha Tin water treatment works (South Works) - main works

 水務署  
WATER SUPPLIES DEPT.

草圖編號  
SKETCH NO. SK 62019 / 017

## **353WF – Upgrading of Sheung Wong Yi Au fresh water supply system**

### **PROJECT SCOPE**

The part of **353WF** which we propose to upgrade to Category A comprises the upgrading of the existing Ha Wong Yi Au (HWYA) fresh water pumping station and laying of associated fresh water mains with diameters ranging from 400 millimetres (mm) to 600 mm and approximate total length of 5.5 kilometres (km) of the Sheung Wong Yi Au fresh water supply system. The location of the proposed works is shown on the plan at **Annex 1 to Enclosure 2**.

2. Subject to the approval of Finance Committee (FC), we plan to commence the proposed works in the third quarter of 2019 for completion in the fourth quarter of 2022.
3. We will retain the remainder of **353WF** in Category B, which mainly comprises the construction of Sheung Wong Yi Au (SWYA) No. 3 fresh water service reservoir with a storage capacity of 6 000 cubic metres (m<sup>3</sup>). We will seek approval of FC for the remainder of **353WF** at a later stage.

### **JUSTIFICATION**

4. At present, the SWYA fresh water supply system includes the HWYA fresh water pumping station and the SWYA fresh water service reservoirs, which can cater for a mean daily demand of about 10 500 m<sup>3</sup> per day.
5. It is projected that the water demand in the supply zone of Sheung Wong Yi Au fresh water supply system will increase to about 12 900 m<sup>3</sup> per day in 2022 and eventually to 15 600 m<sup>3</sup> in 2030 due to housing developments in Tai Po South area. There is a need to uprate the existing HWYA fresh water pumping station and the associated pumping mains and complete the works by the fourth quarter of 2022 to meet the increase in water demand.

6. The reservoir storage capacity of the Sheung Wong Yi Au fresh water supply system also needs to be increased to cope with the further increase in water demand. It is proposed to construct the SWYA No. 3 fresh water service reservoir under the remainder of **353WF** to be upgraded to Category A at a later stage.

## **FINANCIAL IMPLICATIONS**

7. We estimate the cost of the proposed works to be \$207.0 million in money-of-the-day prices.

## **PUBLIC CONSULTATION**

8. We consulted the Tai Po Rural Committee and Environment, Housing and Works Committee of Tai Po District Council on 7 November 2018. Members supported the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

9. The proposed works are not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have carried out the Preliminary Environmental Review (PER) for the proposed works. The PER concluded that the project would not have any long-term environmental impacts. We will incorporate the mitigation measures recommended in the PER into the works contract to control the environmental impacts arising from the construction works to within established standards and guidelines. These measures include frequent watering of the site, provision of wheel-washing facilities, covering of materials on trucks and use of silenced construction plant. We have included in the project estimate the cost for the implementation of the environmental mitigation measures.

10. At the planning and design stages, we have considered design and layout optimisation to reduce the generation of construction waste. In addition, we will require the contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or in other suitable construction sites as far as possible, in order to minimize the disposal of inert construction waste to public fill reception facilities<sup>1</sup>. 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 where possible.

11. 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 also control the disposal of inert and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

12. We estimate that the proposed works will generate in total about 49 740 tonnes of construction waste. Of these, we will reuse about 10 160 tonnes (20%) of inert construction waste on site and deliver 34 600 tonnes (70%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 4 980 tonnes (10%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at public fill reception facilities and landfills is estimated to be \$3.4 million for this project (based on a unit charge rate of \$71 per tonne for disposal at public fill reception facilities and \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

## **HERITAGE IMPLICATIONS**

13. 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.

---

<sup>1</sup> 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.

