15 TERRITORY-WIDE ENVIRONMENTAL IMPLICATIONS

15.1 INTRODUCTION

15.1.1 This Section addresses in broad terms the overall territory-wide environmental implications of the additional visitors to the Theme Park, in terms of air quality, water and waste. This assessment was undertaken to satisfy Clause 3.6 of the Study Brief. Further technical assessment details are provided in *Sections 3* (Air Quality), *Section 5* (Water Quality) and *Section 6* (Waste Management Implications).

15.2 TERRITORY-WIDE AIR EMISSIONS CAUSED BY THEME PARK TRAFFIC

15.2.1 The territory-wide air quality impact from additional traffic generated by the operation of Theme Park and associated developments was evaluated. Daily person trip data for the year 2014 were used as the basis for comparison with the projected CTS-3 traffic figures in 2016 (which do not include the Theme Park), as shown in *Table 3.5c* of S*ection 3.5*.

15.2.2 The number of additional vehicles generated within the HK SAR (local) and transboundary traffic and their vehicle-kilometre-travelled (vkt) were estimated and are shown in *Tables 3.5h* and *3.5i* of *Section 3*.

15.2.3 As compared with the total vkt estimate obtained from the *CTS-3 Study* (which did not include the Theme Park), the additional traffic generated will only contribute to 0.26 % and 6.7 x 10^{-4} % of the total local and transboundary vkt, respectively. On this basis, it is reasonable to conclude that the territory-wide air quality impact due to Theme Park related traffic is not significant.

15.2.4 Alternative access modes, described in *Section 14*, using railway (PBRL) and ferry have been taken into account in the evaluation. *Table 3.5c* of *Section 3* shows that, about 34,653 and 3,296 person trips would be taken using the PBRL and ferry, respectively. These two transport modes contribute to about 43 to 44% of the total person trips generated to the Theme Park. Significantly more road traffic would be generated should these alternative access modes not be provided. The consequence would be an increase in traffic related emissions.

15.3 TERRITORY-WIDE IMPLICATIONS OF THE THEME PARK TO WATER QUALITY AND HYDRODYNAMICS

TERRITORIAL MODELLING

15.3.2 As detailed in *Section 5*, the hydrodynamic and water quality models used in the water quality and hydrodynamic assessment cover the whole of Hong Kong waters, the Pearl River Delta, Mirs Bay and the Lema Channel and as such are able to predict far field effects of the Theme Park on hydrodynamics and water quality.

HYDRODYNAMICS

15.3.3 The potential impacts to hydrodynamics from the Theme Park and associated reclamations were assessed using computational modelling with the full coverage of Hong Kong waters. The cumulative modelling assessment predicted that the Theme Park reclamations would have only minimal effects on tidal current speeds and directions in the immediate vicinity of the Theme Park and no changes in territory-wide hydrodynamics, when compared with the EIAO TM assessment criteria.

WATER QUALITY

15.3.4 The potential operational impacts to water quality from the discharge of treated sewage effluent and stormwater were modelled. The sewage effluent flows from the Theme Park will be conveyed to the Siu Ho Wan Sewage Treatment Works. Stormwater will be discharged to the south and east of the Theme Park.

15.3.5 The increased treated effluent flows from the Siu Ho Wan STW due to the load from the Theme Park and the stormwater discharges were included in the operational water quality modelling. It should be noted that there is an ongoing plan under the Outlying Islands Sewerage Master Plans to upgrade the Siu Ho Wan STW to utilise Chemically Enhanced Primary Treatment with disinfection to protect the quality of waters off North Lantau. Operational water quality modelling predicted that there would be no breaches of the Water Quality Objectives due to the treated sewage effluent and stormwater discharges from the operation of the Theme Park and associated developments. It was therefore concluded that there would be no adverse territory-wide or local impacts to water quality due to the operation of the Theme Park and associated developments.

15.4 TERRITORY-WIDE IMPLICATIONS OF THE THEME PARK WASTE ARISINGS

SOLID WASTE ARISINGS

15.4.2 Based on the operating experience of other international theme parks, the amount of Municipal Solid Waste (MSW) to be generated from the operation of the Theme Park (Phase I and II) at Penny's Bay has been assessed to be 38 tpd in 2005, increasing to 73.5 tpd in 2014 and 175 tpd in 2024. These estimates assumed that no waste reduction measures were in place. Without waste reduction measures, such arisings would increase the demand for valuable landfill void space.

15.4.3 The North Lantau Transfer Station (NLTS) was commissioned in April 1998 and has a throughout of 650 tpd which will be expanded to 1,200 tpd to handle the anticipated growth of waste arisings from the North Lantau area. The anticipated waste throughputs of NLTS are 180, 370, 770, and 880 tpd for the years 2001, 2006, 2011 and 2016, respectively(1). At the NLTS, the waste is compacted into 20 ft ISO containers for bulk transfer by marine vessels to the Western New Territories (WENT) landfill for final disposal. The Transfer Station will be able to handle the waste arisings from the Theme Park (Phases I and II) and associated developments at least until 2016. The WENT landfill was commissioned in November 1993 and has a design capacity and void capacity of about 61 M m^3, and 53 Mm^3 respectively. Based on the current waste input forecast,

(1) EPD Communication ref EP 20/03/205 M

the SAR's strategic landfills even with the full implementation of the Waste Reduction Framework Plan will be exhausted by 2019. The waste arisings assessment has further estimated that with no waste reduction initiatives, the wastes generated from the Theme Park (Phase I and II) between 2005 and 2019 are expected to reduce the life of the strategic landfills by only 20 days.

WASTE REDUCTION OPPORTUNITIES

15.4.4 A detailed review of waste reduction opportunities has been undertaken in *Section 6*. The review indicates that the quantity of recyclable materials that may be recovered by local recyclers under market driven conditions is estimated to be about 23 to 26% of the total quantity of waste generated at the Theme Park. These estimates are based on the prevailing market conditions in Hong Kong.

15.4.5 In addition, the potential for further recovery of major recyclables exists when source separation programmes are in place to enhance the value and quality of the materials. It is, thus, recommended that the Theme Park should institute a source separation programme to recover additional recyclables from the remaining waste stream. A preliminary recycling target of 10% is recommended for the additional recovery of recyclable materials. A further 10% is recommended for the recovery of compostable materials, if a composting facility is available in the HK SAR. The targets should be adopted in the Waste Management Plan for the Theme Park.

15.4.6 Additionally, an annual waste composition and recycling monitoring programme will be implemented to determine the practical recycling rate that can be achieved given the prevailing market for recyclables.

15.4.7 With a standard waste recycling rate of only 23%, the life of strategic landfills will be prolonged by 5 days. With a source separation programme to recover recyclables from the remaining waste stream, the life of strategic landfills will be prolonged by another 2 days. With a further 10% removal rate for compostable materials, assuming that a composting facility is available, the life of strategic landfills will be prolonged by another 2 days.