

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

Head 705 – CIVIL ENGINEERING Environmental Protection – Refuse Disposal 164DR – Southeast New Territories Landfill Extension

Members are invited to recommend to the Finance Committee the upgrading of **164DR** to Category A at an estimated cost of \$1,886.4 million in money-of-the-day prices for the extension of the Southeast New Territories Landfill.

PROBLEM

The existing Southeast New Territories (SENT) Landfill is anticipated to be exhausted in 2014-15 and there is a need to maintain a continuous waste disposal outlet for the south-eastern part of the territory.

PROPOSAL

2. The Director of Environmental Protection, with the support of the Secretary for the Environment, proposes to upgrade **164DR** to Category A at an estimated cost of \$1,886.4 million in money-of-the-day (MOD) prices for the design, construction and restoration of the proposed SENT Landfill Extension project.

/PROJECT

PROJECT SCOPE AND NATURE

3. The proposed scope of works under **164DR** comprises all works necessary for the development of the SENT Landfill Extension including –

- (a) landfill design¹ and site formation (including utilities provision and drainage diversion);
- (b) provision and relocation of landfill infrastructure and surface water management;
- (c) provision of landfill liner system²;
- (d) provision of leachate collection and treatment system³;
- (e) provision of landfill gas (LFG) collection and management system⁴;
- (f) implementation of measures to mitigate environmental impacts and environmental monitoring and auditing (EM&A) for construction works;
- (g) engagement of community stakeholders; and
- (h) construction of restoration and aftercare⁵ facilities.

————— A plan showing the location of the proposed works is at Enclosure 1.

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¹ 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.

² The landfill liner system consists of multilayer impermeable composite liners installed at the formation level of the landfilling area to contain landfill gas and leachate produced during the degradation process and prevent them from leaving the landfill to the surrounding environment.

³ 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.

⁴ LFG is produced during the waste degradation process. It is made up of several gases such as methane which are potentially flammable and harmful to health. The LFG management system comprises collection network, gas extraction system and flaring unit for handling and treating landfill gas.

⁵ Restoration and aftercare facilities include the installation of the capping system, sub-surface drainage system, monitoring facilities and landscape works.

4. Subject to the funding approval of the Finance Committee, we plan to commence the proposed works in mid-2014, with a view to commencing waste intake in early 2016 for completion in mid-2023 (including about two years of restoration works after its exhaustion).

JUSTIFICATION

5. We released the “Hong Kong Blueprint for Sustainable Use of Resources 2013-2022” (the “Action Blueprint”) on 20 May 2013⁶, which maps out a comprehensive strategy with targets, policies and action plans for waste management for the coming ten years to tackle the imminent waste challenge. The Action Blueprint has illustrated that, even if measures and facilities are taken forward as planned, and waste reduction targets are achieved as set, there will still be about 10 000 tonnes of waste that require disposal every day in 2017.

6. Landfills are an essential and ultimate part of the waste management chain everywhere in the world and the same applies to Hong Kong. No matter how hard we work to reduce waste, there will still be inert materials, non-recyclables, construction waste and post-treatment residues that need to be disposed of, and in the case of Hong Kong, municipal solid waste that could not be otherwise treated due to lack of modern waste treatment facilities. With the three existing landfills⁷ to be exhausted one by one by 2019, while large scale waste-to-energy facilities have yet to come on stream by then, we have no means to tackle such waste apart from extending the landfills in time. Without the three landfill extension projects, we cannot provide adequate disposal outlets to serve the whole territory nor maintain a continuous waste disposal service to the public upon the exhaustion of the existing landfills.

7. We anticipate that the SENT Landfill will be exhausted in 2014-15. Timely extension of the landfill is crucial as an integral part of Hong Kong’s waste management strategy as set out in the Action Blueprint. To address community concerns on odour, we will designate the proposed SENT Landfill Extension for reception of only construction waste with no odour problem⁸. The SENT Landfill Extension project could therefore provide additional landfill capacity to maintain a continuous disposal service for construction waste in the urban and south-eastern part of the territory.

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⁶ The blueprint is available at the website of Environmental Protection Department (www.epd.gov.hk).

