

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 \$1,993 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 2015 and there is a need to maintain a continuous waste disposal outlet for the southeastern part of the territory.

PROPOSAL

2. The Director of Environmental Protection, with the support of the Secretary for the Environment (SEN), proposes to upgrade **164DR** to Category A at an estimated cost of \$1,993 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 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. 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 (FC), we plan to commence the proposed works in early 2015, with a view to commencing waste intake in 2016 for completion in 2024 (including about two years of restoration works after its exhaustion).

JUSTIFICATION

Incineration and landfills are essential waste treatment infrastructure

5. To tackle the imminent waste challenge, the Environment Bureau released the “Hong Kong: Blueprint for Sustainable Use of Resources 2013-2022” (the Action Blueprint) on 20 May 2013⁶. The Action Blueprint maps out a comprehensive strategy with targets, policies and action plans for waste management for the coming ten years. We have set an aggressive target to reduce the per capita disposal rate of municipal solid waste (MSW) by 40% by 2022. Yet, 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. With the three existing landfills to be exhausted one by one by 2019, we need to proceed with the extension of the existing landfills and the development of modern waste-to-energy facilities in time to treat MSW, otherwise we cannot maintain the high hygiene standard expected of a modern, world-class city like Hong Kong.

6. No matter how hard we work to reduce waste, there will still be inert materials, non-recyclables, non-combustible waste, construction waste and post-treatment residues that need to be disposed of. While we acknowledge that in the longer run, our waste management system has to evolve in the direction of reducing direct landfilling of MSW, landfills are essential and ultimate parts of the waste management chain. 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 exhaustion of the existing landfills.

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

Proposed SENT landfill extension

7. We anticipate that the SENT Landfill will be exhausted in 2015. 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. 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.

8. To address community concerns on odour, we will designate the proposed SENT landfill extension for reception of only construction waste with no odour problem. The distance between the nearest residential development and the proposed extension part will be around double of that of the existing landfill. The existing SENT Landfill, upon restoration, will provide substantial intermediary buffer with greenery between residential development nearby and the proposed landfill extension.

9. The proposed scheme of the extension, which will occupy 13 hectares (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 SENT landfill extension project could therefore provide additional landfill capacity to maintain a continuous disposal service for construction waste in the urban and southeastern part of the territory. The estimated operating life of the proposed landfill extension is about six years, which may vary according to future development such as extent of waste reduction.

FINANCIAL IMPLICATIONS

10. We estimate the capital cost of the proposed works to be \$1,993 million in MOD prices (please see paragraph 11 below), broken down as follows –

/(a)

		\$ million
(a)	Landfill design and site formation (including utilities provision and drainage diversion)	155.7
	(i) landfill design	22.4
	(ii) initial works	25.8
	(iii) site preparation	107.5
(b)	Landfill Infrastructure	195.9
	(i) provision of infrastructure (including relocation of existing landfill infrastructure)	165.7
	(ii) surface water management system	30.2
(c)	Landfill liner system	324.5
(d)	Leachate collection and treatment system	162.3
	(i) leachate collection system	24.6
	(ii) leachate treatment system	137.7
(e)	Landfill gas collection and management system	68.3
(f)	Mitigation measures and EM&A for construction works	33.6
(g)	Continuous enhancement and associated works and implementation of local improvement works	22.3
(h)	Restoration and aftercare facilities	296.6
(i)	Consultants' fees for	12.7
	(i) contract procurement	8.0
	(ii) contract administration	4.1
	(iii) management of resident site staff	0.6
(j)	Remuneration of resident site staff	11.8

	\$ million	
(k) Contingencies	128.4	
Sub-total	1,412.1	(in September 2013 prices)
(l) Provision for price adjustment	580.9	
Total	1,993.0	(in MOD prices)

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

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

Year	\$ million (Sept 2013)	Price adjustment factor	\$ million (MOD)
2014 – 2015	3.3	1.05450	3.5
2015 – 2016	4.9	1.11777	5.5
2016 – 2017	117.5	1.18484	139.2
2017 – 2018	350.8	1.25593	440.6
2018 – 2019	350.8	1.33128	467.0
2019 – 2020	105.3	1.40117	147.5
2020 – 2021	93.6	1.47123	137.7
2021 – 2022	81.9	1.54479	126.5
2022 – 2023	81.9	1.61624	132.4
2023 – 2024	70.4	1.68897	118.9
2024 – 2025	70.2	1.76498	123.9
2025 – 2026	81.5	1.84440	150.3
	1,412.1		1,993.0

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12. 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 2014 to 2024. For the remaining year or so beyond 2024, an assumed annual rate of increase of 4.5% has been adopted as a working assumption.

