

**For discussion
on 23 January 2006**

Legislative Council Panel on Environmental Affairs

PWP Item 5167DR – Provision of Grease Trap Waste Treatment Facility at a Refuse Transfer Station

Purpose

This paper briefs Members on the Administration's proposal to submit PWP Item **5167DR** "Provision of Grease Trap Waste Treatment Facility at a Refuse Transfer Station" to the Public Works Subcommittee for upgrading to Category A at an estimated cost of \$85.3 million in money-of-the-day (MOD) prices.

Background

2. Grease traps are installed at restaurants and food processing establishments to separate the cooking oils and animal fats from sewage flow because oil and grease will clog sewers and affect the treatment processes of sewage treatment plants. The oil and grease intercepted by grease traps has to be removed regularly to ensure the proper functioning of the grease traps.

3. For large grease traps, the restaurants and food processing establishments employ collectors registered with the Environmental Protection Department (EPD) to collect the grease trap waste (GTW) by means of road tankers. Currently 71 collectors are registered with the EPD for the collection of GTW. The GTW collected has a high water content (over 90%), as well as some oil & grease and other food debris.

4. At present, the GTW collected is delivered to an interim grease trap waste treatment facility (IGTWTF) located in the West New Territories (WENT) Landfill at Nim Wan, Tuen Mun for treatment before it is disposed of at the landfill. This interim facility needs to be replaced by a permanent facility for the following reasons:-

(a) It is operating in an overloaded condition as its design capacity is only 250 tonnes per day while the average intake of the IGTWTF was around 400 tonnes per day in 2005;

- (b) Its location at Nim Wan, Tuen Mun is remote and not convenient to most GTW collectors in the urban area;
- (c) It is an interim facility and its services cannot be provided when the site is required for landfilling of waste in the near future; and more importantly
- (d) The treated GTW is not recovered for reuse and has to be disposed of at the landfill after mixing with Pulverised Fuel Ash (PFA).

5. We propose that a permanent grease trap waste treatment facility (GTWTF) should be provided in an operating Refuse Transfer Station (RTS) located in the urban area to replace the IGTWTF at Nim Wan, Tuen Mun because:

- (a) Most GTW is generated and collected in the urban area. Locating the permanent GTWTF at an urban Refuse Transfer Station (RTS) would minimize the transportation distance of GTW;
- (b) Utilizing the existing infrastructural support available at an operating RTS, including reception and loading areas, odour control units etc will reduce environmental impacts and achieve cost savings in the new facility; and
- (c) The development of the permanent GTWTF would facilitate the recovery of grease trap waste.

Two RTSs located in urban areas, namely West Kowloon Transfer Station (WKTS) and Sha Tin Transfer Station (STTS) were identified as the best available potential sites for the permanent GTWTF. The contractors of WKTS and STTS were invited to submit proposals for developing a GTWTF within the existing RTS boundary in November 2004. The proposal submitted by the contractor of the WKTS was the better between the 2 proposals and was therefore selected.

Proposal

6. We propose to develop and operate a permanent GTWTF at the existing WKTS located at Sham Shui Po, Kowloon. The proposed GTWTF

will be located completely within the boundary of the existing WKTS. The location of the proposed GTWTF is shown in Enclosure 1.

7. The project includes the design and construction of facilities for the reception, treatment, recovery and disposal of grease trap waste. The design capacity of the proposed facility will be 450 tonnes per day which, with further modification if proven to be necessary in future, could be increased to sustain GTW treatment of 500 tonnes per day. The contractor of WKTS will make use of the existing waste reception and weighing facilities of the WKTS for reception of GTW collection road tankers. The whole grease trap waste unloading operation will be carried out within the existing waste tipping hall which is fully enclosed and under negative air pressure. The air in the tipping hall will be cleaned by an efficient air scrubbing system prior to discharge to the atmosphere to minimize any odour impact to the environment. The wastewater in the GTW will be properly treated in a wastewater treatment system before discharge to foul sewer.

8. One of the major benefits of the proposed facility is to recover the oil and grease from GTW for reuse. The grease trap waste unloaded from the collection tankers will be processed in a treatment system where the oil and grease in the GTW will be concentrated into a semi-solid state which can then be recovered for reuse as an alternative industrial fuel, hence reducing reliance on fossil fuel.

