40/F, Revenue Tower, 5 Gloucester Road, Wan Chai, Hong Kong
香港灣仔告士打道5號稅務大樓40樓

ACE-EIA Paper 2/2008
For Advice

Environmental Impact Assessment Ordinance (Cap. 499)
Environmental Impact Assessment Report
South East New Territories (SENT) Landfill Extension

PURPOSE

This paper presents the key findings and recommendations of the Environmental Impact Assessment (EIA) report for the South East New Territories (SENT) Landfill Extension (hereafter known as the Project), submitted under section 6(2) of the Environmental Impact Assessment Ordinance (EIAO) with the application No. EIA-143/2007. The Environmental Infrastructure Division of the Environmental Protection Department (the applicant) and their consultants will make a presentation. Comments from the public and the Advisory Council on the Environment will be taken into account by the Director of Environmental Protection when she makes the decision on the approval of the EIA Report under the EIAO.

ADVICE SOUGHT

2. Members' views are sought on the findings and recommendations of the EIA report.

NEED FOR THE PROJECT

3. The three strategic landfills in Hong Kong, i.e. the West New Territories (WENT) Landfill, the North East New Territories (NENT) Landfill and the South East New Territories (SENT) Landfill, are expected to be filled up within the next decade. In December 2005, the Government published the waste management policy document "A Policy Framework for the Management of Municipal Solid Waste (2005-2014)" (the Policy Framework). This document sets out a comprehensive strategy for the management of municipal solid waste in Hong Kong, with clear targets and a ten-year (2005-2014) timetable for action. The strategy adopts the three-tiered

waste hierarchy with avoidance and minimization as top priorities, followed by reuse, recovery and recycling, and with bulk waste reduction and landfill disposal at the bottom of hierarchy. It is projected that, even with effective reduction and recycling measures stated in the Policy Framework extensions to the existing landfills would be required in the early 2010s to mid-2010s.

DESCRIPTION OF THE PROJECT

4. The project comprises the development, management, operation, restoration and aftercare of the SENT Landfill Extension. The proposed extension option covers an area of about 50 ha with a filling capacity of about 17 million m^3 on the southern side of the existing SENT Landfill, including a temporary encroachment of about 5.1 ha into the Clear Water Bay Country Park (CWBCP). The location of the proposed SENT Landfill Extension site is indicated in **Figure 1**. The Project covers the following works:

a) site formation and preparation;

b) installation of liner system;

c) installation of leachate collection, treatment and disposal facilities;

d) installation of gas collection and management facilities;

e) utilities provisions and drainage diversion;

f) operation of the landfill;

g) restoration and aftercare;

h) measures to mitigate environmental impacts as well as environmental monitoring and auditing to be implemented; and

i) relocation of existing landfill infrastructures including the leachate treatment plant, landfill gas management plant, power generator, workshops and merging the existing landfill and its extension.

5. The Project is classified as a designated project under Item G.1, Schedule 2 of the EIAO: "*A landfill for waste as defined in the Waste Disposal Ordinance (Cap. 354)*".

CONSIDERATION OF ALTERNATIVE EXTENSION OPTIONS

6. The EIA study has considered alternative extension options for developing the preferred option. Priority was given to consider options without the encroachment of CWBCP. However, the EIA found that these options could only provide limited void capacity which would not be able to accommodate the waste generated in the forecast period, even with effective waste reduction and recycling measures as stated in the Policy Framework. Engineering measures have also been considered to maximize the void space offered by these non-encroachment options. However, the required massive retaining wall/earth bunds (in the order of 40 m) would be visually intrusive and technically very challenging. Even so, it would still not increase the void space sufficiently to meet the demand.

7. Hence, the option with an encroachment of about 5.1 ha into the CWBCP (see **Figure 2**) was proposed which would provide the required void capacity to meet the landfill space demand while minimizing disturbance to natural habitats. The encroached area would be filled to the final formation level and formed part of the restored landfill. The whole restored area would be landscaped and vegetated, and the encroached area after restoration would be returned for country park use.

