

For discussion

Legislative Council Panel on Development

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

PURPOSE

This paper seeks Members' support on our proposal to upgrade part of **181WF** entitled "**In-situ reprovisioning of Sha Tin water treatment works (South Works) – advance works**" to Category A at an estimated cost of \$1,660.9 million in money-of-the-day (MOD) prices for the advance works of the in-situ reprovisioning of the South Works of Sha Tin water treatment works (WTW)¹.

PROPOSAL

2. The scope of works under **181WF** for in-situ reprovisioning of the South Works of Sha Tin WTW comprises :-

- (a) Site formation, construction of access roads and associated slope works;
- (b) Reprovisioning of common facilities (i.e. serving both the South Works and the North Works) including the administration building, the power house and the chemical house, alum saturation tanks, and mechanical & electrical workshops and offices in a new logistics centre;
- (c) Reprovisioning of the South Works pumping station;
- (d) Demolition of the South Works treatment processing units including clarifiers, filters and washwater recovery tanks;
- (e) Reprovisioning of the South Works treatment processing units with modern technology including the ozonation buildings, flocculation and sedimentation tanks, 2-stage filters, ultra-violet disinfection facility and residual management facility; and
- (f) Construction of a hydro-turbine house.

¹ Sha Tin WTW consists of two portions namely the South Works and North Works.

3. The part of **181WF** which we propose to upgrade to Category A for the advance works of the in-situ reprovisioning of the South Works comprises -
 - (a) Site formation for the administration building;
 - (b) Reprovisioning of the power house and the chemical house, alum saturation tanks and mechanical & electrical workshops and offices, in a new logistics centre;
 - (c) Construction of a hydro-turbine house; and
 - (d) Construction of access roads and associated slope works.
4. The location of the proposed works is shown on the plan at **Enclosure 1**.
5. Subject to funding approval of the Finance Committee (FC), we plan to commence the proposed advance works in August 2015 for completion in December 2018.
6. We will retain the remainder of **181WF** in Category B. Funding for the remainder of **181WF** will be sought at a later stage.

JUSTIFICATION

7. The 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 entire Central and Western districts on Hong Kong Island, and part of the New Territories, serving a total population of around 2.5 million. As there are new public and private housing developments within the combined supply zone of Sha Tin WTW and Tai Po WTW which will be implemented progressively, it is necessary that the total treatment capacity of the two WTWs will be adequate to meet the increasing demand arising from these new housing developments.
8. The South Works of the Sha Tin WTW was commissioned in 1964 while the North Works was implemented and commissioned in stages in 1973, 1976 and 1983. After more than 50 years of service, the South Works has deteriorated to a stage that its reliable output has been reduced and it is uneconomical to maintain its operation. It is therefore proposed to reprovision the South Works in-situ. During reprovisioning, the South Works has to be taken out of service which will reduce the total treatment capacity of Sha Tin WTW and Tai Po WTW. It is therefore necessary to programme the reprovisioning works such that the total treatment capacity of the two WTWs will be adequate to meet the demand in their combined supply zone during the reprovisioning. Based on the demand forecast, the reprovisioning of the

South Works has to be completed in 2023. Apart from replacing the aged treatment facilities, the reprovisioning works will also uprate the treatment capacity of the South Works from 360,000 cubic metres (m³)/day to 550,000 m³/day to meet the increasing demand arising from the new housing developments in the combined supply zone of Sha Tin WTW and Tai Po WTW.

9. The proposed advance works will fast-track the implementation and pave the way for the main works for in-situ reprovisioning of the South Works to meet the programme as discussed in paragraph 8 above. A site is proposed to be formed at the government land to the west of the Sha Tin WTW for building the new logistics centre. Upon its completion, the existing chemical house, alum saturation tanks, mechanical & electrical workshops and offices in the South Works will be relocated to the new logistics centre, with their original sites freed up for the subsequent reprovisioning works. For similar purpose, the power house will be reprovisioned to release its existing site. To ensure that the access to the North Works will not be affected by the construction traffic during the reprovisioning of the South Works, new access roads to the North Works will be constructed under the advance works. The site for the future administration building will also be formed under the advance works to speed up its construction during the main works. Moreover, to make use of the residual kinetic energy in the inflow of raw water to the WTW, a new hydro-turbine house will be constructed for generation of electricity up to about 520,000 kilowatts-hours (kWh) per year for use in the Sha Tin WTW.

