

**For discussion on  
26 March 2012**

**LEGISLATIVE COUNCIL PANEL ON  
ENVIRONMENTAL AFFAIRS**

**“REDUCE, RECYCLE AND PROPER WASTE MANAGEMENT”:**

- (i) Progress of the Key Initiatives under the Waste Management Strategy**
- (ii) 5177DR: Integrated Waste Management Facilities (IWMF) Phase 1**
- (iii) 5163DR: Northeast New Territories (NENT) landfill extension**
- (v) 5164DR: Southeast New Territories (SENT) landfill extension**
- (vi) 5165DR: West New Territories (WENT) landfill extension**

**1. PURPOSE**

1.1 Hong Kong faces an imminent waste management problem as the three existing landfills would exhaust their design capacity one by one in the mid and end 2010s. In January 2011, the Government announced an action agenda on the implementation of initiatives that would help achieve a sustainable waste management solution for Hong Kong, using the *Policy Framework for the Management of Municipal Solid Waste (2005-2014)* (*The MSW Policy Framework*) as the basis. The action agenda listed concrete actions for resolving Hong Kong’s waste problem under a three-pronged approach that includes (i) strengthened actions to reduce wastes at source, (ii) introduction of modern technologies to upgrade our waste treatment capability, and (ii) timely extension of landfill, at a reduced scale with the implementation of (i) and (ii). This paper –

- (a) updates Members on the progress of waste reduction and recycling initiatives under the action agenda;

- (b) seeks Members' support for our proposals to –
- (i) upgrade **5177DR** to Category A at an estimated cost of \$14,960.1 million in money-of-the-day (MOD) prices (or \$11,383.0 million in September 2011 prices);
  - (ii) upgrade **5163DR** to Category A at an estimated cost of \$6,631.7 million in MOD prices (or \$3,969.8 million in September 2011 prices);
  - (iii) upgrade **5164DR** to Category A at an estimated cost of \$1,759.4 million in MOD prices (or \$1,254.3 million in September 2011 prices); and
  - (iv) upgrade part of **5165DR** to Category A at an estimated cost of \$33.4 million in MOD prices (or \$26.1 million in September 2011 prices).

## 2. BACKGROUND

2.1 We need to put in place a sustainable waste management solution for Hong Kong. Around the world, the waste management solution of all big cities comprise three major components, namely waste reduction and separation, modern waste treatment facilities and landfilling. While each of three components plays an essential role and is indispensable as part of the waste management formula, it is common for cities with a sustainable agenda to seek to maximize the portion of wastes that are reduced and separated at source. At the same time, the use of modern waste facilities with proven reliable and safe technology is a commonly-adopted approach by cities to achieve bulk reduction. This would avert cities of the need to allocate their precious land resources for waste dumping, a process which will take decades before the land concerned can be released for other uses. The final portion of wastes to be disposed of at landfills would depend on the results of first two strategies mentioned above.

2.2. The action agenda announced in January 2011 sets out a concrete action agenda for Hong Kong along the experiences of other major cities. Of priority is the strategy to reduce waste at source. Amongst other things, we have committed to –

- (a) raising the municipal solid waste (MSW) recovery target to 55% by 2015 from the current level of 52% through stepping up publicity and promotional efforts on waste reduction and recycling, including food wastes;
- (b) expediting legislative proposals to introduce new producer responsibility scheme (PRS) and extend current PRS to encourage waste reduction; and
- (c) engaging the public in discussion on options to introduce MSW charging as a direct economic disincentive to reduce waste at source.

2.3 As we proceed with the above initiatives, we need to take urgent action to ensure the proper treatment of wastes. The urgency of the waste problem as exemplified by the exhaustion of the three existing landfills estimated to occur in 2014, 2016 and 2018 respectively calls for timely action regarding the introduction of modern treatment facilities and landfill extensions. A table showing the estimated remaining capacity of the three landfills is at **Annex A1**. As such, we have also committed to:

- (d) seeking funding approval from the Legislative Council (LegCo) Finance Committee (FC) in early 2012 so that advanced waste treatment facilities and extension of the existing landfills will be commissioned in time to ensure solid waste can continue to be properly managed in an environmentally acceptable manner.

Subject to funding approval, the advanced waste treatment facilities will require some seven years for reclamation, construction and commissioning (project details at section 4.1 below). As regards landfill extensions, they require a few years for site preparation works before commissioning. All these waste treatment projects should be pursued as a package and any delay of this package would seriously impact on the ability of Hong Kong to handle waste and maintain its environmental hygiene expected of an international city.

### **3. PROGRESS OF THE KEY INITIATIVES**

3.1 Since the announcement of the action agenda, over which the Panel was briefed on 24 January 2011, we have achieved the following progress –

## **3.2 Waste Reduction at Source**

### **3.2.1 Achieving 55% MSW Recovery by 2015**

3.2.1.1 As at 2010, the MSW recovery rate of Hong Kong stood at 52%, which exceeded our original target laid down in *The MSW Policy Framework*, i.e. to attain 50% waste recovery rate by 2014. By comparison, the recovery rate in other cities are 68% for Seoul, 58% for Taipei, 48% for Singapore and 23% for Tokyo. Continued promotion of 3R (namely reduce, reuse and recycle) is a key component of our waste management strategy. Our aim is to raise the MSW recovery rate to 55% by 2015 through a range of enhanced or new initiatives.

3.2.1.2 Launched in January 2005, the territory-wide Source Separation of Waste (SSW) Programme aims at providing suitable facilities for waste recovery close to the source of waste generation, and at the same time broadening the types of recyclables to be recovered. The SSW Programme now covers over 80% of the population in Hong Kong. We are enhancing our collaboration with government departments, district councils, property management companies, residents groups, green groups, social services organizations and schools to form a wider community recycling network (CRN) comprising at present more than 350 community recycling points in various districts. Through face-to-face promotion at the recycling points, the CRN encourages members of the public to participate in waste reduction and recycling and instills changes in their lifestyle. The CRN also facilitates the collection of recyclables, especially those of low commercial value, including waste plastics, glass bottles and small waste electrical and electronic equipment (WEEE).

3.2.1.3 To reduce food waste, a new funding scheme under Environment and Conservation Fund (ECF) to promote on-site composting has been introduced and we have collaborated with the catering industry to promote good food management practices. At the same time, we have provided support to interested trades and organizations to implement glass recycling programmes and various trade-led voluntary recycling programmes covering computers, fluorescent lamps, glass containers and rechargeable batteries. Details of the progress are provided at **Annex A2**.

### 3.2.2 Expediting PRS Legislative Proposals

3.2.2.1 Having consolidated the findings of the respective public consultation exercises, the Government briefed this Panel at the meeting of 28 November 2011 on the proposed way forward of two mandatory PRS initiatives, namely (i) to extend the Environmental Levy Scheme on Plastic Shopping Bags to cover all retailers, and (ii) to introduce a new mandatory PRS for the proper management of WEEE. As a complementary initiative under the PRS on WEEE, we have proposed that the Government would support, under Public Works Programme, the development of a local WEEE treatment plant through a “Design, Build and Operate” (DBO) contractual arrangement at a reserved site of about three hectares (ha) at the EcoPark so as to make available the requisite local treatment capacity to serve the PRS when it becomes ready for implementation. We are now preparing the legislative proposals for introduction into the LegCo as soon as practicable.