9. An outline of the oil and grease recovery process is shown in Enclosure 2. The end product of the process, i.e. recovered oil and grease, is essentially a purified animal and vegetable oil/fat concentrate containing mainly organic fatty acids. Because of its high calorific value, it can be used as an alternative biofuel in replacing fossil fuel. Due to its food origin, the sulphur content of the recovered oil and grease is much lower than the sulphur content of industrial fuel used in Hong Kong and thus the use of it as a replacement fuel can reduce the emission of sulphur oxides. The recovered oil and grease successfully used as an alternative fuel replacing liquid fossil fuel in industrial furnances in France.

10. Based on the current GTW intake of 400 tonnes per day, we estimate that the proposed facility should be able to recover approximately 15 tonnes of recovered oil and grease for reuse on a daily basis (noting that the water content of GTW is over 90%). The recovered oil and grease will be sold to potential users by the contractor on a commercial basis. In the contract that we will enter with the contractor of WKTS, we will require the contractor to pay a royalty to the Government as a percentage of the net profit arising from the sale of the recovered oil and grease. We will negotiate

the contract terms with the contractor of WKTS after funding approval. In addition, we are currently exploring the potential outlets (e.g. for installations at other waste facilities) for reusing the recovered oil and grease. We will ensure that the contractor can find suitable outlets to reuse the recovered oil and grease and we will maintain an appropriate record of this utilization.

11. We plan to commence the proposed works in June 2006 for completion in May 2007.

Financial Implications

12. We estimate the cost of the proposed works to be \$85.3 million in MOD prices, made up as follows –

	\$ million	
(a) Design	4.5	
(b) Civil engineering works	22.8	
(c) Building works	10.5	
(d) Grease Trap Waste reception, unloading, treatment, oil and grease recovery facilities	18.9	
(e) Wastewater treatment and ancillary facilities	19.7	
(f) Electrical and mechanical equipment	7.7	
(g) Independent assessor's fees	0.8	
(h) Contingencies	0.3	
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Sub-total	85.2	(in September 2005 prices)
(i) Provision for price adjustment	0.1	
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Total	85.3	(in MOD prices)
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13. We intend to implement the project under a Design-Build-and-Operate contract arrangement. Subject to approval of funding, we will enter into a Supplementary Agreement (SA) with the contractor of WKTS. We will require the contractor to operate the GTWTF in accordance with the performance requirements laid down in the SA. The Government will pay the contractor the operating charges of the facility by monthly instalments in arrears. The annual operating cost is estimated to be \$9.7 million per year before the proceeds from the sale of the recovered oil and grease. The details are in Enclosure 3. Moreover, the operating cost of the proposed facility at WKTS (around HK\$66.69/tonne) is much lower than the current operating cost of the interim facility at WENT Landfill (around HK\$150/tonne). Based on the current GTW intake of 400 tonnes per day, there will be a saving of around HK\$12 million per annum¹ by operating the proposed GTWTF when compared to the interim facility. More importantly, the oil and grease recovered from GTW can be put into good use and valuable landfill capacity can be preserved.

14. The contract management, supervision and environmental monitoring during the operation stage will be undertaken by the existing EPD staff currently overseeing the contract of WKTS. No additional staff and other recurrent costs will be required.

15. We estimate that the proposed project will create 98 jobs (8 professional/technical staff and 90 labourers), totalling 980 man-months during the design and build stage, and will provide 7 jobs (7 labourers) during the operation stage.

Public Consultation

16. On 3 November 2005, we consulted the Environment and Food Committee of the Sham Shui Po District Council on the project. Members have no objection to the proposed project.

17. We have also informed all the grease trap waste collectors registered with the EPD of our plan to replace the interim grease trap waste treatment facility located in the WENT Landfill at Nim Wan, Tuen Mun by a permanent facility located in the WKTS at Sham Shui Po, Kowloon. They have no objection to the proposal.