10. The advance works are proposed to commence in August 2015 for completion in December 2018 which will enable the main works for in-situ reprovisioning of the South Works to commence in 2017 for completion in 2023 to meet the demand as elaborated in paragraph 8 above.

FINANCIAL IMPLICATIONS

11. We estimate the cost of the proposed works to be \$1,660.9 million in MOD prices, broken down as follows -

	\$ million
(a) Civil Works	665.9
(b) Electrical and mechanical works	475.6

	\$ million	
(c) Environmental mitigation measures	13.1	
(d) Consultants' fee	26.0	
(i) contract administration	17.6	
(ii) management of resident site staff	8.4	
(e) Remuneration of resident site staff	104.4	
(f) Contingencies	128.5	
	Sub-total	1,413.5 (in September 2014 prices)
(g) Provision for price adjustment	247.4	
	Total	1,660.9 (in MOD prices)

PUBLIC CONSULTATION

12. We consulted the Development and Housing Committee of the Sha Tin District Council (STDC) on 30 October 2014. STDC members in general have no objection to the proposed advance works but requested the Government to minimize any possible impact on the neighbourhood during the construction period.

ENVIRONMENTAL IMPLICATIONS

13. The proposed in-situ reprovisioning of the South Works of Sha Tin WTW is a designated project under the Environmental Impact Assessment (EIA) Ordinance, Cap. 499 ("the Ordinance"). We completed the EIA study in 2014 to address the environmental impacts of the in-situ reprovisioning of the South Works of Sha Tin WTW. The EIA study report concluded that, with the implementation of mitigation measures, the environmental impacts of both the advance works and the main works under the project could be controlled to within the established standards and criteria. The Environmental Permit was granted on 28 January 2015.

14. During the construction of the advance works, we will control noise, dust and site run-off nuisances to within established standards and guidelines through the implementation of appropriate mitigation measures in the contract. These include the use of silencers, mufflers, acoustic lining or shields for noisy construction activities, frequent cleaning and watering of the site, and the provision of wheel-washing facilities. We will implement an Environmental Monitoring and Audit programme during the course of construction to ensure that potential impacts are adequately addressed. We have included a sum of \$13.1 million (in September 2014 prices) in paragraph 11(c) above in the project estimate for the implementation of the environmental mitigation measures in the advance works.

15. At the planning and design stages, we have optimised the design of site levels and layouts as well as the adoption of bored pile retaining walls to reduce the generation of construction waste wherever practicable. 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 facilities². We will encourage the contractor to maximise the use of recycled/recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

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

17. We estimate that the advance works will generate in total about 209,905 tonnes of construction waste. Of these, we will reuse about 14,100 tonnes (6.7%) of inert construction waste on site and deliver 195,505 tonnes (93.1%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 300 tonnes (0.2%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities

² 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 license issued by the Director of Civil Engineering and Development.

and landfill sites is estimated to be \$5.3 million for this project (based on a unit charge rate of \$27 per tonne for disposal at public fill reception facilities and \$125 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation).

HERITAGE IMPLICATIONS

18. The proposed advance works 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.

TRAFFIC IMPLICATIONS

19. To minimise possible disruption to traffic during construction, we have completed a traffic impact assessment (TIA) for the proposed advance works. The TIA has concluded that the proposed advance works would not cause significant impact on the local traffic network.

LAND ACQUISITION

20. The proposed advance works do not require any land acquisition.

BACKGROUND INFORMATION

21. We upgraded **181WF** to Category B in February 2002. In January 2003, we engaged consultants to carry out the investigation study for the proposed works under **181WF** at a cost of about \$10.2 million charged under block allocation **Subhead 9100WX** "Waterworks, studies and investigations for items in Category D of the Public Works Programme".

22. The investigation study was completed in September 2004. It recommended an outline design scheme for the in-situ reprovisioning of the Sha Tin WTW which was used as the basis for further design development of the proposed works.