## LAND ACQUISITION

14. The proposed works do not involve resumption of private land.

## TRAFFIC IMPLICATIONS

15. Traffic review has been carried out for the proposed works in the design stage and it concluded that the proposed works would not cause any significant impact on the traffic during the construction and operation stages. Since temporary traffic diversion at Tai Po Road, Shan Tong Road and Shan Yin Road is required, we will conduct a traffic review for the proposed works before commencement of the construction works and will submit temporary traffic arrangement for approval by relevant authorities.

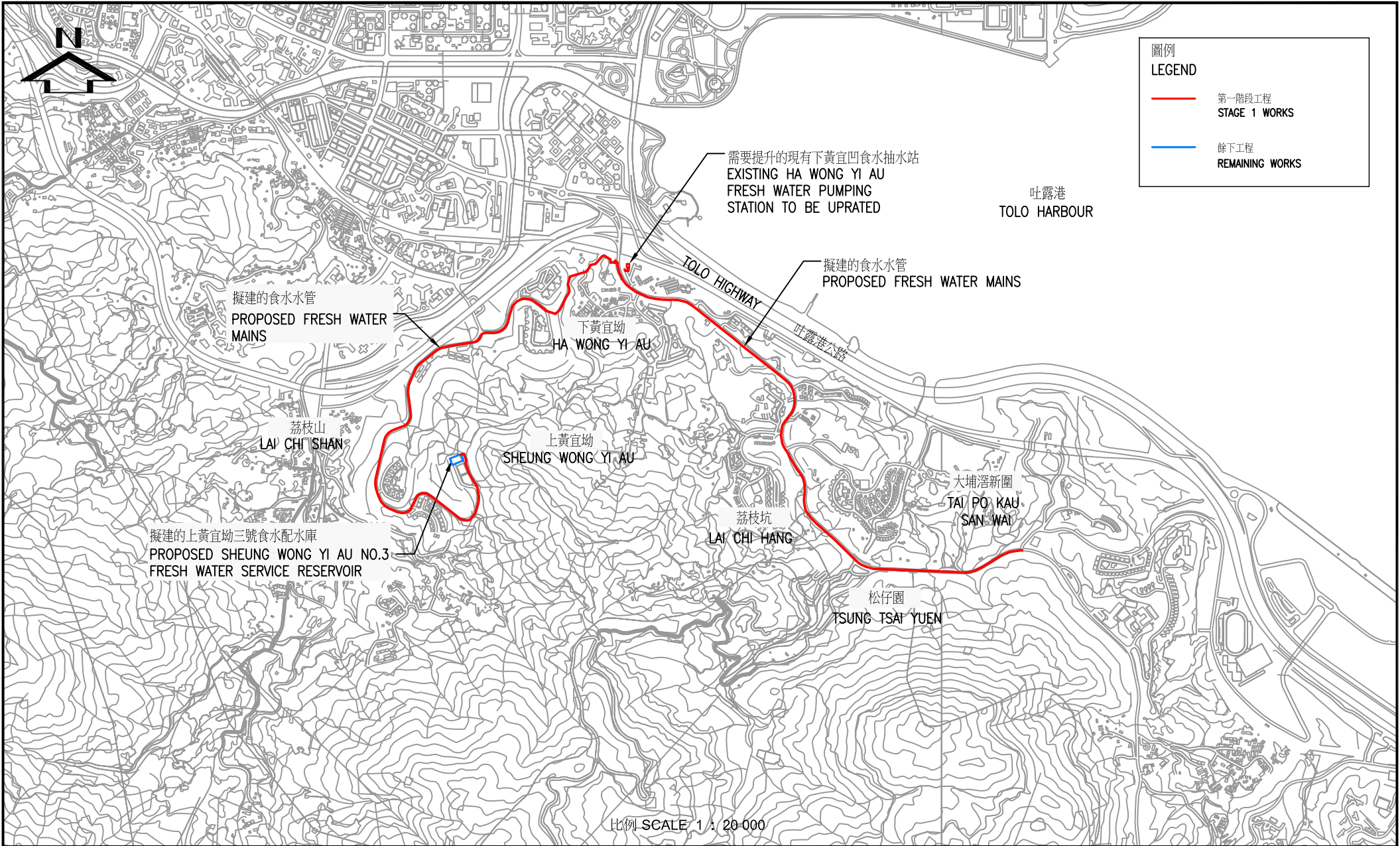
## BACKGROUND

16. We upgraded **353WF** to Category B in September 2014.
17. In September 2015, we engaged contractors to carry out ground investigation and consultants to undertake the landscape design for the proposed works at a total cost of \$1.8 million. We charged the amount to block allocation **Subhead 9100WX** “Waterworks, studies and investigations for items in Category D of the Public Works Programme”.
18. Of the 336 trees within the project boundary of the proposed works, 225 trees will be preserved and 111 trees will be felled. All trees to be removed are not important trees<sup>2</sup>. We will incorporate planting proposals as part of the proposed works, including planting of 14 trees and formation of 1 296 square metres of grassed area.

---

<sup>2</sup> “Important trees” 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 trees, trees as landmark of monastery or heritage monument, and trees in memory of important persons or events;
- (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 or canopy spread equal or exceeding 25 m.



工務工程編號 9353WF-1 ---- 上黃宜坳食水供應系統提升工程 - 第一階段  
 P.W.P. Item No. 9353WF-1 ---- Uprating of Sheung Wong Yi Au fresh water supply system - Stage 1

水務署  
 WATER SUPPLIES DEPARTMENT

草圖編號 SKETCH NO. SK 62019 / 018

附件二 附錄一 ANNEX 1 to ENCLOSURE 2

## **368WF – Improvement to Dongjiang Water Mains P4 at Sheung Shui and Fanling**

### **PROJECT SCOPE**

The **368WF** which we propose to upgrade to Category A comprises the replacement of sections of about 5 kilometres (km) of glass reinforced plastic (GRP) pipes of the Dongjiang (DJ) water mains P4 with diameter ranging from 2 100 mm to 2 300 mm and associated works at Sheung Shui and Fanling. The location of the proposed works is shown on the plan at **Annex 1 to Enclosure 3**.