### 3.2.3 MSW Charging

3.2.3.1 The experience of some cities shows that charging is a very effective way of reducing the generation of wastes. However, the success of charging in such cities are contingent upon the re-engineering of municipal waste collection system, behavioural change on the part of stakeholders affected, as well as other complimentary implementation and facilitation arrangements. On 10 January 2012, we published a consultation document entitled “*Strengthening Waste Reduction: Is Waste Charging an Option?*” and launched a three-month public consultation on this issue. This Panel was briefed at its meeting on 26 January 2012. We aim to take into account the outcome of this public consultation, which ends on 10 April 2012, and would draw up the recommended way forward as soon as possible in the light of the comments received.

## **3.3 Modern Treatment Facilities**

3.3.1 While reducing waste at source and waste recycling are important in waste management, there are wastes that could not be recovered or recycled and require proper treatment. In all modern cities in Europe and Asia including those with high waste reduction and recycling performance, development of modern waste treatment facilities such as incinerators and landfills are indispensable part of their waste management programmes. In Hong Kong we are no exception. Development of modern facilities for bulk reduction of waste is part of our waste management strategy. The use of modern technologies could

significantly reduce the size of the waste treated to about 10% of the original volume before final disposal. This could help maximize the economic life of our landfills. In some cases, waste could be turned into useful resources through the treatment processes.

3.3.2 At present, with the funding approval from the LegCo FC on 5 June 2009, the Government is developing the Sludge Treatment Facility (STF), for which design and construction commenced in October 2010. Now the site formation, piling and substructure works have been substantially completed and some major process plants and equipment are being installed. Upon its commissioning in end 2013, the STF will enable the diversion of disposal of odourous sludge away from the landfills.

3.3.3 The Government also plans to develop Organic Waste Treatment Facilities (OWTFs) in phases to treat food waste from the commercial and industrial (C&I) sectors. The facilities will be able to convert such waste into renewable energy and compost products. As this Panel was consulted in November 2010, the first phase of OWTF, having a treatment capacity of 200 tonnes per day (tpd), would be developed in Siu Ho Wan of North Lantau. Tendering for the DBO contract of the facilities is now in progress. In addition to the OWTF Phase 1 project, the second phase with a treatment capacity of 300 tpd is planned to be developed at Shaling in North District. We have commenced the Engineering Investigation and Environmental Impact Assessment (EIA) studies for this development in late 2011. We plan to complete the EIA study in end 2012 with a view to commissioning the facilities in 2016-17.

3.3.4 For the IWMF Phase 1 project (i.e. **5177DR**), we have set out its details in section 4.1. We intend to submit this project to the Public Works Subcommittee (PWSC) in May 2012 for consideration with a view to seeking funding approval from the FC in June 2012.

3.3.5 An associated environmental benefit for the introduction of modern waste treatment facilities is the reduction of greenhouse gas emission from wastes, and the generation of energy in the process. In the waste treatment process of the IWMF Phase 1 project, energy will be recovered from waste to generate electricity sufficient for 100 000 households annually.

### **3.4 Landfill Extension**

3.4.1 Continuing efforts to reduce and separate wastes and the introduction of modern waste treatment technology would help to reduce reliance on landfill. In some European cities, the percentage of wastes to be disposed of in landfills can be reduced to single-digit percentage points of wastes generated. In Hong Kong, our aim is to reduce reliance on landfilling as the only means for waste treatment. However, in the medium range, landfills will continue to play a key part in our waste management strategy. With our effort to raise our waste recovery rate to 55% in 2015 and assuming the completion of the advanced treatment facilities now under planning (i.e. IWMF Phase I and two OWTF phases) by 2018, the daily intake by the three strategic landfills will stand at around 10 000 tonnes (including mainly MSW and construction waste) even though there could be zero growth in waste disposal. As discussed in section 2.3 above, with the successive filling up of existing landfills, we need to seek funding approval from the LegCo FC so that extension of the existing landfills will be commissioned in time to ensure solid waste can continue to be properly managed in an environmentally acceptable manner.

3.4.2 For the three landfill extension projects, viz. **5163DR**, **5164DR** and **5165DR**, we have set out their details in sections 4.2 to 4.4. We intend to submit these projects to the PWSC in May 2012 for consideration with a view to seeking funding approval from the FC in June 2012.

## **4. FUNDING APPLICATIONS**

### **4.1 5177DR: IWMF Phase 1**

#### **4.1.1 Proposal and Justifications**

##### **4.1.1.1 *Need for the Project***

4.1.1.1.1 The justifications for introducing IWMF is set out in section 3.3 above. Given that our three landfills are approaching the end of their respective lifespan, we must plan for waste treatment by modern waste treatment facilities at the earliest opportunity to bring about a substantial reduction in landfilled waste. The Government has earlier confirmed the adoption of incineration as the core technology in the development of IWMFs in Hong Kong. Such facilities will help significantly reduce the

volume of wastes. The process of incineration will also generate electricity, thus turning wastes into resource while, at the same time, reducing local greenhouse gas emissions. It will form an integral part of Hong Kong's sustainable waste management policy and contribute to the proper treatment of the tens of thousands tonnes of wastes generated by our city.

#### 4.1.1.2 *Technology Selection*

4.1.1.2.1 We have selected the most appropriate technology proposal for the IWMF after thorough study. Back in 2002, we invited companies from Hong Kong and overseas to submit expression of interest for the provision of waste management technology. We set up the Advisory Group on Waste Management Facilities (AG) with non-government members from professional bodies, environmental groups, academia and business sectors to assess the submissions and recommend the technology suitable for Hong Kong. A total of 59 submissions were received. After evaluation the AG advised that the IWMF should adopt a multi-technology approach with incineration as the core waste treatment technology [cf. LegCo Paper No. **CB(1) 1544/04-05(15)**].

4.1.1.2.2 In 2008/09 we further reviewed the latest development of various thermal treatment technologies, including moving grate incineration, gasification, plasma gasification, pyrolysis and eco-co-combustion. According to the review, there is more than 100 years of operational experience for the moving grate incineration technology which is being used in excess of 900 MSW treatment facilities in over 20 countries and has been adopted in the majority of new waste-to-energy plants commissioned since 2009. The extensive use of the moving-grate incineration technology shows that it is still the mainstream advanced technology in the world for MSW treatment. It is popular worldwide for the merits of its environmental performance, technological soundness, reliability, operation adaptability in waste treatment and cost effectiveness. It is also an evolving technology that can continue to meet the increasingly stringent prevailing environmental standards in Europe and elsewhere. As such, it is the most suitable technology for the first modern IWMF in Hong Kong. The conclusion is consistent with the views given by the AG previously. The Advisory Council on the Environment (ACE) was consulted on the findings of the feasibility study and the proposed moving grate incineration technology in December 2009. It supported the use of the moving grate incineration as the core technology for the IWMF [cf. LegCo Brief on Development of the Integrated Waste Management Facilities issued on 21 February 2011].