23. We submitted an information paper [LC Paper No. CB(1)86/07-08(01)] regarding the implementation strategy for the in-situ reprovisioning of the Sha Tin

WTW to the Legislative Council 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 of \$149.1 million in MOD prices. We engaged consultants in August 2010 to undertake the design and site investigation works. We have substantially completed the detail design of the proposed advance works.

24. Through various stages of expansion since the initial commissioning of the Sha Tin WTW, the existing site has already been fully developed with congested facilities. As it is necessary to maintain the continuous operation of the North Works during the reprovisioning of the South Works, a site will be formed at the government land to the west of Sha Tin WTW for constructing the new logistics centre as discussed in paragraph 9 above to facilitate subsequent reprovisioning works. Since the WTW is surrounded by woodland and the East Rail Line, encroachment into the woodland is unavoidable to enable the reprovisioning of the South Works. Through careful layout design and adoption of compact water treatment technologies, the additional land requirements as well as felling of trees have been minimised. We have employed tree specialists to prepare tree preservation, removal and compensation proposals in consultation with the Agriculture, Fisheries and Conservation Department and the Leisure and Cultural Services Department.

25. Tree survey³ has been conducted to identify the trees affected by the project for in-situ reprovisioning of the South Works. Of the 608 trees within the project boundary of the proposed advance works, 59 trees will be preserved and 543 common trees will be removed, including 536 trees to be felled and seven trees to be replanted within the project site. Besides, six important trees⁴ within the project site would be removed during the implementation of the advance works, including three trees to be replanted within the project site and three trees to be felled. It is assessed that the three important trees recommended to be felled are in poor health

³ Tree survey was conducted in 2011 with subsequent review and update in 2013. Site inspections were carried out in Jan 2015 to further update the survey.

⁴ “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.

condition and they would have low survival rate after transplanting. The six important trees to be removed were precious or rare species with five *Aquilaria sinensis* protected under the Protection of Endangered Species of Animals and Plants Ordinance (Cap 586) and one *Ailanthus fordii* protected under the Forest and Countryside Ordinance (Cap 96). None of the trees recommended for removal is in the Register of Old and Valuable Trees. Details of the six important trees and their treatment proposal are summarised at **Enclosure 2**.

26. Besides, there are 193 trees within the project boundary of the main works for in-situ re-provisioning of the South Works. 63 of them will be preserved and 130 common trees will be removed during the main works, including 105 trees to be felled and 25 trees to be replanted within the project site. All trees to be removed under the main works are not important trees.