2. Subject to the approval of the Finance Committee, we plan to commence the proposed works in the fourth quarter of 2019 for completion in the second quarter of 2022.

### **JUSTIFICATION**

3. The DJ water mains P4 is one of the water mains for transfer of DJ raw water. It transfers the DJ raw water from Muk Wu Raw Water Pumping Station to Tai Po Tau Raw Water Pumping Station, where the DJ raw water will be further distributed to various water treatment works and the Plover Cove reservoir. The sections of the GRP pipes of the DJ water mains P4 at Sheung Shui and Fanling were laid more than 30 years ago. They are approaching the end of their service life and are in deteriorated condition. As a result, they have significant risk of burst and leaks, which will have severe impact to facilities in the vicinity, as well as disrupting the DJ raw water transfer. Therefore, we need to replace the sections of GRP pipes of the DJ water mains to ensure its reliability.

### **FINANCIAL IMPLICATIONS**

4. We estimate the cost of the proposed works to be \$1,071.4 million in money-of-the-day prices.



## **PUBLIC CONSULTATION**

5. We consulted the Environment, Housing and Works Committee of the Tai Po District Council, and the District Minor Works and Environmental Improvement Committee of the North District Council on 9 January 2019 and 21 January 2019 respectively. Members supported the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

6. The proposed works are not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have carried out the Preliminary Environmental Review (PER) for the proposed works. The PER concluded that the project would not have any long-term environmental impacts. We will incorporate the mitigation measures recommended in the PER into the works contract to control the environmental impacts arising from the construction works to within established standards and guidelines. These measures include frequent watering of the site, provision of wheel-washing facilities, covering of materials on trucks and use of silenced construction plant. We have included in the project estimate for the implementation of these environmental mitigation measures.

7. At the planning and design stages, we have considered design and layouts optimisation to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities<sup>1</sup>. 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.