4.1.1.2.3 The technology review in 2009 also looked into other thermal technologies such as plasma gasification, and concluded these other alternatives were not suitable for the first IWWMF in Hong Kong because of their various drawbacks, such as their limited track record for large scale MSW treatment and the limited number of suppliers. In relation to plasma gasification, which some are advocating for the project, our research shows that as at present, the technology is primarily used for small scale treatment of industrial wastes and hazardous wastes, but it is not suitable for treating MSW, which contain wastes of varying size and qualities. The application of plasma gasification to MSW is uncommon and is only limited to relatively small scale application or pilot trials.

#### 4.1.1.3 *Scale and Site Selection*

4.1.1.3.1 The optimal capacity of waste treatment facilities is determined after a detailed analysis of various relevant factors. For instance, in planning the development of the local IWWMF, we have reviewed the treatment capacities of similar facilities in other densely populated cities (such as Singapore which features similar demographic and geographical characteristics as Hong Kong) as well as our overall strategy on waste transfer and treatment (i.e. sending most of our local waste for compaction and containerization at refuse transfer stations before transfer to landfills by marine transport). The final recommendation was phased development in an appropriate scale with the capacity of the first phase IWWMF set at 3 000 tpd.

4.1.1.3.2 As for small-scale incineration facilities mentioned by some of the stakeholders, although technically feasible, their cost-effectiveness is much lower than the large-scale incineration facilities. The land required for small-scale incineration plant is not small. According to the experience in Tokyo, the smallest incineration plant that treats 200 tonnes of waste each day requires about 1 ha of land. For larger plants with capacities from 300 to 600 tpd, about 3 to 5 ha will be required. Given the already highly congested, high density urban area particularly with high rise buildings and the competing claims for land for housing development, it will be very difficult to identify a suitable site for accommodating small incineration facilities in urban area.

4.1.1.3.3 As it has already been indicated in the LegCo Brief on Development of the Integrated Waste Management Facilities issued on 21 February 2011, the proposed site for the IWWMF was chosen on the basis of substantial scientific studies and analyses and has taken into account the

territory-wide spatial distribution of waste treatment facilities. We first conducted an initial territory-wide site selection study to examine the preliminary data of all possible sites in 2007-08 before shortlisting the sites at Tsang Tsui Ash Lagoons (TTAL) in Tuen Mun and the artificial island near Shek Kwu Chau (SKC) for further feasibility and environmental assessments in 2008.

4.1.1.3.4 As required under the EIA Ordinance (Cap. 499) and the Technical Memorandum on the EIA, we have conducted detailed EIA for the development of IW MF at these two sites to evaluate the cumulative impact of the project and other projects in respect of noise, air, water quality, waste, ecology, landscape and cultural heritage. The EIA report also recommended suitable mitigation measures to be adopted for ensuring that the environmental impact was limited to an acceptable level. It also recommended an environmental monitoring and audit programme for ensuring the effectiveness of these measures.

4.1.1.3.5 The EIA findings indicated that both phased and simultaneous development of IW MF at the two sites would meet the EIA requirements. Having considered the spatial distribution of our waste management facilities, environmental factors and transport efficiency, the Government has chosen the artificial island next to SKC as the site for the first IW MF on the following grounds:

- (a) The proposed choice ensures a more balanced spatial distribution of waste facilities. For the Western New Territories, there is WENT Landfill and the proposed WENT Landfill extension. There is also a STF with a capacity of 2 000 tpd under construction at TTAL. For the North New Territories, there is NENT Landfill and the proposed landfill extension. For the East New Territories, there is SENT Landfill and proposed landfill extension. For the urban area, we have a network of Refuse Transfer stations, including two at both ends of Hong Kong Island. The Chemical Waste Treatment Centre is situated in Tsing Yi. The development of the IW MF at the southern tip of Hong Kong will present a more balanced spatial distribution of facilities;
- (b) The artificial island next to SKC is closer to the Island East, Island West and West Kowloon refuse transfer stations, the catchment area for the IW MF, when compared with the site at TTAL. The sea route for delivering solid waste from these stations to the artificial island next to SKC is shorter by

one fourth when compared with the route to TTAL. This routing will not cause significant impact on the marine traffic in the area. Consequently the transport of MSW to the island will help reduce the current transport of MSW to the WENT Landfill, hence reducing marine traffic in the busy Ma Wan Channel;

- (c) The SKC site is far away from the densely populated areas. It is located at about 3.5 to 5 km from Cheung Chau, which is not in the direction of prevailing wind (northeasterly wind towards southwest in the sea). The IWMF will have advanced incineration technology and air cleansing systems on site to further minimize impact caused by gas emission on ambient air quality and, hence, the residents nearby; and
- (d) The IWMF and its on-site educational and community facilities under planning would bring considerable economic benefits to the nearby islands (e.g. Cheung Chau). Apart from more jobs and enhanced ferry services, the development will also bring in streams of workers and visitors that will, in turn, generate other economic activities and benefits. During the construction and operation of the IWMF, there will be about 3 000 workers working on the island and in the surrounding waters during the peak construction period. When it commences operation, there will be about 200 workers working every day in the facility. Besides, the education centre and associated facilities for visitors at the IWMF under planning will also draw in students as well as other visitors. As the site on SKC is far from the urban areas, Cheung Chau will serve as its key back-up area, both during the construction and operation of the IWMF. This will benefit the economic activities related to accommodation, retail and catering trades in Cheung Chau.

#### 4.1.1.4 *Scope of work*

4.1.1.4.1 A plan showing the location of the IWMF Phase 1 at the SKC site is at **Annex B1**. The IWMF will be built on an artificial island formed by reclamation to the south-western coast of SKC. The reclaimed island will measure about 11.8 ha including a berth area and storage area for waste containers. Due to occasionally rough sea condition in the vicinity, the project will include constructing a breakwater of about 4.1 ha

to ensure that loading/ unloading activities can be safely carried out in the berth, and that the safety of facilities can be guaranteed.

4.1.1.4.2 The scope of **5177DR** comprises –

- (a) design and construction of reclamation to form an artificial island near SKC;
- (b) design and construction of an MSW incineration plant of a design capacity of 3 000 tpd employing advanced moving grate waste-to-energy technologies. The incineration plant will comprise the following main components –
  - (i) waste reception, storage and feeding system;
  - (ii) moving grate incinerators;
  - (iii) waste heat recovery, turbine generator and cooling system;
  - (iv) boiler feedwater treatment system;
  - (v) flue gas treatment and discharge system;
  - (vi) fly ash, bottom ash and residues storage, treatment and handling system;
  - (vii) bulky waste storage and handling system, reagent reception and storage system; and
  - (viii) process control and monitoring system;
- (c) design and construction of a mechanical sorting and recycling plant of a design capacity of 200 tpd. The mechanical treatment plant will comprise the installation of the following main components –
  - (i) waste reception system;
  - (ii) mechanical sorting and shredding system; and
  - (iii) process control and monitoring system;
- (d) provision of ancillary and supporting facilities including submarine power cables and electrical system connecting the artificial land to Cheung Sha of Lantau Island, a desalination plant providing water supply to the facility, a wastewater treatment plant, an environmental education centre, community facilities<sup>1</sup> and minor supporting facilities for a

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<sup>1</sup> Making reference to incineration facilities in Japan where education and recreational centers are commonly provided as community service, the IWMPF would include an environmental education centre that may feature sustainable waste management and advanced waste treatment technologies,

marine park<sup>2</sup>; and

- (e) environmental monitoring and auditing during the construction stage.