⁷ Namely the Northeast New Territories Landfill, Southeast New Territories Landfill and the West New Territories Landfill.

⁸ This designation requires legislative amendments to the Waste Disposal (Designated Waste Disposal Facility) Regulation under the Waste Disposal Ordinance.

8. It is essential to extend the SENT Landfill 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 the public fill bank (to stockpile inert fill materials) in Tseung Kwan O (TKO) Area 137. Some 2 320 tonnes of construction waste are being disposed of at the SENT Landfill each day, which account for about 67% of the overall construction waste disposed of daily at the three landfills. The proposed scheme of Extension, which will occupy 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 metres for disposal of construction waste. The estimated operating life of the proposed landfill extension is about 6 years, which may vary according to future development such as extent of waste reduction. The landfill extension is currently estimated to be completed in around 2023 (including about two years of restoration works after its exhaustion).

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be \$1,886.4 million in MOD prices (please see paragraph 10 below), broken down as follows –

	\$ million
(a) Landfill design and site formation (including utilities provision and drainage diversion)	146.4
(i) landfill design	21.1
(ii) initial works	24.2
(iii) site preparation ⁹	101.1
(b) Infrastructure	184.3
(i) provision of infrastructure (including relocation of existing landfill infrastructure)	155.9
(ii) surface water management system	28.4
(c) Landfill liner system	305.5

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⁹ Site preparation includes site clearance, excavation works, site formation (deposition and compaction) and temporary and permanent slope stabilization.

		\$ million	
(d)	Leachate management system	152.8	
	(i) leachate collection system	23.2	
	(ii) leachate treatment system	129.6	
(e)	Landfill gas collection and management system	64.3	
(f)	Mitigation measures and EM&A for construction works	31.6	
(g)	Continuous enhancement and associated works and implementation of local improvement works	21.0	
(h)	Restoration and aftercare facilities	279.2	
(i)	Consultants' fees for	4.6	
	(i) contract administration	4.0	
	(ii) management of resident site staff	0.6	
(j)	Remuneration of resident site staff	11.3	
(k)	Contingencies	120.0	
	Sub-total	1,321.0	(in September 2012 prices)
(l)	Provision for price adjustment	565.4	
	Total	1,886.4	(in MOD prices)

— A breakdown of the estimates for the consultants' fees and resident site staff costs by man-months is at Enclosure 2.

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10. Subject to approval, we will phase the expenditure as follows –

Year	\$ million (Sept 2012)	Price adjustment factor	\$ million (MOD)
2015 – 2016	110.1	1.19354	131.4
2016 – 2017	330.3	1.26516	417.9
2017 – 2018	330.3	1.34107	443.0
2018 – 2019	99.1	1.41147	139.9
2019 – 2020	88.1	1.48205	130.6
2020 – 2021	77.1	1.55615	120.0
2021 – 2022	77.1	1.63396	126.0
2022 – 2023	66.1	1.71565	113.4
2023 – 2024	65.9	1.80144	118.7
2024 – 2025	76.9	1.89151	145.5
	1,321.0		1,886.4

11. We have derived the MOD estimate on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2015 to 2023, and an assumption of an annual growth rate of 5% between 2023 and 2025.

12. Due to the restriction for disposal of construction waste only, we estimate that the annual recurrent expenditure will be reduced by about \$22 million after commissioning the proposed SENT Landfill Extension. The capital and recurrent costs arising from the project would be taken into consideration when determining the affected fees and charges as appropriate in accordance with "polluter pays" principle.

PUBLIC CONSULTATION

13. We have adopted a continuous public involvement approach with the statutory bodies, non-statutory organizations and local representatives since the inception of the project in 2004. We have consulted the Sai Kung District Council (SKDC), the Advisory Council on the Environment (ACE), green groups, professional bodies and institutions, education institutions and the TKO community. In addition, we have organized altogether over 500 site visits (with some 15 000 participants) 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.