¹ $(\$150 - \$66.69) \times 400 \times 365 = \12 million

Environmental Implications

18. The proposed GTWTF constitutes a material change to an exempted project (i.e. the WKTS). It requires an environmental permit under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) for the construction and operation of the project. Having regard to the project profile, the Director of Environmental Protection is satisfied that the impact of the project and the mitigation measures meet the requirements of the Technical Memorandum on EIA Process. The permission to apply directly for an environmental permit was granted on 9 January 2006 with conditions. We shall implement the environmental mitigation measures set out in the project profile and as required by the Director of Environmental Protection. We estimate the cost of implementing the environmental mitigation measures to be around \$2.4 million. We have included this cost in the project estimate for item (d) “grease trap waste reception, unloading, treatment, oil and grease recovery facilities” and item (e) “wastewater treatment and ancillary facilities” in paragraph 11.

19. During the Design and Build part of the contract, we will require the contractor to appoint an independent third party, with Government’s agreement, to ensure that the facility complies with the contract requirements. During the contract period, we will withhold payment to the contractor if there is any non-compliance with the required environmental standards. In addition, we will control dust, noise and site run-off nuisance during construction to within established standards and guidelines through the implementation of mitigation measures in the relevant works contract.

20. We will require the contractor to consider measures in the planning and design stages to reduce the generation of construction and demolition (C&D) materials where possible. In addition, we will require the contractor to reuse inert C&D materials in other suitable construction sites as far as possible, in order to minimize the disposal of C&D materials at public fill reception facilities. We will encourage the contractor to maximize the use of recycled or recyclable C&D materials, as well as the use of non-timber formwork to further minimize the generation of construction waste.

21. We will also require the contractor to submit a waste management plan (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reduce, reuse and recycle C&D materials. We will ensure that the day-to-day operations on site comply with the approved WMP. We will control the disposal of public fill, C&D materials and C&D waste to public fill reception facilities, sorting facilities and landfills respectively through a trip-ticket system. We will require the contractor to

separate public fill from C&D waste for disposal at appropriate facilities. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

22. We estimate that the project will generate about 570 tonnes of C&D materials. Of these, we will deliver 285 tonnes (50%) to public fill reception facilities² for subsequent reuse, and 57 tonnes (10%) to sorting facilities in order to retrieve the inert portion for reuse as public fill. In addition, we will dispose of 228 tonnes (40%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites, together with the cost for handling the materials at sorting facilities is estimated to be \$41,895 for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities, \$100/tonne at sorting facilities and \$125/tonne³ at landfills).

23. More importantly, this project will also bring about additional environmental benefits as the new facility is designed to recover oil and grease which has a high calorific value for beneficial reuse such as industrial fuel to replace fossil fuel. Moreover, since the new GTWTF is located in the urban area, it will not be necessary for GTW collectors to transport GTW all the way from the urban areas to Tuen Mun for disposal and thus the road traffic associated with the transportation of GTW will be reduced. We estimate that 90% of the collection journeys will be significantly shorter as a result of the relocation of the GTWTF. Air pollutants emitted by GTW collection vehicles will also be reduced because of the shorter haulage distance.