SPECIFIC ENVIRONMENT ASPECTS TO HIGHLIGHT

Ecological Impact

8. The majority of the proposed extension would be located in habitats which have already been disturbed or developed, including existing SENT Landfill (about 30 ha) and the fill bank in Tseung Kwan O Area 137 (about 15 ha). The proposed extension option also has an encroachment of about 5.1 ha into the CWBCP, comprising shrubland and grassland habitats of low to moderate ecological value. The EIA recorded 11 wildlife species of conservation interest, including birds (Brown Hawk Owl, Greater Coucal, Common Buzzard, Black Kite), bats (Japanese Pipistrelle, Brown Noctule Bat), butterflies (White-edged Blue Baron, Indian Fritillary, Swallowtail, Tooth Sunbeam), and reptile (Common Rat Snake) at the extension site, but the majority of the extension site is not the preferred habitat of these species. As these species are highly mobile and there is a large extent of similar habitat in the vicinity of the extension site, the EIA concluded that there would be no adverse ecological impacts.

9. The EIA recommended 6 ha of mixed woodland planting and provision of a mosaic of grassland and shrubland in the remaining areas of the extension site to compensate for the loss of about 6 ha of shrubland affected due to the proposed extension. A trial nursery for native plant species was also recommended to be set up in advance during the construction phase in order to fine tune the planting matrix and

management intensity of the recommended indigenous tree species. With the proposed ecological mitigation measures in place, adverse residual impact is not expected. The Agriculture, Fisheries and Conservation Department has reviewed the EIA report and indicated that the ecological assessment of the report met the requirements of the EIA study brief and the Technical Memorandum on Environmental Impact Assessment Process (TM).

Operational Phase Odour Impacts

10. The EIA has assessed the odour impacts during the operation and restoration phase of the project and recommended mitigation measures including limiting active tipping surface area to 30 x 40 m, covering daily covered area with 300 mm soil, covering the non-active tipping face with 600 mm of soil and an impervious liner, no disposal of sludge from sewage treatment works, enclosing the weighbridge area, vertical and horizontal landfill gas extraction, mobile cover for special waste trench, and applying deodorizer or odour suppression agents to control odour emissions from the active tipping face and special waste trench.

11. With the recommended mitigation measures in place, the EIA found that for air sensitive receivers including the planned and existing residential development the odour criteria would be met except that there would be a residual odour impact to the existing TVB City located adjacent to the proposed extension boundary, and the planned industrial developments at Tseung Kwan O Area 137 (which is currently occupied by the Fill Bank). To further minimize the frequency of the exceedances at the TVB City, tipping activities would be rephrased and limited to the southern part of the extension site during summer months. After incorporation of all practicable mitigation measures recommended in the EIA, the predicted highest 5-second odour concentration at TVB City over the 6 year operation period is estimated to be 9.5 OU and the maximum number of potential exceedances is estimated to be 11 events. The number of potential exceedances is expected to diminish to zero over the 6 years operation as the separation distances and heights between the active tipping face and the air sensitive receivers increase. Taking into consideration of the extent of the impact, the transient nature, low frequency and magnitude of exceedances, the residual impacts are considered acceptable and meeting the requirements of the Study Brief and TM,

Landfill Gas

12. The decomposition of waste deposited in a landfill will generate landfill gas (LFG) which can present potential hazards if it is not adequately controlled. The EIA has included a qualitative risk assessment of LFG hazards at the receivers. LFG control measures have been installed in the existing SENT Landfill and will be installed in the extension site. The overall risk to receivers within the Project area was categorized to be medium to high and that to receivers outside the Project area was

categorized as very low to low depending on the nature and location of these developments. The EIA has recommended a package of protective and precautionary measures including engineering design and monitoring program to reduce the risk. With these measures in place, unacceptable LFG hazards at receivers are not anticipated.

Other Environmental Impacts

13. The EIA report also assessed the impacts of air quality, noise, water quality, waste management, as well as visual and landscape impacts due to the proposed landfill extension. The assessment concluded that, with the implementation of recommended mitigation measures, the anticipated environmental impacts are acceptable and will meet the relevant requirements under the TM.