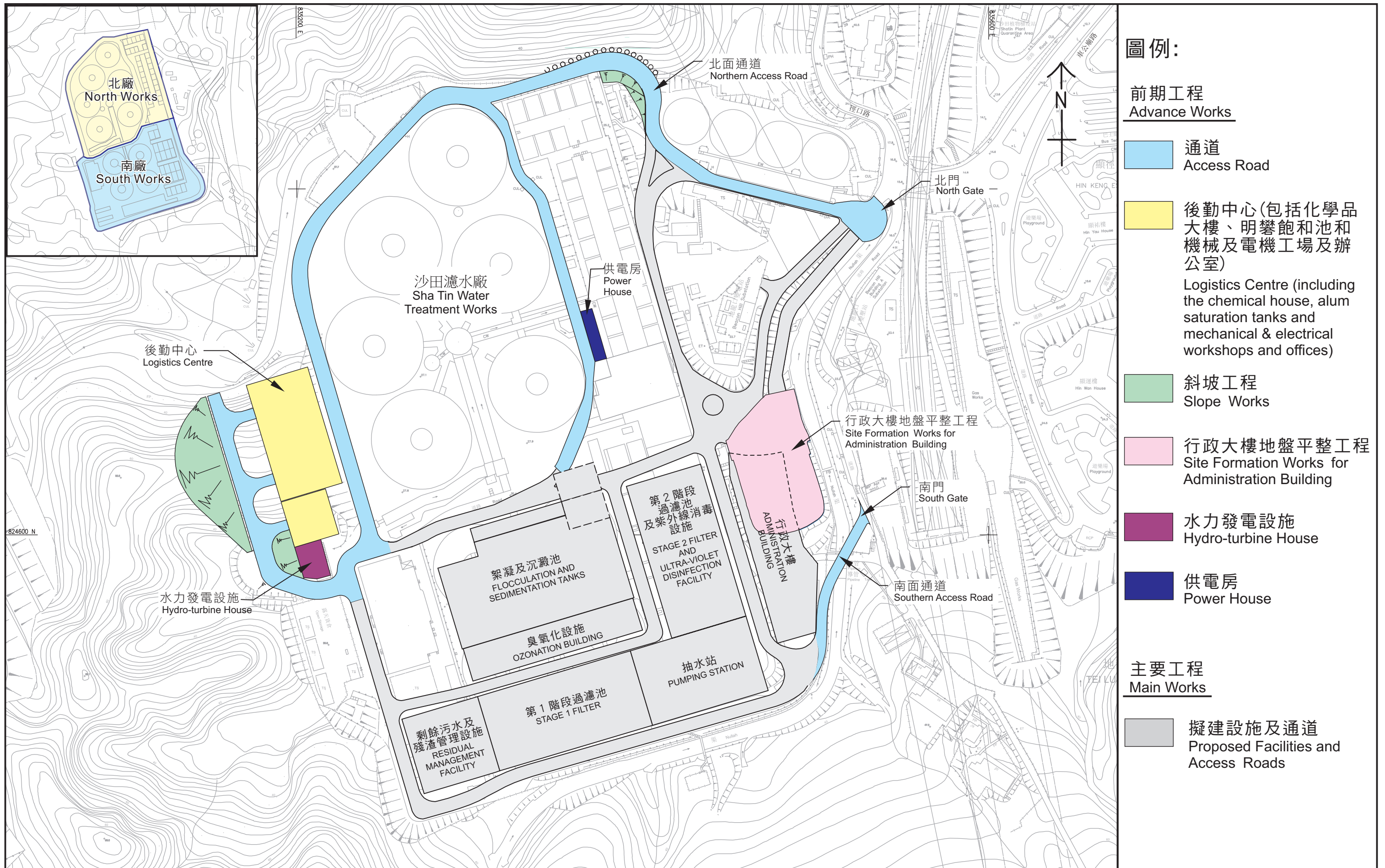
27. We will incorporate planting proposal as part of the project for in-situ re-provisioning of the South Works, including planting of 731 trees comprising 147 heavy standard trees and 584 light standard trees. Moreover, 3,320 shrubs and 6,300 square metres (m²) of grassed area will be established in conjunction with the planting proposal. About 80 heavy standard trees, 500 light standard trees, 900 shrubs and 1,800 m² of grassed area will be implemented under the advance works and the remaining will be implemented under the main works.

28. We estimate that the proposed advance works will create about 500 jobs (400 for labourers and 100 for professional/technical staff) providing a total employment of 16,300 man-months.

WAY FORWARD

29. We plan to seek the support of the Public Works Sub-committee for the proposed part-upgrading of **181WF** to Category A with a view to seeking funding approval from the FC subsequently.

Development Bureau
Water Supplies Department
February 2015



圖例:

**前期工程
Advance Works**

- 通道
Access Road
- 後勤中心(包括化學品大樓、明礬飽和池和機械及電機工場及辦公室)
Logistics Centre (including the chemical house, alum saturation tanks and mechanical & electrical workshops and offices)
- 斜坡工程
Slope Works
- 行政大樓地盤平整工程
Site Formation Works for Administration Building
- 水力發電設施
Hydro-turbine House
- 供電房
Power House