14. Among the three landfills, SENT Landfill is the closest to major residential developments, thus called for extra efforts in addressing community concerns on air quality, odour and dust. On odour concerns, we will designate the proposed SENT Landfill Extension for the reception of only construction waste with no odour issue. Municipal solid waste (MSW) will no longer be accepted upon the designation, resulting in reduction of relevant vehicle count by half when only construction waste is received. Waste haulers would then need to redirect their MSW to the other waste reception or disposal facilities sometime in 2014-2015 and action is already in place to remind these waste haulers to plan ahead. In addition, from mid-2013, an on-site odour monitoring team will operate from 6 a.m. to 2 a.m. every day to enhance monitoring on and provide swift response to odour issue. To step up monitoring on air quality, we will measure PM_{2.5} at Wan Po Road from July 2013 onwards, and establish an air monitoring station in Tseung Kwan O. For addressing concerns on dust, frequent cleansing of Wan Po Road has been arranged.

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

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16. The Town Planning Board (the Board) gazetted under the Town Planning Ordinance (TPO) the amendments to the draft outline zoning plan (OZP) for the original scheme for the project, amongst other items, on 7 May 2010 and received 2 479 representations upon expiry of the gazetting period. The Board then published the representations on 30 July 2010 and received 205 comments. The majority of the representations objected to the original scheme due to various reasons including site selection, environmental concerns and encroachment upon the Clear Water Bay Country Park area. In November and December 2011, the Board considered the representations and comments and decided to propose amendments to the draft OZP. The proposed amendments reflecting the reduced scale of the proposed SENT Landfill Extension were gazetted on 16 December 2011 for public inspection for 3 weeks. Upon expiry of the gazetting period, no valid further representation was received. The Chief Executive-in-Council approved the OZP for the proposed Extension scheme on 17 April 2012 and the approved OZP was gazetted under the TPO on 27 April 2012.

17. We last consulted the Legislative Council Panel on Environmental Affairs (EA Panel) on 27 May 2013 on the proposed extension. A motion against the proposed SENT Landfill Extension was passed. A special EA Panel meeting was held on 1 June 2013 for meeting deputations over the extension of three landfills. Views and concerns raised by the Members and the deputations/individuals primarily related to the odour, traffic and environmental issues pertinent to the operation of SENT Landfill. As we undertake for the SENT Landfill Extension project to only receive odourless construction waste, the proposed scheme will positively address the odour problem and reduce half of the traffic flow to the landfill. Together with other improvement measures outlined in paragraph 14 above, we have put forth our best attempt for a holistic proposal to tackle the concerns raised. In addition, in view of the urgency that the existing SENT Landfill is anticipated to be exhausted in 2014-15, we need to secure approval for commencing the works of the Extension now without any further delay. Given the strategic position of SENT Landfill as a final disposal facility close to urban area, to maintain locational balance in our waste management network, we decide to submit the extension proposal to the PWSC despite the motion.

ENVIRONMENTAL IMPLICATIONS

18. **164DR** is a designated project and the environmental impact assessment (EIA) report for the original scheme of the Extension was approved under the EIA Ordinance on 6 May 2008 after consulting the general public and the ACE. The Environmental Permit (EP) for the construction and operation of the landfill was issued on 5 August 2008. The project would need to comply with the requirements in accordance with the EP conditions.

19. With the proposed scheme of the Extension, 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 reduced scale of the landfill extension, the reception of construction waste only and the implementation of the proposed mitigation measures, the environmental impacts of the proposed scheme are acceptable. On 6 January 2012, the Director of Environmental Protection issued an amended EP for the proposed scheme of the Extension. We will continue to comply with the conditions in the amended EP. We estimate the cost of implementing the environmental mitigation measures and EM&A for construction works to be \$31.6 million. We have included this cost in the overall project estimate.

20. 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 containment and 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.

21. During the operation phase, we will control the size of the active tipping area even though the proposed extension scheme will only receive construction waste for disposal. The landfill design is a containment design and its impermeable bottom liner provides a barrier separating the waste mass from the environment. LFG and leachate will be contained, collected and properly treated by treatment facilities on site. LFG will be utilized on site for generating electricity for site operation and converting to heat energy for leachate treatment process and can be exported off site for other beneficial uses. We shall ensure that both LFG and leachate would have no adverse impact on air and water quality of the environment.