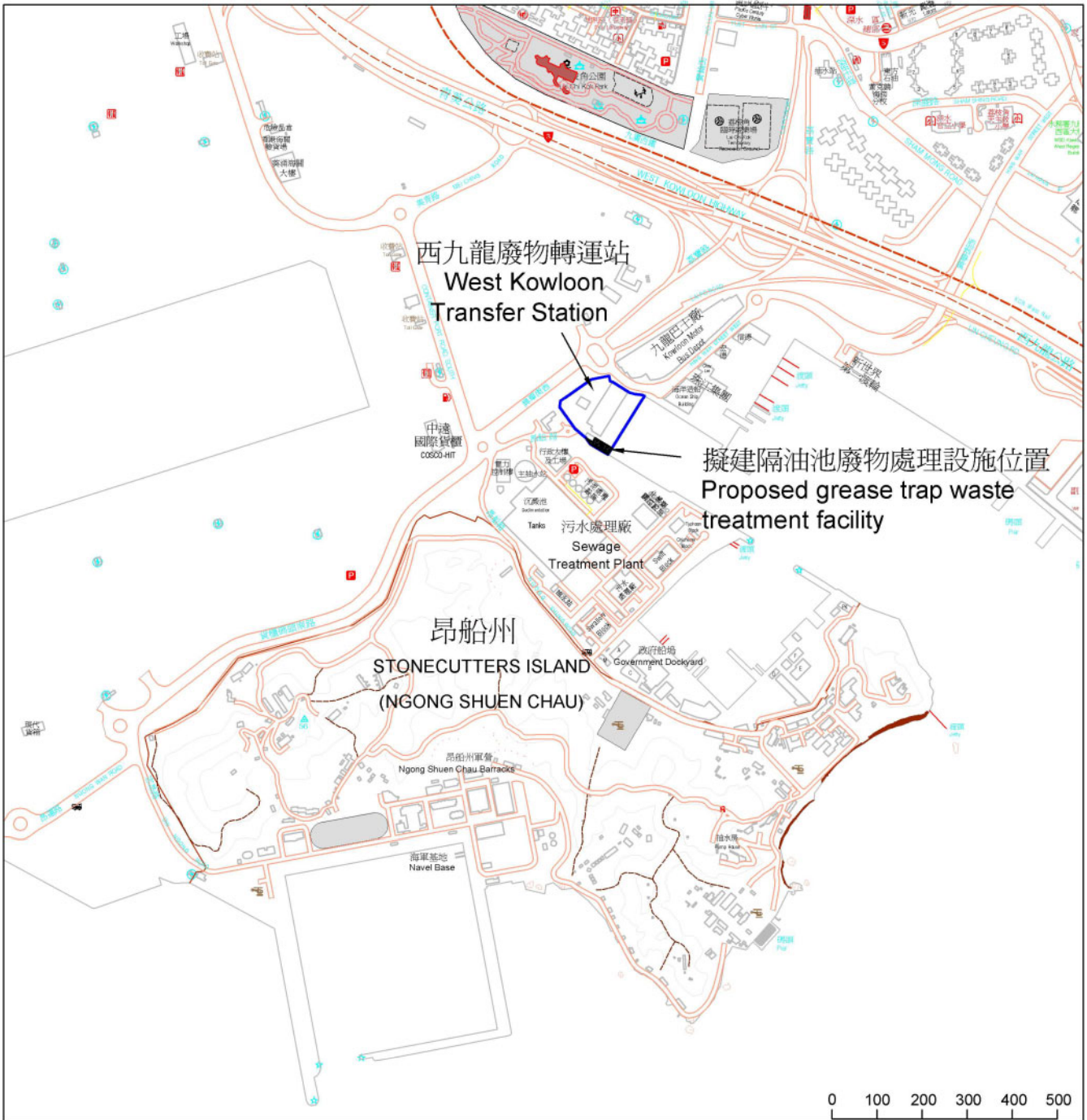
² Sorting facilities and public fill reception facilities are specified in Schedule 3 and Schedule 4 respectively of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of public fill in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

³ This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90/m³), nor the cost to provide new landfills, (which is likely to be more expensive) when the existing ones are filled.