13. 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

14. 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 650 site visits (with some 20 000 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.

15. 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 gazettal 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 (CWBCP) area. In January 2011, the Administration announced a comprehensive waste management strategy including reducing the area of the extension scheme in TKO Area 137 to around 13 ha, without using the 5 ha of land inside the CWBCP area, and accepting only construction waste at the proposed extension. 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 gazettal 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.

16. When we consulted SKDC on 3 May 2011, the meeting concluded that a majority of the SKDC members present at that meeting supported or had no objection to the scheme under which the landfill extension was reduced and only construction waste will be received, thereby addressed the community's concern on odour problem. At the meetings of the Legislative Council (LegCo) Panel on Environmental Affairs (EA Panel) on 27 May and 1 June 2013 and Public Works Subcommittee (PWSC) on 26 June 2013, views from Members and representatives of the public were received. On 6 September 2013, SEN briefed SKDC members on the Action Blueprint, listened to their views on waste management and addressed the local concerns.

17. Taking into account the views and concerns raised by Members, the local community and the public on proposed landfill extensions, in particular the proposed SENT landfill extension, we have carried out actions below in addition to the measures already put in place -

- (a) the Waste Disposal (Designated Waste Disposal Facility) (Amendment) Regulation 2013 has been introduced and passed by the LegCo on 22 January 2014 to designate the SENT Landfill as one which only accepts construction waste for disposal. When the extension is approved, we will announce the effective date of the designation by notice in the Gazette. By then, not only will the odour concern be removed, the number of vehicular trips going to the SENT Landfill will also drop from about 1 000 to about 500 daily;
- (b) to facilitate diversion of waste from the SENT Landfill to other waste disposal facilities, we have introduced the Waste Disposal (Refuse Transfer Station) (Amendment) Regulation 2013 to optimize the use of the refuse transfer station (RTS) system through fee reduction for some RTSS and opening of the Sha Tin Transfer Station to private waste collectors. We will announce the effective date of the amendment regulation by notice in the Gazette;

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- (c) subsidy is being provided to retrofit all private refuse collection vehicles (RCVs) for installation of metallic tailgates and waste water sump tanks to bring their environmental performance up to the prevailing standard of Government RCV fleet. The recently passed Waste Disposal (Designated Waste Disposal Facility) (Amendment) Regulation 2013 also requires, among other things, that all RCVs entering landfills or RTSs be equipped with a metal tailgate cover and waste water sump tank in good working condition. This will greatly reduce nuisance caused by dripping of waste water and spattering of waste from RCVs;
- (d) monitoring and enforcement were stepped up by joint actions of the Hong Kong Police Force (HKPF), Food and Environmental Hygiene Department (FEHD) and Environmental Protection Department (EPD) against RCVs causing hygiene, overloading or other problems in TKO. From August 2013 to March 2014, over 440 summons and warnings were issued. EPD and FEHD have also enhanced enforcement actions against fly-tipping at Wan Po Road and nearby areas in TKO;
- (e) to combat illegal fly-tipping at car-parks near the TKO Industrial Estate, EPD has installed a close-circuit television system at the Chun Cheong Street public car-park. From early December 2013 to now, ten suspected fly-tipping cases were identified. We are following up the cases with a view to initiating prosecutions against the offenders;
- (f) we have enhanced odour monitoring by setting up an odour monitoring team to swiftly respond to odour complaints near the SENT Landfill;
- (g) to step up monitoring on air quality, we have been measuring PM2.5 at Wan Po Road in TKO since September 2013 (results show that the 24-hour average PM2.5 level measured was similar to those recorded at the general air quality monitoring stations elsewhere in Hong Kong). We will also establish an air quality monitoring station in TKO. We have consulted SKDC on the proposed location and the station is planned for operation by end 2015;