A layout plan showing the proposed works is at **Annex B2**. Subject to funding approval of the FC, we plan to commence the design and construction works in September 2013 and commission the IWMF in 2018/19.

4.1.1.4.3 Similar to other waste management facilities developed by the Environmental Protection Department (EPD), to ensure unity of responsibility and cost effectiveness and to expedite the development of the facility, the project will engage a DBO contractor to conduct the detailed design, construction and operation of the IWMF. The contractual operation period will be 15 years.

4.1.1.4.4 The IWMF will be operated on a 24-hour basis daily throughout the year, with the reception of MSW to be limited from 8 am to 8 pm. MSW loaded in containers will be delivered daily by marine vessels to a pier on the artificial island from the existing refuse transfer stations, including the Island East Transfer Station, Island West Transfer Station and West Kowloon Transfer Station. The waste will be incinerated and the heat energy released will be recovered to generate electricity for normal operation of the IWMF facilities. Surplus electricity energy, estimated to be sufficient for 100 000 households annually, will be exported via the submarine cables to the existing power grid. Advanced air pollution control (APC) system will be installed to ensure that emissions from the IWMF stacks will meet the internationally most stringent European Union standard for MSW incinerators and the Hong Kong Best Practicable Means for Incinerators. Incineration fly ash and APC residues produced will be treated and stabilized. The treated ash and residue and also the bottom ash from the incinerator will be disposed of at the WENT Landfill after checking for compliance with the proposed incineration residue pollution control limits.

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and leisure facilities utilizing the recovered renewable energy.

<sup>2</sup> To compensate the loss of finless porpoises' habitats near SKC, the EIA has proposed that a marine park of approximately 700 ha should be designated in a suitable area in the waters between SKC and the Soko Islands. The marine park will be managed by the Agriculture, Fisheries and Conservation Department (cf. Annex B5).

#### 4.1.2 Financial Implications

4.1.2.1 We estimate the capital cost of the proposed works to be about \$14,960.1 million in MOD prices (or \$11,383.0 million in September 2011 prices). We estimate the annual recurrent cost to be about \$353 million.

4.1.2.2 The estimated ex-gratia allowance (EGA) payable to eligible fishermen affected by the dredging and the filling works of the reclamation works gazetted under the Foreshore and Sea-bed (Reclamations) Ordinance (FS(R)O) is about \$3.01 million. The Food and Health Bureau is currently reviewing the EGAs for fishermen and mariculturists affected by marine works projects. Subject to the approval of the FC for the proposals of the review, the amount of EGA for fishermen will be increased to \$4.98 million. The proposed special EGA to mariculturists in respect of six marine works projects will be about \$74.1 million at the maximum. The actual expenditure will depend on the options opted by mariculturists.

4.1.2.3 We estimate that the design and construction of the proposed works will create about 2 942 jobs (2 386 labourers and 556 professional/technical staff) providing a total employment of 75 086 man-months. In addition, we estimate that the operation of the project will create about 200 permanent jobs (53 labourers and 147 professional/technical staff)

4.1.2.4 During the construction and operation phases of the project, employment and economic opportunities will be created for the locals. The project will generate demand for economic activities for SKC and the neighbouring islands, such as Cheung Chau. The ferry services to be set up between the artificial island and Cheung Chau, together with the on-site environmental education centre, recreational and leisure facilities on the project site will be open to the public. We will consult the District Council on the provision of recreational and leisure facilities. With the provision of the above, the project is expected to bring forth improvements to the leisure and cultural vibrancy and to the local economy.

#### 4.1.3 Public Consultation

4.1.3.1 We have been actively engaging the public on the development of the project for more than ten years. A summary of previous consultation and discussion at this Panel regarding the project since 2002 is at **Annex B3**. Since the announcement of TTAL and the artificial island near SKC as the two potential sites in January 2008, we have briefed this Panel on 25 February 2008 (cf. LegCo Paper No.

**CB(1)724/07-08(01))** and the ACE on findings of the site search. We have also been explaining the proposal to respective District Councils (DCs), local communities, professional institutions, environmental groups and groups concerned with environmental issues and addressing questions and views raised by them. Since 2008, we have launched more than 120 consultation and community engagement activities. The public engagement activities undertaken since January 2008 are listed in **Annex B4**. Amongst these activities, we briefed the Tuen Mun DC (TMDC) on 28 February 2008 and Islands DC (IsDC) on 14 April 2008 regarding the status of the IWMF project and the result of the site selection. We attended the meetings of Cheung Chau Rural Committee (CCRC) and the public forums organized by CCRC in April and May 2008 respectively to address their views. In 2009, a delegation, comprising representatives from EPD and 26 members of the TMDC and IsDC, conducted a study visit to Tokyo and Osaka to inspect the use of advanced incineration technologies for waste and sludge treatment in Japan. In response to a DC member's request, we briefed the Tourism, Agriculture, Fisheries and Environmental Hygiene Committee (TAFEHC) of IsDC on 15 November 2010 on the two potential sites.

4.1.3.2 We released the IWMF EIA Report for public inspection and comment on 17 February 2011 and we also provided a brief to update LegCo members about the IWMF development, including the EIA findings and the identification of the artificial island near SKC as the preferred site for IWMF. Since February 2011, we had met with over 1 300 concerned people and about 50 groups/ organizations and attended more than 50 meetings to explain the need for the project and to address their queries on various aspects of the project, including air quality and health, air pollution control technology, ecology, water quality and fisheries. A summary of our response is in **Annex B5**.

4.1.3.3 At District Council level, we briefed the IsDC on 21 February 2011 at which some DC members raised objection to the Administration's preference for SKC as the site for the proposed IWMF. We have further responded to members' enquiries at IsDC meeting on 20 February 2012, at which IsDC agreed to follow up the project by setting up a dedicated Working Group under the DC. The Working Group will serve as an inter-departmental high-level platform for IsDC to have direct dialogue with responsible bureaux/ departments on various aspects of the project.

4.1.3.4 In accordance with one of the conditions of the environmental permit (EP), we will set up community liaison group(s) comprising representatives of concerned and affected parties, including the fishery

sector, to facilitate communications, enquiries and complaints handling on all environmental issues. We are in the process of incorporating views from the community in the detailed design of the project. For instance, the IWFMF will have an architectural and landscaping design such that the facilities can blend into the surrounding natural and green environment. The IWFMF will also include an environmental education centre and related visitor facilities. Drawing on experience from the STF, the IWFMF may also provide recreational and leisure facilities for visitors. We will continue to engage the communities and stakeholders regarding the design and facilities to be included in the IWFMF. In taking forward the project, we will maintain our liaison and engagement with the community, local organizations, professional institutions, environmental groups and relevant stakeholders to address their views and help them gain better understanding of the project.

