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The Government of the Hong Kong Special Administrative Region
The People's Republic of China

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14 October 2014

Hon Tommy CHEUNG Yu-yan, SBS, JP
Room 818, Legislative Council Complex,
1 Legislative Council Road,
Central, Hong Kong

Dear

A handwritten signature in black ink that reads 'Tommy'.

Organic Waste Treatment Facilities Phase 1

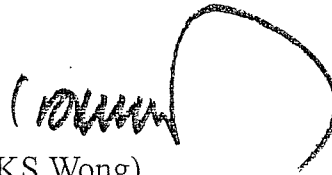
Thank you for your letter of 9 October 2014 setting out further questions on the proposed organic waste treatment facilities phase 1. Our replies to the questions are attached.

I believe we share the common objective of ensuring cost-effectiveness of the OWTF phase 1 project. The OWTF phase 1 has been developed having regard to the completed feasibility study and EIA. For other food waste treatment projects, please rest assured that we would keep an open mind on various issues and continue to explore them in a suitable manner.

On the issue of fees and charges, MSW charging is one of the important measures unveiled in the "Hong Kong Blueprint for Sustainable use of Resources" to achieve our target to reduce the per capita waste disposal rate by 40% in 2022. We are studying the way forward for the implementation of MSW charging. It should be noted that MSW charging is not meant to achieve cost recovery, but to create economic incentive for people and various trades to reduce avoidable waste and to separate recyclables from waste stream.

If you have any further questions, we would be pleased to provide further information.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'KS Wong', with a large, sweeping flourish extending to the right.

(KS Wong)

Secretary for the Environment

Replies to Further Questions from HON Tommy Cheung

- Q1. Organic waste treatment facilities in other countries are usually housed by steel frame structure, which is usually lower in cost and can be built in shorter time. What is the consideration in this proposed works in architectural design with respect to cost- effectiveness?

Reply to Question 1:

We share the objective of ensuring that the proposed works for the OWTF Phase 1 need to be cost-effective. To this end, we have adopted a performance based Design-Build-Operate contract arrangement, giving the tenderers the flexibility to come up with the most cost-effective design to meet the requirements. Under the Design-Build-Operate (DBO) contract arrangement, we have specified the necessary and essential design and construction requirements to ensure the functionality, operational and environmental performance, durability, sustainability and safety of the OWTF phase 1 facilities. These requirements conform with factory grade architectural design rather than office grade design. Tenderers were free to propose the most cost-effective method and materials of construction to suit their design and operation while meeting the specified requirements. We note that both steel and concrete framing structures were proposed in the returned tenders and do not see indications from the proposals that the use of steel or concrete was a major deciding factor on the returned prices in this particular project.

Secondly, price was a major consideration in the assessment of the returned tenders, which carried a weighting of 50% in the overall tender assessment. In the re-tendered exercise, we reminded all potential tenderers at the pre-tender briefing to come up with cost-effective design to meet the requirements and to minimize the overall project costs.

- Q2. From the break-down of capital cost, the works of OWTF is a self-contained design, with in-house wastewater treatment facility (estimated cost \$48 Mn). Are there any cost and operational synergy effects for wastewater to be delivered to nearby Siu Ho Wan Sewage

Treatment Works? The design capacity of the nearby Siu Ho Wan wastewater treatment works is 180,000 m³/day and its current utilization is less than 30%. The wastewater from OWTF phase 1 would be approximately 200 m³/day, which is around 0.1% of the capacity of the said wastewater treatment works. It is well understood that if wastewater is to be discharged to public sewer, the effluent from organic waste treatment process should be treated to a level that comparable to ordinary household and commercial wastewater. However, instead of discharge to public sewer, OWTF phase 1 could be connected directly to the wastewater treatment works through a dedicated pipeline. Effluent could be then mixed with the other incoming wastewater and properly treated by the already built facilities. As such, the wastewater treatment equipment in OWTF phase 1 can be down-sized to manage the need of recycled water for process use water only. Shall we save more money by the following two options: (1) discharging the wastewater for treatment to nearby Siu Ho Wan Sewage Treatment Works through a dedicated pipeline or (2) diluting the wastewater with the treated water from Siu Ho Wan Sewage Treatment Works before discharging it to public sewer?

Reply to Question 2:

The OWTF phase 1 project has already been subject to the feasibility study and EIA, which started a few years ago, on the basis that there would be pre-treatment of wastewater from the project to meet the standards under the Water Pollution Control Ordinance (WPCO) Technical Memorandum (TM) for discharge to public foul sewer, before the wastewater is further treated at the Siu Ho Wan Sewage Treatment Works. The pre-treatment has become one of the recommendations in the approved EIA. Any major changes to wastewater treatment arrangement would require supplementary assessment on the technical viability and implications and would likely result in further delay to the project.