22. Mixed woodland planting will be provided under the landfill extension contract to compensate for 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.

23. 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 at public fill reception facilities¹⁰. 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.

24. 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 operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste to public fill reception facilities and landfills respectively through a trip-ticket system.

25. 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 landfills. 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 tonne¹¹ for disposal at landfills).

HERITAGE IMPLICATIONS

26. The proposed works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interest and Government historic sites identified by the Antiquities and Monuments Office.

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¹⁰ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

¹¹ 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 per m³), nor the cost to provide new landfills (which is likely to be more expensive), when the existing ones are filled.

LAND ACQUISITION

27. The proposed works do not require any land acquisition.

BACKGROUND INFORMATION

28. In February 2000, we commissioned a territory-wide study “Extension of Existing Landfills and Identification of Potential New Waste Disposal Sites” to identify new landfill capacity for waste disposal in Hong Kong up to 2050, at an estimated cost of \$5.1 million in MOD prices. We charged this amount to block allocation **Subhead 5101DX** “Environmental works, studies and investigations for items in Category D of the Public Works Programme”. A possible extension was identified for the SENT Landfill in the study.

29. We upgrade **164DR** to Category B in October 2003. In August 2005, we engaged consultants to carry out an engineering feasibility and EIA study for the original scheme of the SENT Landfill Extension at an estimated cost of \$10.7 million in MOD prices. The EIA report was approved under the EIA Ordinance on 6 May 2008 and the EP was issued on 5 August 2008. The study was completed in February 2010. In late 2011, with the revised proposed scheme to receive only construction waste, we engaged consultants to review the environmental impacts and apply for variation of the EP for the proposed revised SENT Landfill Extension at an estimated cost of \$1.4 million in MOD prices. On 6 January 2012, the amended EP was issued. We charged these amounts to block allocation **Subhead 5101DX** “Environmental works, studies and investigations for items in Category D of the Public Works Programme”.

30. Of the about 10 470 trees within the project boundary, about 55 trees will/may be preserved. The proposed works of SENT Landfill Extension may involve the removal of about 10 415 trees including 10 380 trees to be felled and about 35 trees to be replanted within the project site (subject to finalization of design). All trees to be removed are not important trees¹². We will incorporate planting proposals as part of the project, including estimated quantities of about 11 000 trees and 20 ha of grassland and shrubland.