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- (h) the operating hours of TKO fill bank have been reduced by around 4 hours on Sunday and public holiday from April to December 2013. Since January 2014, it is closed on Sunday and public holiday;
- (i) the Sludge Treatment Facility is targeted for full commissioning in end 2014. Upon its commissioning, odorous sludge will no longer be disposed of at landfills;
- (j) to reduce traffic burden and environmental nuisance, we strive to increase the use of marine transportation to landfills. The new marine barging point at Kai Tak will commission in the second half of 2014. By then, more fill materials will be transported by sea to the TKO fill bank, reducing the traffic and environmental impacts of construction waste vehicles in TKO area;
- (k) future development of community, environmental or recreational facilities at restored landfills will be expedited by the Restored Landfill Revitalisation Funding Scheme announced in the 2014 Policy Address with \$1 billion funding earmarked;
- (l) to promote the sustainable development of the recycling industry, the Government has earmarked \$1 billion to launch a Recycling Fund in the 2014 Policy Address; and
- (m) we will set up District Liaison Groups in the districts concerned including one for SENT Landfill to enhance communication with local communities on operation of major waste treatment facilities. We will continue to maintain close liaison with SKDC and other stakeholders in taking forward the extension project.

18. We last consulted the EA Panel on 24 February 2014 on the proposed extension. Special EA Panel meetings were held on 22 March and 28 March 2014 for meeting deputations and deliberation over the proposed extension. Views and concerns raised by Members and the public during the meetings were primarily related to the odour, traffic and environmental issues pertinent to the operation of the SENT Landfill. The additional improvement measures outlined in paragraph 17 aim to address the concerns in a holistic manner. After deliberation, the EA Panel supported our submission of the proposed SENT landfill extension to the PWSC. We will continue to keep Members abreast of the progress of the improvement and enhancement measures implemented or planned as outlined in paragraph 17.

ENVIRONMENTAL IMPLICATIONS

19. **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.

20. In accordance with the proposal to restrict the SENT landfill extension to accept construction waste only, it is anticipated that the environmental impacts and the traffic impact of the proposed scheme will be 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 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 \$33.6 million in September 2013 prices. We have included this cost in the overall project estimate.

21. 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.

22. 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. We plan to utilise LFG on site for generating electricity for site operation and converting to heat energy for leachate treatment process and to export surplus LFG off site for other beneficial uses after treatment. We shall ensure that both LFG and leachate would have no adverse impact on air and water quality of the environment.

23. 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.

24. At the planning and schematic design stages, we have set 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 facilities⁷. We will encourage the contractor to maximize the use of recycled/recyclable inert construction waste, and the use of non-timber formwork as far as practicable and cost-effective to further reduce the generation of construction waste.

25. 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.

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⁷ 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.

26. 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 \$231,250 for this project (based on a unit charge rate of \$125 per tonne for disposal at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation).

HERITAGE IMPLICATIONS

27. 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.

LAND ACQUISITION

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

BACKGROUND INFORMATION

29. 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.

30. We upgraded **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”.

31. We intend to seek funding approval from the FC for the extension projects of the three existing landfills. On 2 July 2013, the PWSC supported our proposed full-upgrading of the Northeast New Territories landfill extension and part-upgrading of the West New Territories landfill extension to FC. We plan to submit the three landfill extension projects, as well as the integrated waste management facilities phase 1 project for FC's approval in May 2014.

32. 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 trees⁸. 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.

33. We estimate that the proposed works will create about 351 jobs (277 for labourers and another 74 for professional/technical staff) providing a total employment of 10 800 man-months.