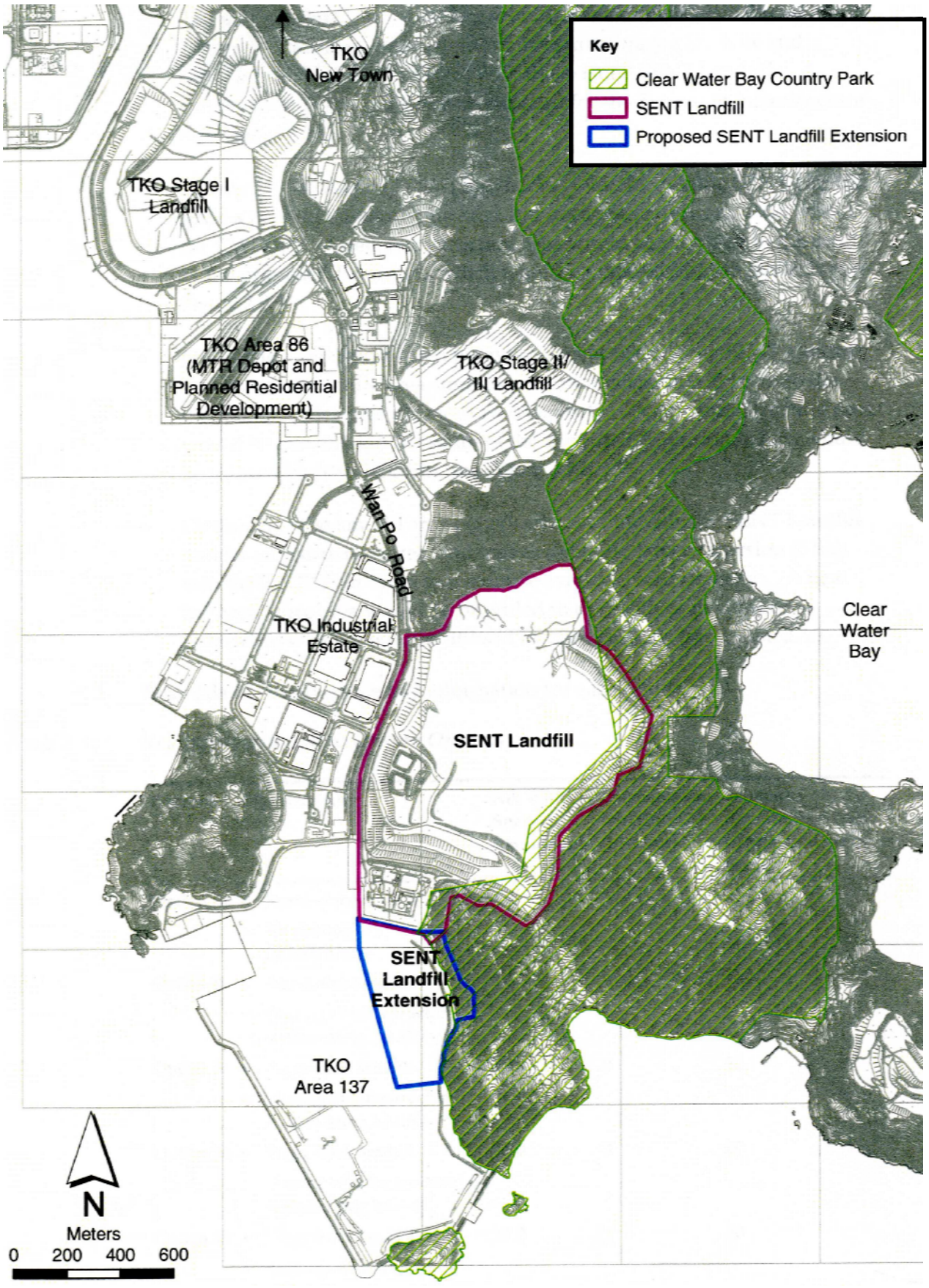
Environmental Monitoring and Audit

14. The EIA report includes an Environmental Monitoring and Audit (EM&A) Manual which recommends an EM&A programme during the construction, operation, restoration and aftercare phases of the Project.