---

<sup>1</sup> 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 fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

8. 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 and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

9. We estimate that the proposed works will generate in total about 83 440 tonnes of construction waste. Of these, we will reuse about 27 170 tonnes (33%) of inert construction waste on site and deliver 43 200 tonnes (52%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 13 070 tonnes (15%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at public fill reception facilities and landfills is estimated to be \$5.68 million for this project (based on a unit charge rate of \$71 per tonne for disposal at public fill reception facilities and \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

## **HERITAGE IMPLICATIONS**

10. 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**

11. The proposed works do not involve resumption of private land but clearance of government land is required.

## TRAFFIC IMPLICATIONS

12. We have carried out a Traffic Impact Assessment (TIA) for the proposed works. The TIA concluded that the proposed works would not cause any significant impact on the traffic. We will carry out a traffic review at the construction stage to revisit the temporary traffic arrangements for meeting the latest traffic condition before implementation of appropriate traffic management schemes.

## BACKGROUND

13. We upgraded **368WF** to Category B in September 2018.

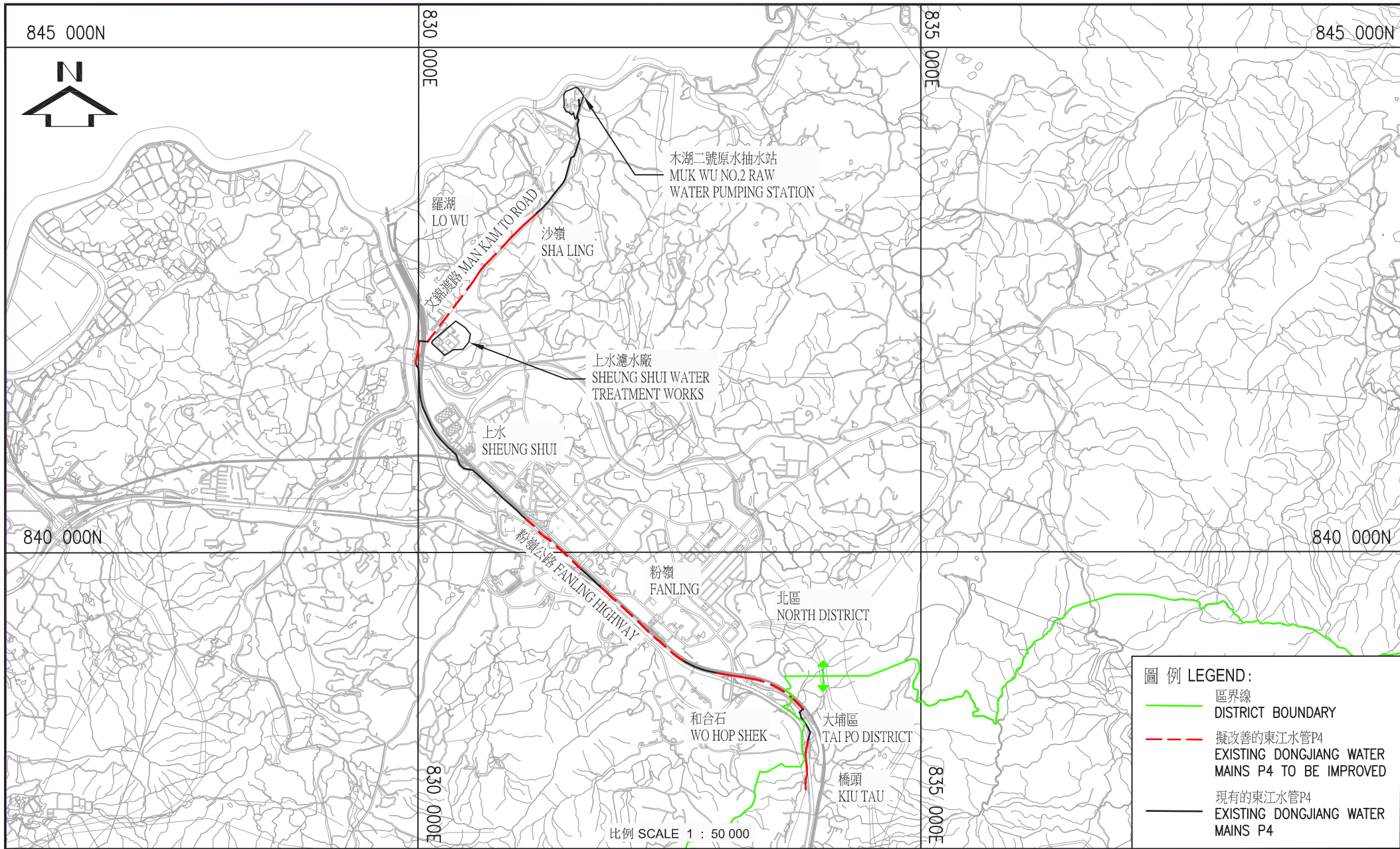
14. In September 2018, we engaged contractors to carry out ground investigation and consultants to undertake the TIA, tree survey and landscape design for the project a total cost of \$7.1 million. We charged the amount to block allocation **Subhead 9100WX** “Waterworks, studies and investigations for items in Category D of the Public Works Programme”.

