18. PILLAR POINT VALLEY NORTH LANDFILL

18.1 Basic Information

Project Title

18.1.1 Pillar Point Valley North Landfill (PPVNL).

Nature of Project

18.1.2 The Project would form a new landfill, designated as PPVNL, which would occupy a valley located between the existing un-restored Pillar Point Valley Landfill and the restored Siu Lang Shui Landfill (*Figure 18.1*).

18.1.3 The PPVNL would be designed to accept waste from the time at which the disposal capacity of the existing/extended landfills has been reached.

18.1.4 If it is assumed that the PPVNL would be constructed as a "stand alone" facility, procured through competitive tendering, construction works would be as described in Section 3.4 (Part A). In addition specific issues for the PPVNL would include:

- Delivery of waste by road-vehicle.

Location and Scale of Project

18.1.5 The site is located in the North West New Territories (NWNT) some 2km west of Tuen Mun, overlooking Urmston Road and Lantau Island. Excepting the Pillar Point Valley Landfill and the Siu Lang Shui Landfill, there are no developments (industrial or residential) within 700m of this site.

18.1.6 Ground elevations within the proposed site vary from +120mPD to +320mPD.

18.1.7 The PPVNL is located within the boundary of a "Land Borrow Area" designated on Lands Department Plan No. DL16-SO that is entirely within the Castle Peak Firing Range (also known as Defence Lot No. 16).

18.1.8 More than 700m to the south of the PPVNL lies Tuen Mun Area 38, the last phase of which is currently under reclamation. This area is currently occupied by a temporary public filling barging point and CED is planning to establish and operate a fill bank for temporary stockpiling of public fill between early 2003 and 2005. The site is earmarked for a number of permanent facilities in the future, including an aviation fuel facility, a petrochemical plant, a recovery park and other waste management facilities. To the east of Area 38 is the River Trade Terminal and to the west lies the Shiu Wing Steel Mill and Castle Peak Power Station. Black Point Power Station is located approximately 3.5km to the north of the PPVNL. Although not yet confirmed, a Waste-to-Energy Facility (WEF) has been proposed at Ha Pak Nai, which is about 4km to the north of the PPVNL.

18.1.9 The PPVNL occupies an area of some 100ha, with a net void capacity in the region of 65Mcum, subject to final contouring, and assuming balanced earthworks. An access road would be required from Lung Mun Road to the landfill.

History of Site

18.1.10 Due to its inclusion within the Castle Peak Firing Range, the site is relatively undisturbed and has not been developed in any way. Consequently, there is little history to report.

18.1.11 This site is currently within Defence Lot No. 16 for use by the Garrison. It is not envisaged that this site would be available for landfill development in the short term. However, the Firing Range is a potential area for landfill development. Consequently this site is being considered as a possible long-term site for development as a landfill in the event that some areas of the "Defence Lot" are released for other uses. There is precedent for this as both the Pillar Point Valley Landfill and the WENT Landfill encroach into the "Defence Lot".

Number and Types of Designated Projects Covered

18.1.12 The PPVNL would be a Designated Project under the following Schedules of the EIAO:

- G1 - A landfill for waste as defined in the Waste Disposal Ordinance (Cap 354)
- G4 - A waste disposal facility for refuse.

18.2 Outline of Planning and Implementation Programme

18.2.1 A generic outline for the planning and implementation is summarised in Section 3.5 (Part A), and a specific outline programme for the PPVNL is shown in *Figure 18.2*.

18.2.2 There is no statutory plan for the area in which this site is located. However the landfill would require the construction of a new access road to the landfill that would cross a "Green Belt" zone, on the draft Tuen Mun Outline Zoning Plan No. S/TM/16, to the south of the site. In addition the waste reception area and leachate treatment plant would fall partially within the "Green Belt" zone.

18.2.3 Other than the designation of this area as being in the Castle Peak Firing Range (which is a "Defence Lot"), there are no other identified uses for this site; however a portion of this "Defence Lot" adjacent to the closed Pillar Point Valley Landfill has been designated as a "Land Borrow Area".