**主要工程
Main Works**

- 擬建設施及通道
Proposed Facilities and Access Roads

核准 APPROVED
Original Signed
總工程師/工程管理 CE / PM
5 / 2 / 2015

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

水務署
WATER SUPPLIES DEPT.
草圖編號 SKETCH NO. SK 62014 / 118

6 棵受影響珍貴樹木的詳情 Details of 6 Important Trees Affected

樹木編號 Tree No.	品種 Species		量度 Measurements			觀賞價值 Amenity value	形態 Form	健康狀況 Health condition	結構狀況 Structural condition	移植合適度 ⁽²⁾ Suitability for transplanting ⁽²⁾		建議處置方法 (保留/移植/ 砍伐) Recommendation (Retain/ Transplant/ Fell)
	學名 Scientific name	中文名 Chinese name	高度 (米) Height (m)	胸徑 ⁽¹⁾ (毫米) DBH ⁽¹⁾ (mm)	樹冠闊度(米) crown spread (m)					(良好/一般/差劣) (Good/Fair/Poor)	(高/中/低) (High/Med/Low)	
TA0179	<i>Aquilaria sinensis</i>	牙香樹 (土沉香)	5.0	180	4.0	差劣 Poor	一般 Fair	差劣 Poor	一般 Fair	低 Low	<p>樹木的形態嚴重傾斜，令根球難以生長。此外，樹幹被觀察到有由砍伐造成的傷口，這會進一步影響該樹於移植後的存活率，因此建議將之砍伐。 (已夾附有關照片)</p> <p>Tree exhibited serious leaning form which make it very difficult to form a viable rootball. Besides, hewed wound was observed on tree trunk and this will further affect the survival rate after transplantation and it is therefore recommended to be felled. (Photographs are attached)</p>	砍伐 Fell
TA0215	<i>Aquilaria sinensis</i>	牙香樹 (土沉香)	7.0	190	4.0	差劣 Poor	一般 Fair	差劣 Poor	一般 Fair	低 Low	<p>樹木的形態嚴重傾斜，令根球難以生長。此外，樹幹被觀察到有由砍伐造成的傷口，這會進一步影響該樹於移植後的存活率，因此建議將之砍伐。 (已夾附有關照片)</p> <p>Trees exhibited serious leaning form which make them very difficult to form a viable rootball. Besides, hewed wound was observed on tree trunks and this will further affect their survival rate after transplantation and it is therefore recommended to be felled. (Photographs are attached)</p>	砍伐 Fell