15. Of the 777 trees within the project boundary of the proposed works, 399 trees will be preserved and 378 trees will be felled. All trees to be removed are not important trees<sup>2</sup>. We will incorporate planting proposals as part of the proposed works, including planting of 378 trees.

---

<sup>2</sup> “Important trees” 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 trees, trees as landmark of monastery or heritage monument, and trees in memory of important persons or events;
- (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.



工務計劃項目第368WF號 --- 上水及粉嶺東江水管P4改善工程  
PWP Item No. 368WF --- Improvement to DongJiang Water Mains P4 at Sheung Shui and Fanling



水務署  
WATER SUPPLIES DEPARTMENT

草圖編號  
SKETCH NO.

SK 62019 / 019

## 196WC – Implementation of Water Intelligent Network

### PROJECT SCOPE

The remaining part of **196WC** which we propose to upgrade to Category A comprises construction works for the establishment of remaining about 640 District Metering Areas (DMAs) and Pressure Management Areas (PMAs)<sup>1</sup> for Water Intelligent Network (WIN).

2. Subject to approval of the Finance Committee, we plan to commence the proposed works in the third quarter of 2019 for completion by the end of 2023.

### JUSTIFICATION

3. In the 1990s, maintenance of a considerable length of water mains approaching the end of their service life became increasingly difficult and costly. The Replacement and Rehabilitation of Water Mains (R&R) Programme was launched in 2000 to replace and rehabilitate around 3 000 km of the aged water mains in Hong Kong. The R&R Programme was substantially completed in 2015 and the condition of the water supply network has been largely improved. The annual number of water main bursts has been reduced from the peak of about 2 500 cases in 2000 to around 100 cases in 2018. The leakage rate has also been reduced from exceeding 25% in 2000 to about 15% in 2018.

4. Riding on the technological advancement of sensors, telemetry, network management software and data analysis in recent years, we implement WIN for monitoring the water loss of the water distribution network for follow up action.

5. The essence of WIN is continuous monitoring of the performance of the distribution network in a holistic manner. Under WIN, the fresh water distribution network will be divided into discrete DMAs and

---

<sup>1</sup> 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.

PMAs of manageable size with monitoring and sensing equipment installed in each DMA and PMA. WIN enables the implementation of effective measures under the four pillars of network management for the DMAs and PMAs in an integrated and coordinated manner. These four pillars include –

- (a) active leakage detection and control;
- (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) reprovisioning of aged water mains which are beyond economic repair.

WIN also enables detection of probable unauthorised consumption in the DMAs and PMAs.