18.3 Possible Impacts on the Environment

18.3.1 Possible impacts on the environment during the construction, operation and aftercare phases of the PPVNL are outlined below. *Figure 18.1* provides details of identified sensitive receivers. The individual assessments are summarised in *Tables 18.1 and 18.2*.

Air Quality

18.3.2 There are no ASRs within 500m of the site or the access road to the site. Residential developments are located at a lower elevation some 700m to the west and Tuen Mun is located approximately 2km to the east. This area of Hong Kong is subject to investigation for a number of industrial related developments. There are a number of industrial developments located 700m to the south, including those at Tuen Mun Area 38 such as the Permanent Aviation Fuel Supply Facilities and a C&D Materials Sorting Facilities.

18.3.3 The site lies at an elevated position within a hilly area, with turbulent air flow. Given the distance to the nearest ASRs, it is unlikely that there would be any noticeable impacts. Within 5km from the site, Castle Peak Power Station, Shiu Wing Steel Mill, River Trade Terminal and Green Island Cement Works are located west of the site; these and other existing and proposed industrial facilities in Tuen Mun Area 38 may give rise to cumulative impacts. Black Point Power Station and a proposed WEF, STF and ACTF are located north of the site and may also give rise to cumulative air quality impacts. However, although the site is located within the Deep Bay Airshed, it is unlikely that air would stagnate within the vicinity of the site because of prevailing winds.

18.3.4 This is a land based site and will have road access only. The cumulative distance to be travelled from the existing network of inland RTSs (eg. NWNT RTS, Shatin RTS) to the site is estimated to be 99km. Given the fact that only road vehicles can be used for waste delivery, the total emissions of air pollutants to this site will likely be higher than a marine based site of equivalent capacity.

Noise

18.3.5 The landfill development, including access roads and reception area, has the potential to cause the following noise impacts:

- Excavation, site formation and general construction activities.
- Heavy mobile plant used during operation.

- Waste collection vehicles, etc. entering and leaving the site during operation.
- Fixed plant noise.

18.3.6 There are unlikely to be any significant noise implications associated with this site because there are no NSRs within 300m of the site or the access road.

18.3.7 During construction and operation phases, it is possible that activities could continue into, or even through, the night-time period. This would depend upon day-to-day landfill operations and the overall landfill development programme employed by the landfill contractor.

18.3.8 Impacts from the various existing and proposed facilities in Tuen Mun Area 38 were considered, but are too far distant from the site to cause cumulative impacts.

Water Quality

18.3.9 The landfill development, including the access road and reception area, has the potential to cause the following water quality impacts:

- Sediment-laden runoff escaping from the site during landfill construction.
- Effluent from the leachate treatment plant during operation and aftercare.
- Accidental leachate breakout into surface water drainage during operation and aftercare.

18.3.10 The site is located in a hilly area and while there is potential for sediment-laden and leachate-contaminated runoff during construction, the fact that the majority of construction works would be undertaken within a "bowl" should negate this potential. During operation and aftercare, surface water drainage channels would be constructed to prevent significant uncontrolled run-off from the completed landfill surface area.

18.3.11 The assumption is made that for an operating landfill all discharges would be controlled, so that there would be no water quality impacts during operation. However, this assumption should be addressed in further detail, including a risk assessment (e.g. of a leachate breakout incident) during the detailed EIA stage of the project. The design of the landfill would have to incorporate environmental protection orientated designs to cater for such potential incidents.

18.3.12 Any discharges from the PPVNL would ultimately enter the North West WCZ, where a "zero discharge" policy is not in force, instead of Deep Bay.

Waste Management / Disposal Impacts

18.3.13 Given the remote location of the site, the conceptual design has provided for a material balance within the site, i.e., there is no significant import to site or export from site of materials.