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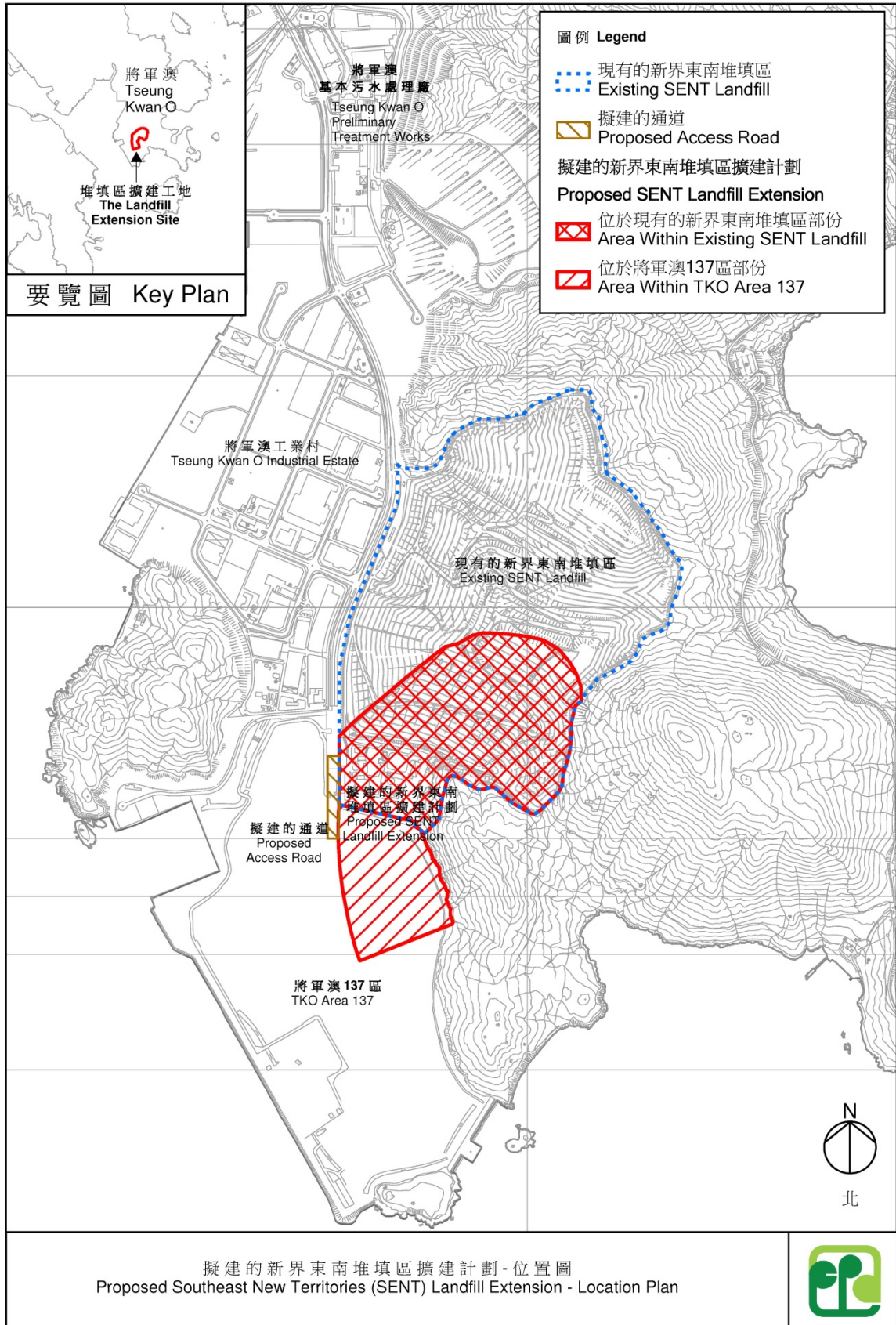
¹² An “important tree” refers to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –

- (a) trees of over 100 years old or above;
- (b) trees of cultural, historical or memorable significance e.g. Fung Shui tree, tree as landmark of monastery or heritage monument, and trees in memory of an important person or even;
- (c) trees of precious or rare species;
- (d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
- (e) trees with trunk diameter equal or exceeding 1.0 metre (measured at 1.3 metres above ground level), or with height/ canopy spread equal or exceeding 25 metres.

31. We estimate that the proposed works will create about 360 jobs (282 for labourers and another 78 for professional/technical staff) providing a total employment of 10 600 man-months.

Environment Bureau
June 2013

164DR – Southeast New Territories Landfill Extension
 164DR – 新界東南堆填區擴建計劃



164DR – Southeast New Territories Landfill extension

Breakdown of estimates for consultants' fees and resident site staff costs
(in September 2012 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Consultants' fees	Professional	18	38	2.0	2.4
	for contract administration (Note 2)	Technical	36	14	2.0	1.6
					Sub-total	4.0
(b)	Resident site staff costs (Note 3)	Professional	48	38	1.6	5.0
		Technical	192	14	1.6	6.9
					Sub-total	11.9
Comprising -						
(i)	Consultants' fee for management of resident site staff				0.6	
(ii)	Remuneration of resident site staff				11.3	
					Total	15.9

* MPS = Master Pay Scale

Notes

1. A multiplier of 2.0 is applied to the average MPS salary point to arrive at the full staff costs, including the consultants' overheads and profit, for staff employed in the consultants' offices. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of resident site staff supplied by the consultants. (As at now, MPS salary point 38 = \$65,695 per month and MPS salary point 14 = \$22,405 per month.)
2. The figures given are based on estimates prepared by the Director of Environmental Protection. We will only know the actual man-months and actual fees when we have selected the consultants through the usual competitive lump sum fee bid system.
3. The actual man-months and actual costs will be known after the completion of the construction works.