Public Consultation

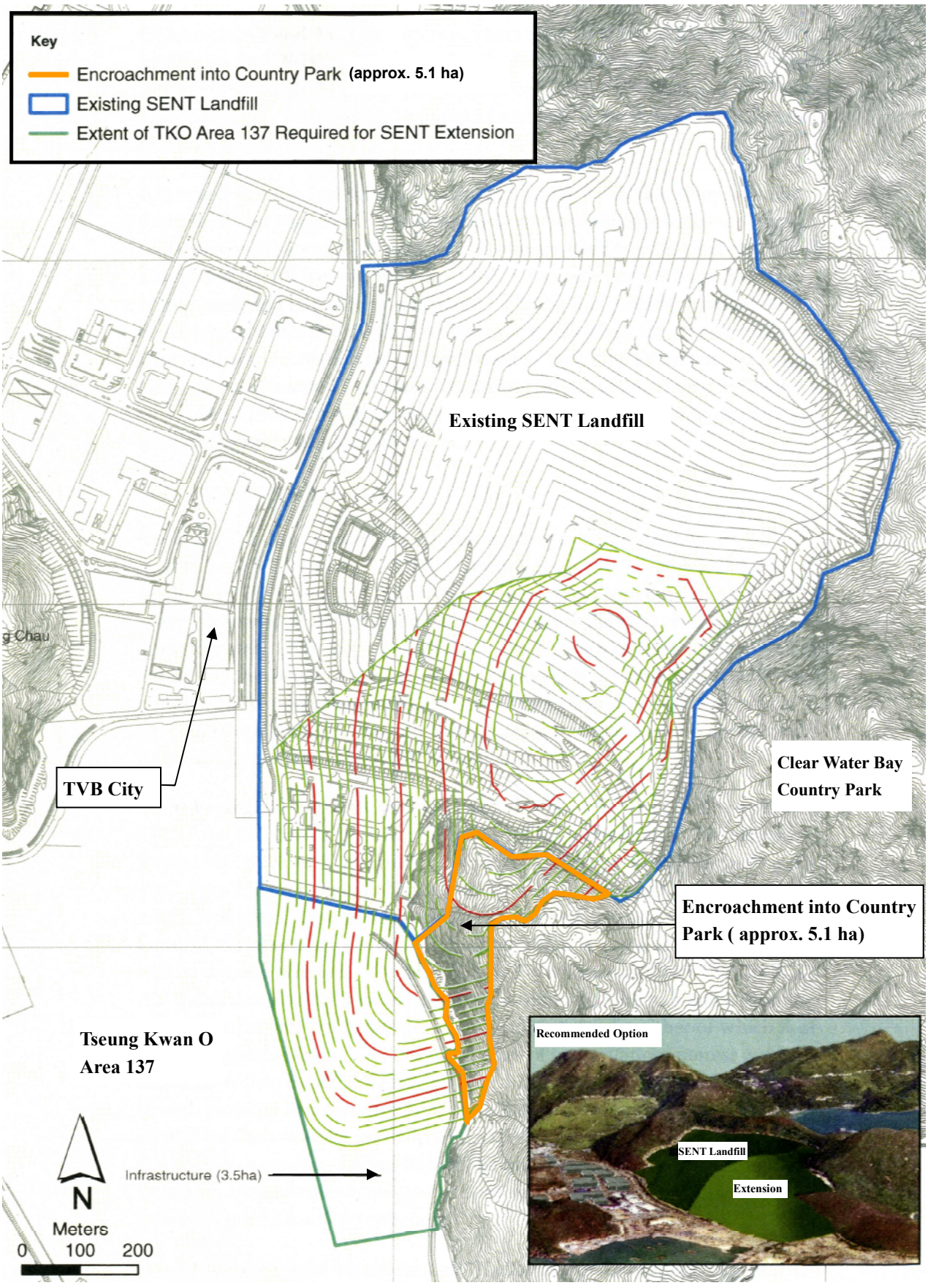
15. The applicant has made the EIA report, EM&A Manual and Executive Summary available for the public to comment under the EIAO from 26 February 2008 to 26 March 2008. Members will be briefed on any comments received from the public at the meeting.

February 2008
Environmental Assessment Division
Environmental Protection Department



Project Title: South East New Territories (SENT) Landfill Extension

Figure 1 Project Location (Reproduced from Figure 2.2a of the EIA Report)



Project Title: South East New Territories (SENT) Landfill Extension

Figure 2 Recommended Landfill Extension Option
(Reproduced from Figure 2.3e of the EIA Report)