18.3.14 The operation of the landfill would include:

- Local deliveries of MSW and other waste from the Tuen Mun area by road
- Waste delivered by road from NWNTRTS

18.3.15 Depending on other facilities then in place:

- Waste could also be delivered to this site by road from STTS
- Waste could also be delivered to this site by private waste hauliers from elsewhere in the SAR

18.3.16 An option would also existing for waste delivered by sea to the existing WENT Landfill waste reception area to be transferred by road to the PPVNL either by a dedicated road across the WENT Landfill and the Castle Peak Firing Range, or by using the public highway via Nim Wan Road and Lung Mun Road.

18.3.17 Various potentially polluting materials may be stored, handled and transported to / from the site. Examples may include chemicals for waste water/leachate treatment, waste oils, fuel for plant working on the site, etc.

18.3.18 All waste materials would need to be stored, handled and transported in an agreed and appropriate manner that complies with the Waste Disposal Ordinance (Cap 354) and subsidiary regulations such as the Waste Disposal (Chemical Waste) (General) Regulation. For this assessment it is assumed that potential impacts from polluting goods would be controlled through appropriate design and management systems.

18.3.19 This site can only be accessed by road and thus all waste delivery will be by road vehicle. The potential GHG emissions (per kg of waste transferred) from territory-wide waste delivery to this site will likely be high compared to an equivalent the marine based site.

Ecology

18.3.20 The site is located within the Castle Peak Firing Range and so has been relatively undisturbed for a number of years. The site comprises a steep-sided valley with two ephemeral streams running roughly northeast to southwest and merging towards the middle of the site.

18.3.21 The general environs of Castle Peak have long been recognized as being of conservation value by virtue of the flora of the area. The Tsing Sham Tsuen SSSI, designated in 1976 due to its unique tree flora, is located 3km east-northeast of the site. According to the SUSDEV21 study, the ecological value of this SSSI is graded as “medium”. The Castle Peak SSSI, designated in 1980 also due to its floristic value, is located approximately 1.5km northeast of the site. In particular, this SSSI supports well-developed populations of the Balloon Flower *Platycodon grandiflora*, which is protected under the Forestry Regulations, (subsidiary of the Forestry and Countryside Ordinance (Cap. 96)), whilst the ravines below the summit provide a habitat for rare shrubs. The ecological value of this SSSI is graded as “high”.

18.3.22 Vegetation is well established all over the site, generally comprising mixed scrub with grass, but also with pockets of tall scrub and semi-mature woodland. Given the undisturbed nature of the site, and its ecological linkage with other undisturbed habitat particularly to the north and east, it is likely to provide habitat for a range of fauna. Likewise, linkage with undisturbed vegetated areas to the north, east and west (including the two SSSIs) means there is potential for flora of conservation significance to be present within or adjacent to the site.

18.3.23 The coastal waters off Pillar Point are a habitat for the Chinese White Dolphin, *Sousa chinensis*. The Sha Chau & Lung Kwu Chau Marine Park is located some 4km west of the point of discharge of the site’s streams into the coastal waters. The waters around the Marine Park are also part of an ecologically important fisheries area. However, impacts on coastal resources are not anticipated, as water quality control measures will be incorporated during site formation to control surface run-off, and into site design to ensure there are no operational impacts on coastal waters.

Fisheries

18.3.24 The site is located some 1.5km inland from the reclaimed coastline at Tuen Mun Area 38, and is situated in an undisturbed upland area. As such there are no mariculture or aquaculture activities at the site that would be directly affected by any development thereat.

18.3.25 The closest site of aquaculture activity to the site is at Ha Pak Nai, located some 5km due north of the site. There is no natural drainage from the site in this direction and so there would be no impacts on aquaculture activities.