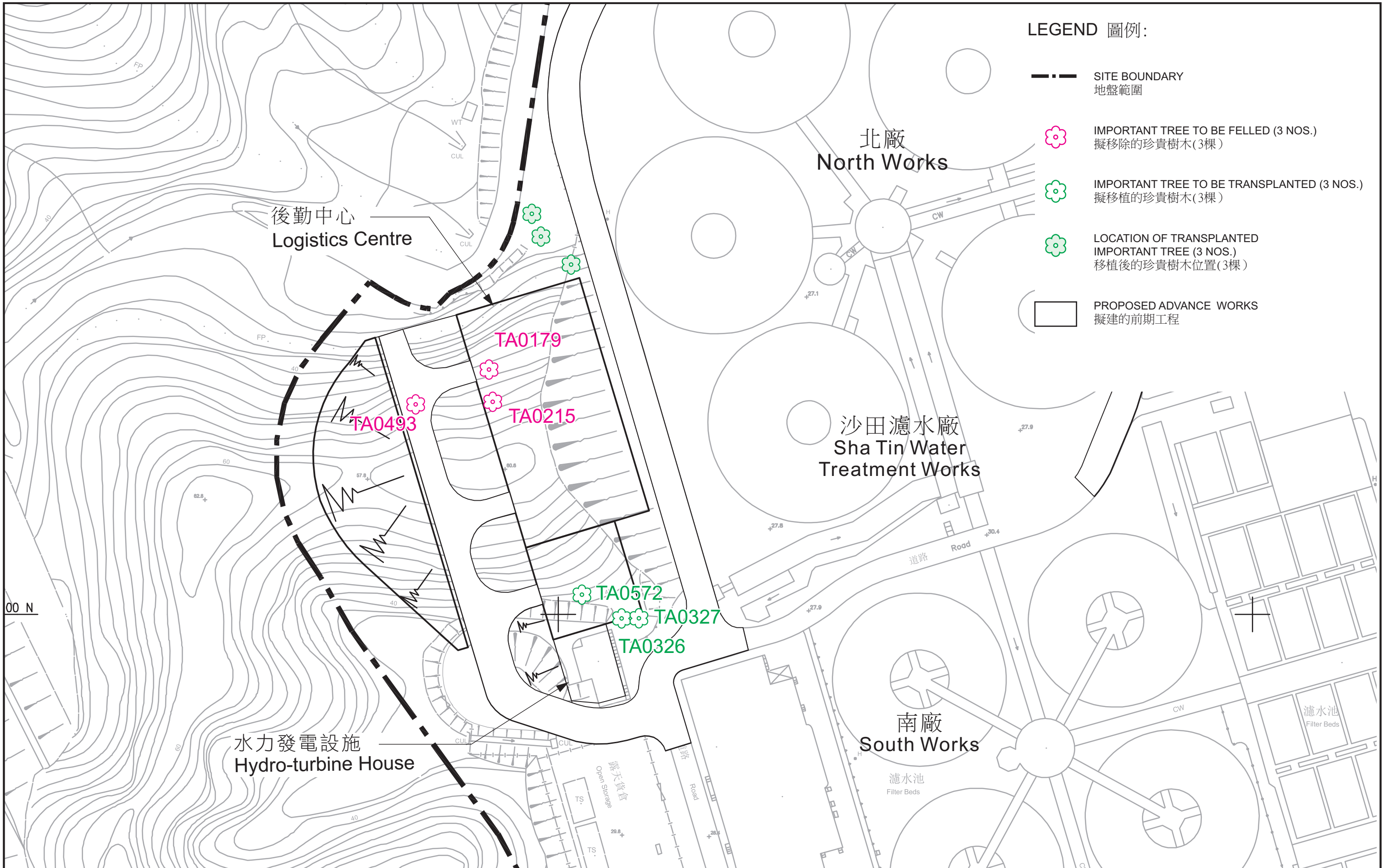
樹木編號 Tree No.	品種 Species		量度 Measurements			觀賞價值 Amenity value	形態 Form	健康狀況 Health condition	結構狀況 Structural condition	移植合適度 ⁽²⁾ Suitability for transplanting ⁽²⁾		建議處置方法 (保留/移植/砍伐) Recommendation (Retain/ Transplant/ Fell)
	學名 Scientific name	中文名 Chinese name	高度 (米) Height (m)	胸徑 ⁽¹⁾ (毫米) DBH ⁽¹⁾ (mm)	樹冠闊度(米) crown spread (m)	(良好/一般/差劣) (Good/Fair/Poor)				(高/中/低) (High/Med/Low)	備註 Remarks	
TA0326	<i>Aquilaria sinensis</i>	牙香樹 (土沉香)	12.0	270	6.0	一般 Fair	良好 Good	一般 Fair	良好 Good	高 High	-	移植 Transplant
TA0327	<i>Aquilaria sinensis</i>	牙香樹 (土沉香)	8.0	170	2.0	良好 Good	良好 Good	良好 Good	良好 Good	高 High	-	移植 Transplant
TA0493	<i>Aquilaria sinensis</i>	牙香樹 (土沉香)	2.0	100	1.0	差劣 Poor	差劣 Poor	差劣 Poor	差劣 Poor	低 Low	樹木的形態嚴重傾斜，整體高度只有 2 米。此外，樹幹被觀察到有由砍伐造成的傷口，這會進一步影響該樹於移植後的存活率，因此建議將之砍伐。 (已夾附有關照片) Tree exhibited a serious leaning form and the overall height is only 2m high. Besides, hewed wound was observed on tree trunk and this will further affect the survival rate after transplantation and it is therefore recommended to be felled. (Photographs are attached)	砍伐 Fell
TA0572	<i>Ailanthus fordii</i>	福氏臭椿 (常綠臭椿)	12.0	100	3.0	一般 Fair	良好 Good	一般 Fair	良好 Good	中 Med	-	移植 Transplant

註： (1) 樹木胸徑是指測量人員從其胸部高度位置量度的樹木直徑（量度的高度是離地 1.3 米）。






(2) 有關評估已顧及個別樹木在調查進行期間的狀況（包括健康、結構、樹齡和根部的狀況）、樹木生長環境（包括地形和易達程度），以及樹木品種的內在特性（移植後的存活率）。

Notes: (1) DBH of a tree refers to its diameter at breast height (i.e. measurement at 1.3 m above ground level).

(2) Assessment has been taken into account conditions of individual tree at the time of survey (including health, structure, age and root conditions), site conditions (including topography and accessibility), and intrinsic characters of tree species (survival rate after transplanting).



