Consultation Paper

Design and Construction for the first stage of Desalination Plant at Tseung Kwan O

1 Purpose

1.1 The paper introduces the project "Design and Construction for the First Stage of Desalination Plant at Tseung Kwan O" (the Project) initiated by the Water Supplies Department (WSD) and seeks members' comments and support for WSD to proceed with design and site investigation of the Project.

2 Background of the Project

- 2.1 Fresh water is a precious resource and its supply is not unlimited. Many places in the world are facing fresh water shortage problem. A reliable fresh water supply is of paramount importance in sustaining Hong Kong's development and economic growth. As at today and in at least the coming 15 years, the raw water collected from the local water gathering ground together with the supply from the Dongjiang Water is generally adequate and reliable to meet our water demand. However, our water source is facing various challenges, including increasing local water demand arising from population and economic growth, occurrence of extreme weather and severe drought as a result of climate change, as well as competition for water resource due to the rapid economic development in the Pearl Delta Area.
- 2.2 In this connection, WSD has been implementing the "Total Water Management (TWM) Strategy" since 2008 to better prepare Hong Kong for uncertainties such as acute climate changes and low rainfall. Besides, it will enhance Hong Kong's role as a good partner of other municipalities in the Pearl River Delta in promoting sustainable use of water in the light of the rapid growth of water demand in the region. The TWM strategy is an integrated, multi-sectorial approach built on good water demand and supply management initiatives. One of the key supply management initiatives is to diversify the water supply resources and to develop new water resources. Under the TWM strategy, therefore, Hong Kong should broaden its strategic investment in advanced water treatment such as the reverse osmosis (RO) technology for desalination plant, not affected by climate change.
- 2.3 WSD has been keeping of the latest developments in desalination technology. The feasibility studies in 2002 and 2007 have confirmed that seawater desalination using reverse osmosis is a viable technology to produce potable water in compliance with the World Health Organisation standards. A 10 ha site in Tseung Kwan O (Area 137) has been reserved for the construction of a desalination plant. A consultant was employed in December 2012 to conduct a planning and investigation study on this plant. The study includes the detailed assessment on cost effectiveness, formulation of implementation strategy and programme, and various impact assessments for the construction of the desalination plant and the study is now largely completed. Key results of the study are detailed in Section 4 below.

3 Brief Description of the Project

- 3.1 The scope of the Project comprises the following components as well as the associated design and site investigation (Layouts are attached in Annex 2):
 - a) formation of a site in Tseung Kwan O (Location plan of the desalination plant is attached in Annex 1) which provides sufficient area for a desalination plant with ultimate water production output at 270 million liters per day (MLD);
 - b) construction of seawater treatment components of a desalination plant with output at 135 MLD as the first stage of the plant;
 - c) construction of associated facilities (the intake pipe, outfall pipe, administrative building, laboratory, maintenance workshop, chemical building, chemical store, sludge filter press building, treated water pumping station and power supply facilities, etc.);
 - d) laying of a trunk main for the transfer of treated water produced from the desalination plant to the existing Tseung Kwan O Fresh Water Primary Service Reservoir; and
 - e) construction of the associated civil, structural, geotechnical, electrical and mechanical works.
- 3.2 We plan to seek funding from Legislative Council in the 1st quarter of 2015 for employing consultants to take forward the design and site investigation (except for item (d) above which will be carried out by in-house resources) of the Project. The construction of the desalination plant and its associated works will commence in stages. It is anticipated that the desalination plant will be commissioned in 2020.

4 Key Results of the Planning and Investigation Study

4.1 Land Requirement

4.1.1 The proposed desalination plant is located at Tseung Kwan O Area 137 with a site area of about 10 ha. The reserved land is sufficient for future expansion of the desalination plant to an ultimate capacity at 270 MLD. Additional land resumption and clearance are not anticipated.

4.2 Environmental

- 4.2.1 Pursuant to Environmental Impact Assessment (EIA) Ordinance (Cap.499), the construction and operation of the desalination plant is classified as a designated project. Environmental Protection Department (EPD) has issued a study brief for the desalination plant requiring the assessment of the potential impact on ecology, water quality, hazard to life etc. The environmental impact assessment is substantially completed and the EIA report will be submitted to EPD shortly in accordance with the EIA Ordinance. Based on the assessment results and with implementation of appropriate mitigation measures, no unacceptable adverse environmental impact is anticipated.
- 4.2.2 As a by-product of the desalination processes, the produced brine will be disposed to the sea via a properly designed outfall system. The brine will be diluted and its concentration will

be rapidly reduced to the salinity level of marine water. The operation will not cause unacceptable adverse environmental impact to the surrounding environment. Similar design has been successfully adopted in desalination plants in many countries such as Spain, Australia etc. which have stringent environmental protection regulations. Furthermore, water quality at nearby sensitive receivers will be monitored regularly during plant operation. In addition, the ecology survey found no endangered species or habitat in the assessment area and the desalination plant would not give rise to significant ecology impact.

- 4.2.3 In construction phase, standard site practice and dust control measures would be implemented and provided to minimise the impact on air quality and noise. In operation phase, noise sources such as high pressure pumps and exhaust fans for ventilation system will be enclosed in the building structures to minimize noise generated. Furthermore, there are no sensitive receivers in the vicinity of the plant. It is anticipated that the desalination plant would not give rise to unacceptable impact to the nearby environment in term of air quality and noise.
- 4.2.4 Storage and usage of chemicals is anticipated in the desalination plant for water treatment process. The design of the chemical store will make reference to other existing water treatment works in Hong Kong and the result of the hazard assessment shall comply with the Technical Memorandum of Environmental Impact Assessment Ordinance (EIAO). The risk level of the chemical store is found to be acceptable which is similar to other chemical stores of existing water treatment works.

4.3 Traffic Impact

4.3.1 In accordance with traffic impact assessment carried out, the traffic impact associated with the mainlaying works along Wan Po Road, Po Hong Road, and Tsui Lam Road is considered acceptable. Trenchless method will be adopted at critical road sections as appropriate and the works will be carried out outside traffic peak hours to reduce traffic impact where and when needed. The results of traffic impact assessment will be further reviewed and updated during the design stage.

5 Adjacent Facilities

5.1 An existing pier at the southern boundary of the proposed desalination plant is currently used by the Mines Division of Civil Engineering and Development Department for the offloading of explosive materials for blasting operation. A risk assessment on its impact on the desalination plant has been conducted and the overall risk level is acceptable even with the continued operation of this pier.

6 Advice Sought

6.1 Members of the Sai Kung District Council are invited to offer comments on the Project. Subject to Members' comment, WSD plans to proceed with the design and site investigation of the Project.

Water Supplies Department January 2015

Enclosure – Drawings

- Annex 1 Location of the proposed desalination plant at Tseung Kwan O
- Annex 2 Preliminary general layout of proposed desalination plant at Tseung Kwan O





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	LEGEND:
	DESALINATION PLANT SITE BOUNDARY 海水化淡廠邊界
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	Approved
	Agreement No. CE 21/2012 (WS)
	Project Title TSEUNG KWAN O DESALINATION
INTAKE	PACKAGE 1 – DESIGN & CONSTRUCTION
	將軍澳海水化淡廠及相關設施,第一期 - 設計與建造
	PRELIMINARY GENERAL LAYOUT
	OF PROPOSED DESALINATION
	握建將軍澳海水化淡廠
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