18.3.26 The coastal waters off Tuen Mun Area 38 form the northern boundary of the "Northeast Lantau" fish spawning ground that is bound by Chek Lap Kok in the south, "the Brothers" in the east and the Sha Chau & Lung Kwu Chau Marine Park in the west. The area has been identified as an important spawning ground for commercial species including *Leiognathus brevirostrus*, *Lateolabrax japonicus* and *Clupanodon punctatus*, and has been recommended for protection.[1] Commercially valuable shrimp species such as *Penaeus penicillatus* and *Metapenaeus ensis* are also present in the area.[2] The Sha Chau & Lung Kwu Chau Marine Park is of particular importance as a fish spawning ground, and artificial reefs have been deployed here to enhance fisheries resources.[3]

18.3.27 As with ecology, impacts on coastal fisheries resources are not anticipated, as water quality control measures will be incorporated during site formation to control surface run-off and into site design to ensure there are no operational impacts.

Cultural Heritage

18.3.28 There are numerous grave sites in the area surrounding the PPVNL, although none are considered to be of historic or cultural significance. Should any such graves be encountered during the development of the PPVNL then these would be dealt with in accordance with standard procedures – this has been a common occurrence during the development of the strategic landfills and so no particular difficulties are envisaged.

18.3.29 There have been no detailed archaeological surveys undertaken at the PPVNL and given the undeveloped nature of the site and also the steep topography, it is less likely that significant relics would be located in this area. However, this should be investigated further in later studies.

Landscape and Visual

18.3.30 *Landscape Planning Designations* - The area of the PPVNL is not covered by any planning designations reflecting landscape values and so there will be no impacts on these values. The landfill reception area and the southern section of the access road, however, are located within the Green Belt as indicated by the Draft Tuen Mun OZP S/TM/16 (see *Figure 18.4*). Resulting impacts will be slight at all phases of the project.

18.3.31 *Landscape Resources* - The PPVNL is a terrestrial site and as a consequence there is an impact upon landscape resources. The key resources consist of:

- Steep natural slopes.
- Grassland/ scrub and grassland and tall scrub.
- Short lengths of stream courses which may be ephemeral.

18.3.32 Resources are shown in *Figure 18.3A*. As a consequence of the existing land use of the site, the degree of disturbance to the area has been limited to the loss of vegetation and erosion of soil areas caused by "badlands" and the Castle Peak Firing Range. Given the (relatively) limited size of the site, the PPVNL will result in slight impacts during the construction/operation phase and during the afteruse phase.

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1 Environmental Resources Management (1998). Fisheries Resources and Fishing Operations in Hong Kong Waters. Report to the Agriculture and Fisheries Department, Hong Kong Government.

2 AFCD (2001). Marine Parks Database: Sha Chau & Lung Kwu Chau [http://parks.afcd.gov.hk/marine/mpark/scmp.htm]

3 AFCD (2001). Fisheries: Artificial Reefs Programme. [http://www.afcd.gov.hk/fish/ard/webpage/English/index.html].

18.3.33 *Landscape Character* - The PPVNL falls within the Castle Peak Uplands LCA, a predominantly upland landscape dominated by Castle Peak (Tsing Shan) at 553mPD (*Figures 18.3 and 18.4*). The PPVNL will have the effect of creating an elongated summit with two closely linked peaks at 320mPD in the area, by the filling of an existing valley. The presence of a second peak in close proximity to Castle Peak, will have the effect of reducing its dominance within the surrounding landscape. However, the presence of the two existing landfills will tend to reduce the impacts on landscape character. Impacts during the construction/operation phase will therefore be moderate with slight impacts during the afteruse phase.

18.3.34 *VSRs* - Because of the location and elevated nature of the site, there are no large areas of population within the primary visual envelope (*Figures 18.5 and 18.6*). Visual sensitive receivers are listed in *Tables 18.3 and 18.4*. Across much of the envelope close to the site, views are significantly interrupted by the natural landform, the location of roads in artificial cutting, and existing vegetation. A small number of hikers in the vicinity of Castle Peak will experience significant visual impacts during the construction / operation of the landfill. There are no visual impacts on residential VSRs within the primary envelope. For all other VSRs visual impacts will be slight or insubstantial. After completion of restoration, the site will appear as a largely vegetated landform. The change in topography, however, will mean that the impacts on the hikers on and in the vicinity of Castle Peak will be moderate. For the remainder of visual VSRs the visual impacts will be reduced to insubstantial.