6. Tremendous amount of flow and pressure data will be collected from the monitoring and sensing equipment of the DMAs and PMAs under WIN as well as other associated network data. An intelligent network management system (INMS) is being established for analysing the data collected for continuous monitoring of the performance of the DMAs and PMAs, so as to assess their 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. With full implementation of WIN and other measures, we target to reduce leakage rate in government water mains from about 15% in 2018 to below 10% by 2030.

7. Some 1 760 DMAs and PMAs have been established or being established under other projects. We propose to upgrade the remaining part of **196WC** for the establishment of the remaining about 640 DMAs and PMAs to cover the water distribution network in the whole territory for full implementation of WIN.

## FINANCIAL IMPLICATIONS

8. We estimate the cost of the proposed works to be \$1,236.0 million in money-of-the-day (MOD) prices.

## PUBLIC CONSULTATION

9. We consulted the relevant committees of all 18 District Councils concerned as listed in **Annex 1 to Enclosure 4** between January and February 2019. Members generally supported the proposed works.

## ENVIRONMENTAL IMPLICATIONS

10. The proposed works are not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have carried out the Environmental Review (ER) for the proposed works. The ER concluded that the project would not have any long-term environmental impacts. We will incorporate the mitigation measures into the works contract to control the environmental impacts arising from the construction works to within established standards and guidelines. 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. We have included in the project estimate for the implementation of these environmental mitigation measures.

11. At the 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 the generation of construction waste where possible. In addition, we will encourage 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<sup>2</sup>. 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.

---

<sup>2</sup> 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 fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

12. At the 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.

13. We estimate that the construction works will generate in total about 13 300 tonnes of construction waste. Of these, we will reuse about 1 983 tonnes (14.91%) of inert construction waste on site and deliver 10 617 tonnes (79.83%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 700 tonnes (5.26%) 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 \$893,807 for the proposed works (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

14. Part of the proposed works fall within three Sites of Archaeological Interest (SAI) as detailed in **Annex 2 to Enclosure 4**. Pursuant to the Development Bureau Technical Circular (Works) No. 6/2009, the proposed works of this project is subject to a Heritage Impact Assessment (HIA). We have carried out a HIA to assess the impact of the proposed works on the SAIs and devised measures to mitigate the impacts concerned. The HIA report was considered by the Antiquities and Monuments Office (AMO), which raised no objection to the report. We then consulted the Antiquities Advisory Board (AAB) on the HIA report on 6 December 2018 and members were generally supportive of the findings of the HIA. We will ensure that the construction works and future maintenance will comply with the mitigation measures, recommendations and requirements stipulated in the HIA report. In case of any amendments to the recommended mitigation measures, recommendations and requirements stipulated in the HIA report during the course of the site works, we will further consult the AMO and the AAB as necessary to formulate additional mitigation measures to ensure that any possible impact on the SAIs is acceptable from the heritage conservation perspective.



15. Other than the works assessed in the aforesaid HIA report, the remainder of the proposed works will not affect any heritage sites, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the AMO.

## LAND ACQUISITION

16. The proposed works do not involve resumption of private land.

## TRAFFIC IMPLICATIONS

17. 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. We will submit proposed temporary traffic arrangement schemes for the works to relevant authorities for comments before implementation.

## BACKGROUND

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

19. 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 a cost of \$4.5 million. 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 were completed in June 2016.

20. On 28 June 2016, we upgraded part of **196WC** to Category A as **198WC** entitled “Implementation of WIN, stage 1” at an estimated cost of \$239.7 million in MOD prices for 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 the consultancies on the investigation and detailed design for the remaining DMAs and PMAs. The INMS is being established for completion by mid-2020.

21. On 1 June 2018, we upgraded another part of **196WC** to Category A as **202WC** entitled “Implementation of WIN, stage 2” at an estimated cost of \$655.4 million in MOD prices for construction of about 275 DMAs and PMAs in Islands, Tsuen Wan, Kwun Tong, Sai Kung, Wong Tai Sin, Sha Tin and Tai Po Districts. In October 2018, we commenced the works for the aforesaid 275 DMAs and PMAs.