Advice Sought

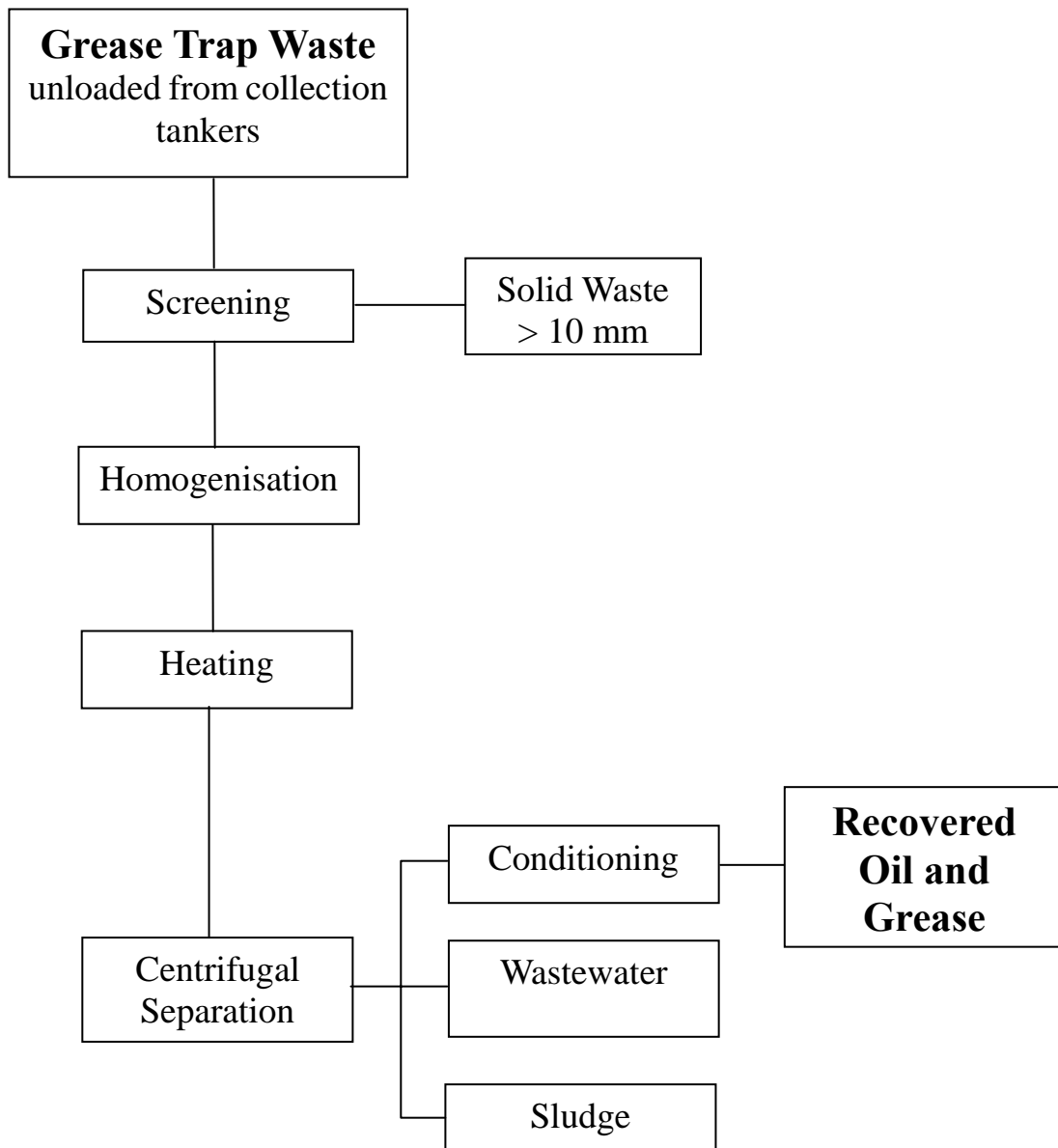
24. Members are invited to note our proposal of upgrading **5167DR** for consideration by the Public Works Subcommittee in February 2006 with a view to seeking funding approval by FC in April 2006.

Environmental Protection Department
Environment, Transport and Works Bureau
January 2006



西九龍廢物轉運站內的擬建隔油池廢物處理設施位置圖
Proposed location of the grease trap waste treatment facility at West Kowloon Transfer Station

RECOVERY OF OIL AND GREASE AT THE PROPOSED GREASE TRAP WASTE TREATMENT FACILITY



(Note : For the current intake of grease trap waste of 400 tonnes per day, about 15 tonnes per day of concentrated oil and grease will be recovered. The balance is mostly water.)

OPERATING AND MAINTENANCE COSTS ASSOCIATED WITH THE GREASE TRAP WASTE TREATMENT FACILITY

We estimate that the operating and maintenance costs for the grease trap waste treatment facility to be \$9.7 million/year (or \$66.69 per tonne of grease trap waste received, assuming a daily intake of 400 tonnes per day), made up as follows -

	Item	\$million/year
(a)	Maintenance of civil engineering and building works	1.0
(b)	Maintenance and operation of waste reception, unloading, treatment, recovery and disposal facilities	2.1
(c)	Maintenance and operation of wastewater treatment and ancillary facilities	2.3
(d)	Maintenance and operation of electrical and mechanical equipment	0.8
(e)	Testing and environmental monitoring	1.7
(f)	Overheads, general and administration costs	1.8
	Total	9.7