#### 4.1.4 Environmental Implications

4.1.4.1 **5177DR** is a designated project under the EIA Ordinance and an EP is required for its construction and operation. We carried out an EIA study for the project since November 2008 in accordance with the requirements set out in the EIA Ordinance. According to the findings of the EIA Report, with implementation of appropriate mitigation measures, the potential environmental impacts of the phased and simultaneous construction and operation of IWFMF at the two sites would be controlled to within the established standards and guidelines. The EIA report was made available to the public for inspection from November to December 2011 in accordance with the EIA Ordinance. Upon consideration and endorsement by the ACE, the EIA report was approved under the EIA Ordinance on 17 January 2012. The EP for developing the IWFMF at SKC site was issued by the EIA Authority on 19 January 2012. We will implement the conditions stipulated in the EP.

4.1.4.2 For short term impacts during construction, we will control noise, dust and site run-off to levels within established standards and guidelines, through the implementation of mitigation measures such as the use of quiet construction plant to reduce noise generation, water-spraying to reduce dust emission and proper pre-treatment of site run-off. We will also carry out site inspections to ensure that these recommended mitigation measures and good site practices are properly carried out.

4.1.4.3 We will require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate means to avoid, reuse and recycle inert construction waste.



We will ensure that the day-to-day operations on site comply with the approved plan. We will control the disposal of non-inert construction waste to landfills through a trip-ticket system. The inert construction waste will be reused on site for reclamation. We will also encourage the contractor to maximize the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further minimize the generation of construction waste.

4.1.4.4 In addition, we will require use of public fill for the reclamation works to help relieve the pressure for disposal sites for construction and demolition materials in Hong Kong. We estimate the proposed works will use a total of about 4 million tonnes (Mt) of public fill.

4.1.4.5 The project upon commissioning could divert some 1.1 Mt of MSW from landfill disposal every year which could help extend the life span of landfills, reduce landfill gas and leachate. Moreover, renewable energy derived from the project will help replace the use of fossil fuel for electricity generation. The reduction of using fossil fuel for electricity generation, coupled with less MSW being landfilled, would reduce the total emission of greenhouse gas in Hong Kong by about 440 000 tonnes carbon dioxide each year.

4.1.4.6 The proposed dredging of the sea-bed and reclamation works will affect about 315 ha of foreshore and sea-bed during the construction period, of which about 16 ha will be the permanent reclamation area, cofferdam/ seawalls, breakwaters and berths. The reclamation and construction works of the breakwaters and vertical seawall would adopt non-dredging method such as cellular cofferdam approach to minimize dredging works and the reclamation footprint, thereby localizing and minimizing potential impacts on marine water quality, ecology and fisheries. The proposed submarine cable installation works would be carried out using an environmentally friendly and non-dredging method, which would only take several work weeks and would not damage the South Lantau coast line.

4.1.4.7 The project will incorporate various green design concepts to make the IWMP an environmentally friendly facility. Apart from employing the most advanced incineration technology which ensures compliance with the most stringent environmental control standards and 90% reduction of waste volume, and the renewable recovered for gainful use, the IWMP will be equipped with a desalination plant to provide fresh water supply and a high level wastewater treatment plant to recycle the wastewater for on-site cleaning and irrigation. No effluent will be

discharged to the nearby water body. We will include a requirement in the DBO contract provisions that the architectural design should be creative and attractive to make the IWWMF an eco-friendly and eye-pleasing infrastructure blending into the surroundings.

## **4.2 5163DR: NENT Landfill Extension**

### **4.2.1 Proposal and Justification**

4.2.1.1 The justifications for the extension of landfills are set out in section 3.4 above. Timely commissioning of the NENT Landfill Extension is crucial as it is an integral part of Hong Kong's waste management strategy as set out clearly in the LegCo Brief dated 4 January 2011. The NENT Landfill Extension project could provide additional landfill capacity to maintain a continuous waste disposal service to the public in the north-eastern part of the territory.

4.2.1.2 In early 2008, we completed an engineering feasibility study and EIA of the proposed site in the Ta Kwu Ling and Sha Tau Kok region, south east of the existing NENT Landfill. The extension site covers about 70 ha of land, comprising mainly the stockpile and borrow area (SBA)<sup>3</sup> and the waste reception area (WRA)<sup>4</sup> of the existing NENT Landfill (about 38 ha) with some additional land (about 32 ha) at the north-western side and south-western side of the SBA. According to the engineering feasibility study, the NENT Landfill Extension could provide about 19 million cubic meters of additional landfill capacity to cope with the continuous need for final waste disposal in the north-eastern part of the territory.

4.2.1.3 Subject to funding approval of the FC, the construction works are scheduled to start in late 2013 with a view to commencing waste intake in early 2016, and will be progressively carried out up to late 2027. The estimated operating life of the landfill is about 8 to 10 years<sup>5</sup>.

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3 The SBA is a soil borrow area for the existing NENT Landfill contract. The existing contractor can excavate material including soil and rock, and use as cover material for daily operation and capping material during restoration works.

4 The WRA is the area where the weighbridges are installed to facilitate the ingress and egress of waste collection vehicles. Utilities and other infrastructures including office buildings are also located in WRA for the operation of the landfill.

5 The operating life of a landfill would depend on many contributing factors such as waste growth, results of waste recovery, the implementation programme of other waste management facilities, population growth, economic development, etc..

4.2.1.4 The scope of **5163DR** comprises –

- (a) landfill design<sup>6</sup> and site formation;
- (b) provision of infrastructure;
- (c) provision of landfill liner system<sup>7</sup>;
- (d) provision of leachate management systems<sup>8</sup>;
- (e) provision of landfill gas (LFG) management systems<sup>9</sup>;
- (f) implementation of measures to mitigate environmental impacts and environmental monitoring and auditing for construction works; and
- (g) construction of restoration and aftercare<sup>10</sup> facilities.

A plan showing the location of the proposed NENT Landfill Extension is at **Annex C1**.

#### 4.2.2 Financial Implications

4.2.2.1 We estimate the capital cost of the proposed landfill extension project to be about \$6,631.7 million in MOD prices (or \$3,969.8 million in September 2011 prices).

4.2.2.2 We estimate that the additional annual recurrent expenditure arising from the NENT Landfill Extension is about \$81 million.

4.2.2.3 We estimate that the proposed works will create about 417 jobs

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<sup>6</sup> The landfill is designed as a secure containment system, which primarily consists of multilayer impermeable composite liners to contain landfill gas and leachate generated, so that the waste is deposited and treated under a controlled environment.

<sup>7</sup> The landfill liner system consists of multilayer impermeable composite liners installed at the formation level to contain landfill gas and leachate produced during the degradation process and prevent them from leaving the landfill to the surrounding environment.