22. The remainder of **196WC** originally encompasses the establishment of the remaining about 240 DMAs and PMAs in North, Tai Po, Yuen Long and Tuen Mun Districts, and the reprovisioning of water mains. However, based on the operational experience of the established DMAs, we find it necessary to establish additional DMAs and PMAs by subdividing the established or proposed DMAs and PMAs to enhance the effectiveness and efficiency for monitoring their performance. With regard to the reprovisioning of water mains, we will carry out the risk-based improvement works to water mains assessed with high risk under block allocation **Subhead 9100WX** “Waterworks, studies and investigation for items in Category D of the Public Works Programme”. To this end, we have varied the remaining scopes of **196WC** by (i) including the construction works to establish about 400 additional DMAs and PMAs; and (ii) deleting the reprovisioning of the water mains which will be implemented under the risk-based improvement works to water mains.

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

196WC - 建設智管網  
196WC – Implementation of Water Intelligent Network

區議會諮詢  
Consultation with District Councils

日期 Date	區議會 District Council	委員會 Committee
3.1.2019	荃灣 Tsuen Wan	環境衛生事務委員會 Environmental and Health Affairs Committee
9.1.2019	大埔 Tai Po	環境、房屋及工程委員會 Environment, Housing and Works Committee
10.1.2019	九龍城 Kowloon City	房屋基建委員會 Housing and Infrastructure Committee
17.1.2019	中西區 Central and Western	食物環境衛生及工務委員會 Food, Environment, Hygiene & Works Committee
17.1.2019	油尖旺 Yau Tsim Mong	食物環境衛生及工務委員會 Food, Environment Hygiene and Public Works Committee
21.1.2019	北區 North	地區小型工程及環境改善委員會 District Minor Works and Environmental Improvement Committee
21.1.2019	元朗 Yuen Long	環境改善委員會 Environmental Improvement Committee
24.1.2019	西貢 Sai Kung	交通運輸委員會 Traffic & Transport Committee
25.1.2019	屯門 Tuen Mun	環境、衛生及地區發展委員會 Environment, Hygiene and District Development Committee
28.1.2019	離島 Islands	旅遊，農業，漁業及環境衛生委員會 Tourism, Agriculture, Fisheries and Environmental Hygiene Committee
28.1.2019	南區 Southern	地區發展及房屋事務委員會 District Development and Housing Committee
29.1.2019	黃大仙 Wong Tai Sin	交通運輸委員會 Traffic and Transport Committee

附件四 附錄一  
Annex 1 to Enclosure 4

日期 Date	區議會 District Council	委員會 Committee
31.1.2019	觀塘 Kwun Tong	交通運輸委員會 Traffic and Transport Committee
12.2.2019	灣仔 Wan Chai	發展、規劃及交通委員會 Development, Planning & Transport Committee
14.2.2019	深水埗 Sham Shui Po	環境衛生事務委員會 Environment and Hygiene Committee
19.2.2019	東區 Eastern	規劃、工務及房屋委員會 Planning, Works and Housing Committee
19.2.2019	葵青 Kwai Tsing	規劃及地區設施管理 Planning and District Facilities Management Committee
28.2.2019	沙田 Sha Tin	地區發展及房屋事務委員會 Development & Housing Committee

196WC - 建設智管網  
196WC – Implementation of Water Intelligent Network

具考古研究價值的地點  
Sites of Archaeological Interest

	地點 Site
1	浪濯村具考古研究價值的地點 Long Jok Tsuen Site of Archaeological Interest
2	虎地凹具考古研究價值的地點 Fu Tei Au Site of Archaeological Interest
3	鰲磳沙具考古研究價值的地點 Ngau Hom Sha Site of Archaeological Interest