18.3.35 Mitigation - Mitigation measures are outlined in Part A and are shown in *Figure 18.8.*

Landfill Gas

18.3.36 There are no sensitive receivers within 250m of the PPVNL. Furthermore, the PPVNL is outside the 250m LFG consultation zones for the Pillar Point Valley Landfill and the Shiu Lang Shui Landfill.

18.3.37 Given the remote location of the site and the lack of any sizeable population nearby, the direct off-site use of LFG as an energy source, e.g., exporting via pipeline to be used as a substitute for “towngas” or LPG in surrounding communities, is not considered practical. These options have also not been considered practical for the LFG generated by the existing Pillar Point Valley Landfill and Shiu Lang Shui Landfill. However, LFG would be used as an on-site energy source.

18.4 Environmental Protection Measures to be Incorporated into Design and Further Environmental Implications

18.4.1 Environmental design measures have been identified in Section 3.8 (Part A) and generic approaches to mitigating impacts on different environmental parameters are outlined in Section 5 (Part A). Specific environmental mitigation requirements for the PPVNL, including the access road and reception area, are outlined below but are subject to the findings of the EIA:

Air Quality

18.4.2 It is unlikely that any construction, operation or aftercare activities would have a significant impact on ASRs, and so no air quality mitigation measures are recommended at this stage, other that good site practice.

Noise

18.4.3 Noise generated by the construction of the PPVNL is not expected to cause any significant impact, since there are no NSRs within 300m of the site.

18.4.4 During construction, the topography of the site provides natural acoustic shielding, nevertheless, good site practice is recommended.

18.4.5 During operation, it is likely that the most significant noise source would be from landfill-related vehicular traffic on the internal haul roads and the site access road from Lung Mun Road. Minor sources would be from on-site plant such as leachate treatment works, pumps, generators and the flare. In the event that changes in future land uses surrounding the site itself result in predicted noise impacts which exceed the appropriate standards, the design and layout should locate fixed noise sources away from NSRs and maximize the shielding effects of other non-noise emitting landfill related facilities. In the event that future NSRs are found to be affected by vehicles using the access route from Lung Mun Road, possible noise mitigation measures as per Annex 13 S.6 of EIAO-TM, for example noise bunding and barriers, should be investigated. To mitigate the most significant sources, the location of fixed plant should be carefully reviewed and permanent noise barriers could possibly be placed alongside roads where necessary.

Water Quality

18.4.6 The PPVNL would include a leachate treatment works. Leachate would initially be passed through the leachate treatment plant to reduce the BOD and ammonia levels. Effluent from the leachate treatment plant could then be discharged to the nearby Pillar Point Sewage Treatment Works for further treatment. Effluent from the Pillar Point Sewage Treatment Work is discharged by outfall into marine waters. The leachate treatment facilities would be designed to achieve the water quality parameters set under the WPCO TM Standards, Environmental Permit and contract specifications.

18.4.7 Surface water would be collected by perimeter drains around the landfill and pass through settlement lagoons before being discharged into existing stream courses and surface water drains. All discharge points would include monitoring facilities to establish that WPCO TM Standards and any standards set under the Environmental Permit and contract specifications were being achieved. The settlement lagoons would be used to remove any suspended solids, and oil interceptors would be used to remove oil and grease.

Waste Management

18.4.8 No specific waste management mitigation measures are recommended at this stage, other that good site practice as described in Part A (Section 5).

Ecology

18.4.9 There are no areas of ecological importance that require specific environmental protection.

18.4.10 However, as vegetation clearance would be necessary for development of the PPVNL, revegetation works should be undertaken at suitable locations and using suitable native species. The exact location of revegetation activities and the species to be used should be determined at the detailed EIA Study stage of the project after a detailed vegetation survey and habitat mapping has been conducted. The revegetation works should adopt a “landscape ecology” approach in that planting proposals should be co-developed by competent landscape architect with support from a botanist / vegetation ecologist.