<sup>8</sup> Leachate is the liquid that has percolated through solid waste. The source of the liquid is primarily the water already present in the waste and any water induced from an external source such as rain water and ground water. The leachate management system comprises leachate collection network, pump sumps, storage lagoons, rising mains and treatment plants for handling and treating leachate.

<sup>9</sup> LFG is produced in significant quantities during the waste degradation process. It is made up of several gases and chemicals such as methane which are potential flammable and harmful to health. The LFG management system comprises collection network, gas extraction system and flaring unit for handling and treating landfill gas.

<sup>10</sup> Restoration and aftercare facilities include the installation of the capping system, sub-surface drainage system, monitoring facilities and landscape works.

(328 for labourers and 89 for professional/technical staff) providing a total employment of 47,693 man-months.

#### 4.2.3 Public Consultation

4.2.3.1 We have adopted and maintained a continuous public involvement approach during the planning and development stages of the project, including the statutory EIA and land re-zoning processes. We have conducted a series of public consultation sessions through which we considered and addressed the concerns of relevant stakeholders and other interested parties on the landfill extension project. A summary of the public consultation activities held is at **Annex C2**.

4.2.3.2 We consulted the North District Council (NDC) on 12 April 2007 regarding the EIA findings and the latest development of the project, a motion objecting to the NENT landfill Extension was moved and resolved by the NDC at the meeting. As the proposed NENT Landfill Extension site is located between Ta Kwu Ling (TKL) and Sha Tau Kok (STK), the Ta Kwu Ling District Rural Committee (TKLDRC) and the Sha Tau Kok District Rural Committee (STKDRC) are therefore the key stakeholders. Local objections to the proposed landfill extension project from TKLDRC and STKDRC were also received during the public engagement process.

4.2.3.3 In response to the concerns of the local community on the proposed project, the North District Office (NDO) and the EPD have taken the lead to set up a Working Group with representatives from the TKLDRC and STKDRC in early 2009 to provide a forum for the stakeholders to express their views and to map out measures and betterment programmes for the nearby community to address their concerns. Liaison meetings under this Working Group are held regularly to brief and update stakeholders of the latest development of the landfill extension project. Nine meetings have been held so far, with most of the requests under the betterment programmes for TKL and STK local community successfully met and resolved or being explored. We will continue to carry out enhancement and associated works, and consider actively the requests for implementation of local improvement works.

4.2.3.4 In a recent consultation with the NDC on 9 June 2011 regarding Hong Kong's latest waste management strategy and the action plan, including the implementation of the NENT Landfill Extension project, the NDC members were generally supportive of the waste management strategy, without any motion against the NENT Landfill Extension. We

will continue to maintain close liaison with the NDC, local community and other relevant stakeholders in taking forward the project.

#### 4.2.4 Environmental Implications

4.2.4.1 **5163DR** is a designated project under the EIA Ordinance and an EP is required for its construction and operation. The EIA report was approved under the EIA Ordinance on 20 September 2007 and the EP was issued on 26 November 2007. The project would comply with the established standards stipulated under the EIA Ordinance.

4.2.4.2 For impacts during construction stages, we will control noise, dust and site run-off to levels within the established standards and guidelines, through the implementation of mitigation measures such as the use of quiet construction plants to reduce noise generation, water-spraying to reduce dust emission as well as proper containment and treatment of site run-off.

4.2.4.3 During the operation phase, we will control the size of the active tipping area to minimise odour nuisance and the assessment shows that there would be no adverse impact on the nearby air sensitive receivers (ASRs) except Tong To Shan Tsuen (TTST) which has been unoccupied for more than a decade. Impact due to odour is scarce and transient in nature. Odour nuisance can be mitigated with good site practices, including applying a thicker daily cover on waste, covering up of inactive tipping face with plastic sheets, positioning of active tipping face further away from ASRs, etc. To minimise the odour issue, we will include a condition in the contract provisions requiring the landfill operator to cover up all (both temporary and permanent) leachate storage tanks

4.2.4.4 The landfill design is a containment design and its impermeable bottom liner is an integral part of the containment system which provides a barrier separating the waste cells from the environment. Leachate and LFG generated during biodegradation process will be contained, collected and properly treated in a control environment. Under the landfill contract, we will require the contractor to implement a LFG utilisation and export scheme to make full beneficial use of all LFG both on site and off site. LFG will be utilised on site as fuel either for generating electricity for site operation or converting to heat energy for leachate treatment process. Leachate generated will be contained and collected by pipe networks and treated at the leachate treatment plant within the landfill before discharged to the public sewerage system for further treatment. We shall ensure that both LFG and leachate would have no adverse impact on the air and water

quality of the environment respectively.

4.2.4.5 Among the possible layout options, we have chosen at the outset an option with total exclusion of the Lin Ma Hang Stream and its catchment area to avoid potential losses, damages and impacts to the existing flora, fauna and natural habitats. The selected option also avoids any potential impact on areas containing archaeological potential, built heritage and cultural landscape, etc

4.2.4.6 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 mitigating measures to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operation on site complies with the approved plan. Under the contract, we will include a requirement in the contract provisions that the landfill design should be a balanced cut and fill design<sup>11</sup> in which no import and export of inert materials are required throughout the project development. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities.

4.2.4.7 We estimate that the project will generate in total about 117 600 tonnes of construction waste. Of these, we will reuse about 105 840 tonnes (90%) of inert construction waste on site. We will dispose of the remaining 11 760 tonnes (10%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at landfill sites is estimated to be about \$1.5 million for this project (based on a unit cost of \$125 per tonne for disposal at landfills).

4.2.4.8 Compensatory tree planting and greening work will be required under the contract to compensate for the loss of existing woodland and shrubland within the site boundary. When the landfill is fully filled and restored, the site will be planted with vegetation to match with its surrounding landform and patterns.

4.2.4.9 The approved EIA report has provided a comprehensive assessment of the potential environmental impacts associated with the construction, operation, restoration and aftercare phases of the project. With the implementation of the proposed mitigation measures, the EIA concluded that the potential environmental impacts of the NENT Landfill Extension would be controlled to within established standards and guidelines. An environmental monitoring and audit programme is also

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<sup>11</sup> In a balanced cut and fill design, excavated material will be stored on site and reused for filling works at a later stage. No surplus cut material will be required to export off site.

recommended to ensure the effectiveness of the proposed mitigation measures.

### **4.3 5164DR: SENT Landfill Extension**

#### **4.3.1 Proposal and Justification**

4.3.1.1 Sections 4.2.1.1 to 4.2.1.3 in respect of the NENT Landfill Extension project also generally apply to the extension of SENT Landfill. The SENT Landfill is expected to be exhausted in 2014, the first among the three existing landfills. The SENT Landfill Extension project could provide additional landfill capacity to maintain a continuous disposal service for construction waste in the urban and south-eastern part of the territory.