LEGEND 圖例:

-  SITE BOUNDARY
地盤範圍
-  IMPORTANT TREE TO BE FELLED (3 NOS.)
擬移除的珍貴樹木(3棵)
-  IMPORTANT TREE TO BE TRANSPLANTED (3 NOS.)
擬移植的珍貴樹木(3棵)
-  LOCATION OF TRANSPLANTED IMPORTANT TREE (3 NOS.)
移植後的珍貴樹木位置(3棵)
-  PROPOSED ADVANCE WORKS
擬建的前期工程

核准 APPROVED
Original Signed
總工程師/工程管理 CE / PM
5 / 2 / 2015

工務計劃項目第181WF號 — 沙田瀘水廠(南廠)原地重置工程 — 前期工程
珍貴樹木
PWP ITEM NO. 181WF — In-situ reprovisioning of Sha Tin water treatment works (South Works) - advance works
(甲級工程)
(CAT 'A' Submission)
Important Tree


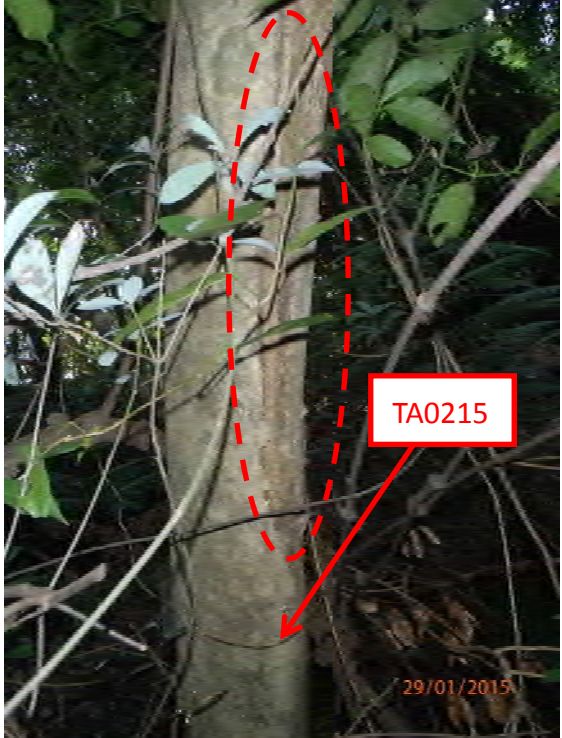
水務署
WATER SUPPLIES DEPT.
草圖編號
SKETCH NO. SK 62014 / 119

附件 2 Enclosure 2 (Sheet 3)

樹木編號：TA0179 - 牙香樹（土沉香） - 建議砍伐
Tree No.: TA0179 – Aquilaria sinensis – To be felled

	<p>TA0179 :</p> <p>概況 斜坡上的樹木的形態嚴重傾斜，而且不均。</p> <p>General View The tree on slope exhibited serious leaning and unbalanced form.</p>
	<p>TA0179 :</p> <p>缺陷— 樹木被觀察到有由砍伐造成的傷口。</p> <p>Defect - Hewed wound was observed.</p>

樹木編號：TA0215 – 牙香樹 (土沉香) - 建議砍伐
Tree No.: TA0215 - Aquilaria sinensis – To be felled

	<p>TA0215 :</p> <p>概況 斜坡上的樹木的形態嚴重傾斜。</p> <p>General View The tree on slope exhibited serious leaning form.</p>
	<p>TA0215 :</p> <p>缺陷— 樹木被觀察到有由砍伐造成的傷口。</p> <p>Defect- Hewed wound was observed</p>

樹木編號：TA0493 – 牙香樹 (土沉香) - 建議砍伐
Tree No.: TA0493 - Aquilaria sinensis – To be felled

	<p>TA0493 :</p> <p>概況 斜坡上的樹木的形態嚴重傾斜。</p> <p>General View The tree on slope exhibited serious leaning form</p>
	<p>TA0493 :</p> <p>缺陷— 樹木被觀察到有由砍伐造成的傷口。</p> <p>Defects - Hewed wound was observed.</p>