OWTF phase 1 is also subject to control of the WPCO. Under WPCO, wastewater from the trade shall meet the standards for discharge to public sewer in accordance with the Technical Memorandum on effluent standards in order to protect the downstream wastewater treatment works and the ultimate receiving water bodies.

The main concern of the wastewater from the OWTF is the high ammonia content which is toxic to marine life. The estimated ammonia content of the wastewater generated by the OWTF phase 1 before pre-treatment is about 2,500 mg/L, which is 12 times higher than the effluent limit for discharge into sewer. The Siu Ho Wan Sewage Treatment Works (SHWSTW) adopts chemically enhanced primary treatment (CEPT) which can remove 75% of Suspended Solids (SS) and 60% of Biochemical Oxygen Demand (BOD). There is no specific process in the SHWSTW for treatment and removal of ammonia-nitrogen. Without the proposed wastewater treatment facility at the OWTF1, the wastewater generated will deteriorate water quality and will breach the prevailing legal environmental requirements.

For other food waste treatment projects, we would examine such issues in the context of relevant studies having regard to the circumstances of the project, the locational characteristics and the nearby wastewater treatment infrastructure.

- Q3. The estimated cost of heat recovery, power generation and surplus electricity export systems is \$99.6M. From previous information, 14 million kWh of surplus electricity can be supplied to the power grid per year. The installed power generation capacity is estimated to be around 2MW and the cost would be exceptionally high. What will be the feed-in tariff of electricity supplied to power grid and the corresponding revenue? Is it possible to make it contribute to off-set part of the cost of the project?

Reply to Question 3:

The cost for item (f) Heat recovery, power generation and surplus electricity export systems in the OWTF phase 1 construction cost breakdown is estimated at \$105.3 million in September 2014 prices, including \$38.6 million for supplying heat and power for internal use and \$66.7 million for export of surplus electricity.

Apart from the OWTF's internal use, we estimate that about 14 million kWh of surplus electricity can be exported each year upon full operation. We plan to export part of the surplus electricity to the nearby government facilities, including the Drainage Services Department's Siu

Ho Wan Sewage Treatment Works and the Water Services Department's Siu Ho Wan Water Treatment Works, and part to the existing power grid. We have also explored with a power company the viability of connecting OWTF phase 1 to the existing grid and found it feasible for the Government to pursue this matter further.

According to our current estimate, the capital cost for power export could be recovered within 10 years from the saving of electricity charges by supplying surplus electricity to the Siu Ho Wan Sewerage Treatment Works and Siu Ho Wan Water Treatment Works plus the revenue from sale of electricity.

Upon funding approval and award of the OWTF phase 1 Contract, we will discuss and negotiate with the power company the term of sales and the detailed technical requirements. In the negotiation, we will follow a criterion that there shall be no impact on the cost of power generation to the power company such that the sale of surplus electricity to the power company shall not cause any increase in electricity tariffs to the public.

For other food waste treatment projects, we would continue to explore the feasibility of utilising gas directly for various beneficial uses as there are certain merits in doing so wherever such opportunities are available and the conditions (eg. availability of existing gas network) are suitable.

- Q4. The anaerobic digestion residues are handled by composting (\$20.5Mn). Due to the relatively small local agricultural and gardening industries in Hong Kong, the demand for compost is in doubt. The Mainland is also self-sufficient in compost production. Have you assessed the difficulties and the costs for Hong Kong to open up the compost market of the Mainland? Even under the situation of your suggested market demand of 20,000 tonne per year, the compost arising from treating organic waste of commercial sector alone would be over 30,000 tonne per year. Composting is obviously not an appropriate mean to handle the residue. Instead of investing in composting system, is there any consideration in recycling of the residue by means of sludge incineration to generate energy?

Reply to Question 4:

The choice of treatment technology, i.e. anaerobic digestion and composting, is in line with latest international practices, and is consistent with the policy of sustainable use of resources, maximization of energy and material recovery, and minimization of landfilling as stipulated in the “Hong Kong: Blueprint for Sustainable Use of Resources 2013-2022”.

The OWTF phase 1 will produce about 7,000 tonnes of compost per year. We estimate that the demand of compost / fertilizer in Hong Kong of around 20,000 tonnes per annum should be able to fully absorb the compost produced from the OWTF.

The co-incineration of anaerobic digestion residues (digestate) with sludge is a very specific and complex process and would require further studies to confirm the technical viability and design requirements of the treatment facility. It is because the characteristics of digestate and sewage sludge are different and it may involve some operational modifications of the existing sludge treatment process. Also, the feasibility study, the approved EIA, the environmental permit and the tender for the OWTF Phase 1 are all based on the treatment of the residue by composting, rather than the disposal of the residues by thermal treatment, and any change of disposal method at this stage would cause further delay to the OWTF Phase 1 and is not recommended.

Having said that, we would examine the viability and the design parameters for the application of the co-incineration of digestate and sewage sludge at the Sludge Treatment Facility with a view to determining if it is appropriate for other food waste treatment projects.

Environmental Protection Department
October 2014