4.3.1.2 In response to views expressed by the LegCo and local community, the Government revamped in January 2011 the original SENT Landfill Extension project by excluding 5 ha of the Clear Water Bay Country Park (CWBCP) and reducing the Extension to only occupying 13 ha of land in TKO Area 137 (hereinafter called the “proposed revised scheme”). In addition, to address community concerns on odour, the proposed revised SENT Landfill Extension will be designated for the reception of only construction waste with no odour concern when diversion of remaining wastes, including municipal solid waste and special waste, to other existing waste disposal facilities is in place in 2014.

4.3.1.3 It is essential to extend the SENT Landfill albeit on a smaller scale because it is the territory’s single largest disposal outlet for construction waste due to the synergy created by the proximity of the SENT Landfill, the construction waste sorting facility (to sort out inert fill materials for later beneficial reuse) and a public fill bank (to stockpile inert fill materials) in TKO Area 137. Some 2 600 tonnes of construction waste are being disposed of at the SENT Landfill each day, which account for 72% of the overall construction waste disposed of daily at the three landfills. We also need to account for any possible increase in the demand for construction waste disposal with the implementation of more infrastructure and urban renewal projects in the years ahead. The proposed revised scheme of the Extension, which will occupy about 13 ha of land in TKO Area 137 and about 30 ha of land within the existing SENT Landfill, will provide a total capacity of about 6.5 million cubic meters (reduced from the original about 17 million cubic meters). The life of the Extension is projected to bridge the gap until the planned new permanent construction waste transfer facilities in the SENT region are commissioned

so that construction waste in this region could be sorted and bulk transferred to the other landfills in future.

4.3.1.4 Subject to the funding approval of the FC, the construction works are scheduled to start in mid 2013 with a view to commencing waste intake in late 2014, and will be progressively carried out up to around 2022<sup>12</sup>. The estimated operating life of the landfill extension is about 6 years<sup>5</sup>.

4.3.1.5 The scope of **5164DR** comprises –

- (a) landfill design<sup>6</sup> and site formation;
- (b) provision of infrastructure (including demolition of existing infrastructure and reprovision of new infrastructure);
- (c) provision of landfill liner system<sup>7</sup>;
- (d) provision of leachate management systems<sup>8</sup>;
- (e) provision of landfill gas management systems<sup>9</sup>;
- (f) implementation of measures to mitigate environmental impacts, and environmental monitoring and auditing for construction works; and
- (g) construction of restoration and aftercare facilities<sup>10</sup>;

A plan showing the location of the proposed revised scheme of the SENT Landfill Extension is at **Annex D1**.

#### 4.3.2 Financial Implications

4.3.2.1 We estimate the capital cost of the proposed works to be about \$1,759.4 million in MOD prices (or \$1,254.3 million in September 2011 prices).

4.3.2.2 We estimate that the annual recurrent expenditure will be reduced by about \$22 million after commissioning the SENT Landfill Extension.

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<sup>12</sup> The year for completion of construction works includes a period of 2 years for restoration works.



4.3.2.3 We estimate that the proposed works will create about 499 jobs (391 for labourers and another 108 for professional/technical staff) providing a total employment of 16 196 man-months.

#### 4.3.3 Public Consultation

4.3.3.1 We have adopted and maintained a continuous public involvement approach with the statutory bodies, non-statutory organisations and local representatives since the inception of the project in 2004. A summary of the public consultation activities is at **Annex D2**. We consulted the Sai Kung District Council (SKDC) and its Housing and Environmental Hygiene Committee, the ACE, green groups, professional bodies and institutions, education institutions and the TKO community. In addition, we have organized site visits to SENT Landfill, roving exhibitions and road shows in TKO and arranged outreach programmes for schools and residents in TKO to introduce the SENT Landfill Extension project to the local community. We have also addressed the concerns of relevant stakeholders in formulating the scope of the project.

4.3.3.2 After revamping the Extension project, we consulted SKDC on 3 May 2011 the proposed revised scheme. The meeting concluded that most SKDC members present at that meeting supported or had no objection to the revised scheme under which the landfill extension will be reduced and only construction waste will be received and thereby addressed the community's concern on the odour problem. We will continue to maintain close liaison with SKDC and other relevant stakeholders in taking forward the project. We will also continue to carry out enhancement and associated works, and consider actively the requests for implementation of local improvement works.

#### 4.3.4 Environmental Implications

4.3.4.1 **5164DR** is a designated project under the EIA Ordinance and an EP is required for its construction and operation. The EIA report for the original scheme of the Extension was approved under the EIA Ordinance on 6 May 2008 and the EP was issued on 5 August 2008. The project would comply with the established standards stipulated under the EIA Ordinance.

4.3.4.2 With the proposed revised scheme of the Extension and the diversion of odourous waste away from the extended landfill in about 2014, it is anticipated that the environmental impacts and the traffic impact of the proposed revised scheme will be significantly reduced. An environmental

review report with an application for variation of EP was submitted to the EIA Authority on 9 December 2011. The report concluded that with the implementation of the proposed mitigation measures, the environmental impacts of the proposed revised scheme are acceptable. On 6 January 2012, the Director of Environmental Protection (the Director) issued an amended EP for the proposed revised scheme of the Extension. We will continue to implement the conditions in the amended EP.

4.3.4.3 For impacts during construction stage, we will control noise, dust and site run-off to levels within established standards and guidelines, through the implementation of mitigation measures such as the use of quiet construction plant to reduce noise generation, water-spraying to reduce dust emission and proper pre-treatment of site run-off. We will also carry out close site inspections to ensure that these recommended mitigation measures and good site practices are properly implemented.

4.3.4.4 During the operation phase, we will control the size of the active tipping area even though the revised extension scheme will only receive construction waste for disposal. Although the extended area will receive only construction waste, to address any potential odour issue arising from the on-site installations, we will include a condition in the contract provisions requiring the landfill operator to cover up all (both temporary and permanent) leachate storage tanks.

4.3.4.5 The landfill design is a containment design and its impermeable bottom liner is an integral part of the containment system which provides a barrier separating the waste mass from the environment. LFG generated during biodegradation process will be contained, collected and properly treated in a control environment. LFG will be utilised on site either for generating electricity for site operation or converting to heat energy for leachate treatment process. Leachate generated each day will be contained and collected with pipe networks and treated at the leachate treatment plant before discharged to the sewerage system for further treatment. We shall ensure that both LFG and leachate would have no adverse impact on air and water quality of the environment.

4.3.4.6 At the planning and schematic design stages, we have considered setting the base of the landfill above the ground water table to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil and demolished concrete) 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. We will

encourage the contractor to maximize the use of recycled/ recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

4.3.4.7 At the construction stage, we will also 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 operation on site complies 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 to public fill reception facilities and landfills respectively through a trip-ticket system.

4.3.4.8 We estimate that the project will generate in total about 7 450 tonnes of construction waste. Of these, we will reuse about 5 600 tonnes (75%) of inert construction waste on site. We will dispose of the remaining 1 850 tonnes (25%) of non-inert construction waste at landfill. The total cost for accommodating construction waste at landfill sites is estimated to be about \$0.23 million for this project (based on a unit cost of \$125 per tonne for disposal at landfills).