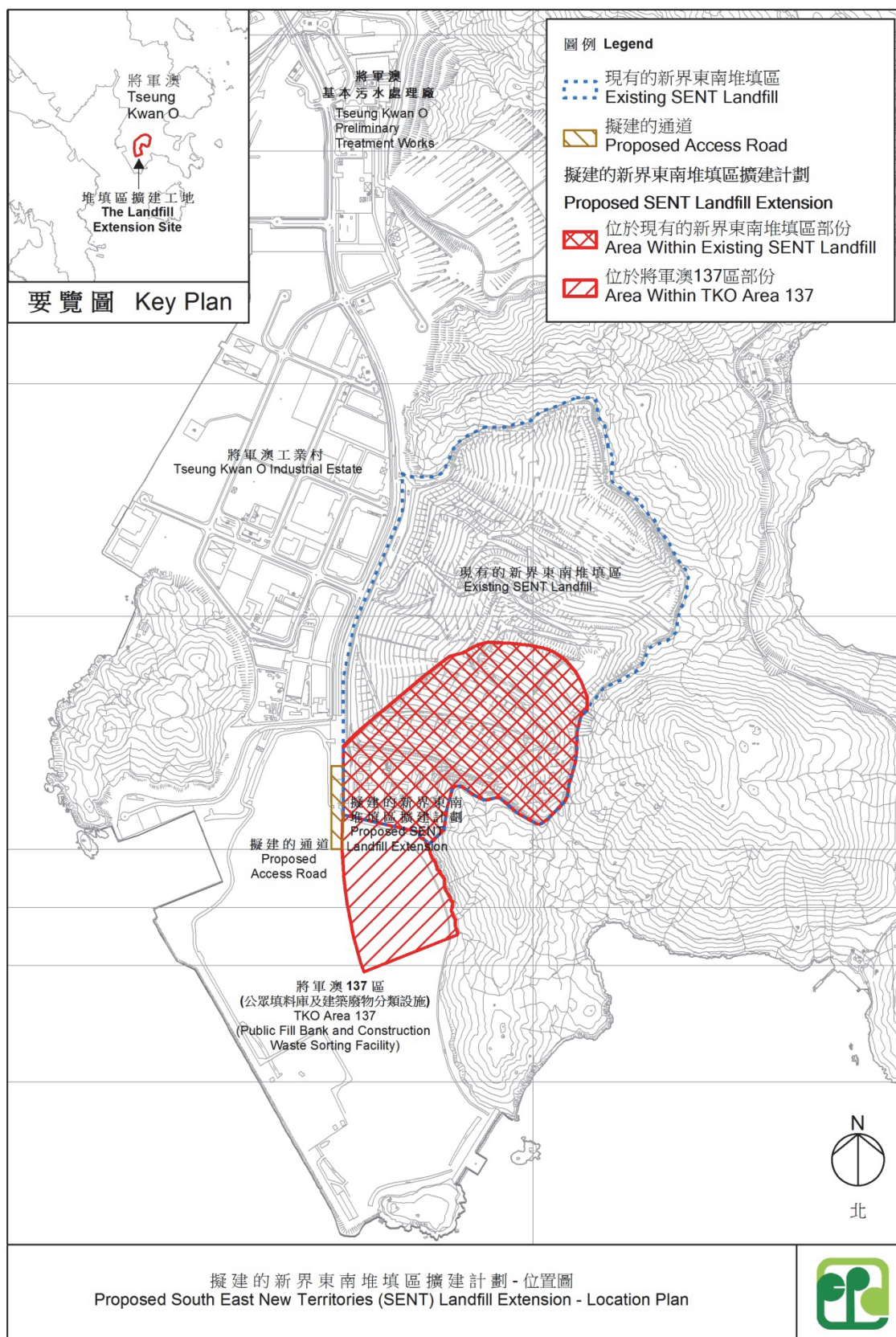
Environment Bureau
April 2014

⁸ 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.

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 2013 prices)**

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a) Consultants' fees ^(Note 2)					
(i) contract procurement	Professional	36	38	2.0	4.9
	Technical	66	14	2.0	3.1
Sub-total					8.0
(ii) contract administration	Professional	18	38	2.0	2.4
	Technical	36	14	2.0	1.7
Sub-total					4.1
(b) Resident site staff costs ^(Note 3)	Professional	48	38	1.6	5.2
	Technical	192	14	1.6	7.2
Sub-total					12.4
Comprising -					
(i) Consultants' fee for management of resident site staff				0.6	
(ii) Remuneration of resident site staff				11.8	
Total					24.5

* 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 = \$67,370 per month and MPS salary point 14 = \$23,285 per month.)
2. The actual man-months and actual fees will only be known after the selection of consultants through the usual competitive lump sum fee bid system.
3. The actual man-months and actual costs will only be known after the completion of the construction works.