4.3.4.9 Mixed woodland planting will be provided under the landfill extension contract to compensate the loss of shrubland and grassland in the extension area. Advance screen planting will also be provided along the High Junk Peak Trail. When the landfill is fully filled and restored, the site will be planted with vegetation to match with its surrounding landform and patterns.

4.3.4.10 The approved EIA report has provided a comprehensive assessment of the potential environmental impacts associated with the construction, operation, restoration and aftercare phases of the project. With the implementation of the proposed mitigation measures, the EIA concluded that the residual environmental impacts of the SENT Landfill Extension would be controlled to within established standards and guidelines. An environmental monitoring and audit programme is also recommended to ensure the effectiveness of the proposed mitigation measures.

## **4.4 5165DR: WENT Landfill Extension**

### **4.4.1 Proposal and Justification**

4.4.1.1 Sections 4.2.1.1 to 4.2.1.3 in respect of the NENT Landfill Extension project also generally apply to the extension of WENT Landfill. The WENT Landfill is forecast to be exhausted in 2018. The WENT Landfill Extension project could provide additional landfill capacity to maintain a continuous waste disposal service to the public in the western part of the territory.

4.4.1.2 Located west of the existing WENT Landfill in Nim Wan, the proposed WENT Landfill Extension site covers some 200 ha of land and could provide about 81 million cubic meters of additional landfill capacity to cope with the continuous need for final waste disposal in the western part of the territory, and in a longer term for the whole territory. The scope of the extension project comprises site formation, construction of surface water and ground water management systems, installation of leachate and landfill gas management (including collection and treatment) systems, restoration works after landfill closure and aftercare, as well as realignment of a section of the Nim Wan Road. A layout plan showing the location of the proposed WENT Landfill Extension is at **Annex E1**.

4.4.1.3 We have substantially completed an engineering feasibility and an EIA study for the WENT Landfill Extension project, which confirm the engineering feasibility of the WENT Landfill extension project and that with appropriate environmental mitigation measures, the project will be environmentally acceptable. Since the engineering feasibility and EIA study were conducted a few years ago and in the light of the latest development at the vicinity including development of the Sludge Treatment Facilities (under construction), proposed columbarium development at Tsang Tsui (under planning), and other interfacing issues, it will be prudent to review the study findings. We plan to commission a consultancy study with an estimated cost of \$33.4 million in MOD prices to undertake the reviews and to make the necessary preparation for the project. Subject to FC's funding approval, we plan to commission the consultancy study by late 2012. Approval for full-upgrading of the WENT Landfill Extension project will be sought in 2015 with a view to commencing the construction works of the initial development of the landfill extension in 2016 for timely commencement of waste intake in 2018.

4.4.1.4 The scope of the proposed consultancy study comprises mainly –

- (a) engineering and environmental reviews of outline design and associated EIA findings to cope with the latest development of interfacing projects/issues;
- (b) gazette arrangement for Nim Wan Road realignment and associated revision to outline design;
- (c) study on interfacing and handing-over issues;
- (d) arrangement and supervision of site investigation and baseline surveys<sup>13</sup>;
- (e) tender document preparation, tender assessment and contract procurement; and
- (f) contract management and administration of resident site staff in the initial stage of the design-build-operate contract.

#### 4.4.2 Financial Implications

4.4.2.1 We estimate the cost of the proposed consultancy study is about \$33.4 million in MOD prices (or \$26.1 million in September 2011 prices).

4.4.2.2 The proposed consultancy study will not give rise to any recurrent consequence.

4.4.2.3 We estimate that the proposed works under this part-upgrading of **5165DR** will create about 13 jobs (2 for labourers and another 11 for professional/technical staff) providing a total employment of 307 man-months

4.4.2.4 For the remaining part of the project to be full-upgraded in the future, which would involve the award of a design-build-operate contract, we estimate that the cost is over \$9,000 million in September 2011 prices. More updated cost estimate will be provided when we conduct the full-upgrading exercise in the next stage.

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<sup>13</sup> Baseline surveys include topographic survey, environmental survey, tree survey, utilities survey, etc. to collect the most updated information to facilitate the engineering and environmental reviews and necessary modifications.

#### 4.4.3 Public Consultation

4.4.3.1 We have adopted and maintained a continuous public involvement approach during the planning and development stages of the project, including the statutory EIA processes. We have conducted a series of public consultation sessions through which we considered and addressed the concerns of relevant stakeholders and other interested parties. A summary of the key public consultation activities is at **Annex E2**.

4.4.3.2 We have consulted the TMDC since 2004 on the proposal to conduct engineering feasibility and EIA study for the project, and from time to time reported to TMDC on the study progress. During the TMDC consultation in January and September 2009, TMDC members passed a motion objecting to further waste facilities in Tuen Mun, and requested the Government to review the overall planning on the long-term development of Tuen Mun. To address members' concern, the Environment Bureau (ENB) took the lead and set up the Tuen Mun Development Liaison Working Group, with representatives from ENB, Development Bureau, Transport and Housing Bureau, Food and Health Bureau, Home Affairs Department and TMDC members, to look into strategic matters relating to the long-term development of the district. Eight meetings have been held since March 2009 to follow up TMDC members' proposals and to report on the progress and development of the action items. The work of this Liaison Working Group is continuing upon the formation of the new TMDC in 2012. We will continue to maintain close liaison with TMDC, the local community and other relevant stakeholders in taking forward the project.

#### 4.4.4 Environmental Implications

4.4.4.1 In view of the anticipated work nature, we consider that there is little environmental implication to be incurred by this consultancy study. We will implement suitable mitigation measures to control the short-term environmental impacts from the site investigation works. The proposed consultancy study which includes site investigation will only generate very little construction waste. We will require the consultant to fully consider measures to minimise the generation of construction waste and to reuse/recycle the construction waste as much as possible in the future implementation of the construction projects.

4.4.4.2 As for the whole project, **5165DR** is a designated project under the EIA Ordinance. The EIA report for the project was made available to the public for inspection from August to September 2009 in accordance

with the EIA Ordinance. Upon consideration and endorsement by the ACE, the EIA report was approved by the Director on 20 November 2009. The EP was issued on 3 June 2010.

4.4.4.3 The approved EIA report has provided a comprehensive assessment of the potential environmental impacts associated with the construction, operation, restoration and aftercare phases of the project. With the implementation of the proposed mitigation measures, the EIA concluded that the potential environmental impacts of the WENT Landfill Extension would be controlled to within the established standards and guidelines. An environmental monitoring and audit programme is also recommended to ensure the effectiveness of the proposed mitigation measures.

## **5. ADVICE SOUGHT**

5.1 Members are invited to note the progress of the key initiatives under the waste management strategy. Members are also invited to support our proposals for upgrading **5177DR**, **5163DR**, **5164DR** and part of **5165DR** to Category A. Subject to Members' advice, we plan to submit our proposals for consideration by the LegCo PWSC in May 2012 for consideration with a view to seeking the FC's approval in June 2012.

**Environment Bureau/Environmental Protection Department  
March 2012**