Fisheries

18.4.11 As the site is totally land based, there will be no impacts to marine fisheries. Furthermore, there is no (freshwater) fish-farming in the area that would be disturbed by the PPVNL.

Cultural Heritage

18.4.12 There are no known areas of cultural heritage importance that require specific protection measures.

Landscape & Visual

18.4.13 It is envisaged that the restored site would not be wholly incompatible with the surrounding natural landscape. If the restored landfill is to be made available for low-intensity recreational use, hiking trails and panoramic lookout points with viewing pavilions could be provided.

18.5 Summary

18.5.1 A summary of the SEA for the PPVNL is provided in *Tables 18.1 and 18.2*:

Table 18.1: Pillar Point Valley North Landfill SEA

Impacts		Score	Commentary
Air Quality Assessment			
1	Distance to areas of air sensitive land use	**O**	There are no ASRs within 500m of the site or the new access road.
2	Presence of topographic features which could decrease or exacerbate impacts	**O**	High hills, such as Castle Peak, separate the PPVNL from major urban areas, such as Tuen Mun. It is unlikely that dust or odours would accumulate around the PPVNL.
3	Occurrence of meteorological conditions which could exacerbate impacts	**O**	Prevailing winds are from the south-west. The predominant wind direction would blow over the Castle Peak Firing Range, away from populated areas.
4	Cumulative impacts of relevant emissions (TSP (construction), NO_x, CO, SO_2 – LFG Flare) taking into account ambient conditions	**-**	Relevant emissions are present within 5km, from the existing Pillar Point Valley Landfill and Shiu Lang Shui Landfill. Other sources of emissions in the vicinity are the existing Castle Peak Power Station, the Green Island Cement Works, the Shiu Wing Steel Mill, the Black Point Power Station, together with proposed waste management facilities in Tuen Mun Area 38 and Ha Pak Nai. However AQOs are unlikely to be exceeded.
5	Total Emissions of Air Pollutants from the territory-wide waste transportation between the RTSs and the site	**- -**	The site is only accessible by road and hence all waste will be delivered by road vehicles.
6	Overall impact	**-**	Overall it is considered that the PPVNL would not cause detrimental air quality impacts. This is generally because the location of the site means that sensitive receivers are more than 500m away and therefore unlikely to be affected. However, given the fact that road-based transportation will be used for waste delivery, the overall impact is considered to be **'Negative – Low'**.
Noise Assessment			
1	Distance to areas of noise sensitive land use	**O**	There are no NSRs within 300m of the site.
2	Topographic features (only applicable if there are NSRs within 300m)	**O**	As the PPVNL is separated from the major urban areas by hills, noise impacts upon them would be negligible. Impacts would thus be within acceptable levels.
3	Cumulative impacts of developments within 300m	**O**	There are no known developments (existing or planned) within 300m of the site. This site is remote from NSRs and there are no surrounding developments within 300m which could cause cumulative impacts.
4	Overall Impact	**O**	Overall it is considered that the PPVNL will have minimal noise impacts on surrounding NSRs due to its remote siting. Therefore a **'Neutral'** impact overall.

Impacts		Score	Commentary
Water Quality Assessment			
1	Watercourse diversion	-	The natural streams within the valley would be destroyed, not diverted, by the PPVNL. Although they are not considered as major watercourses, they would nevertheless be lost to development.
2	Potential for sediment contaminant release	O	The landfill would be constructed in a relatively steep area and so sediment-laden run-of is a potential issue during construction. The landfill would be designed to minimise run-off, and to channel it through control measures, such as sedimentation tanks, prior to discharge, thereby removing any suspended contaminants.
3	Potential impacts on WSRs (including increase or exceedance of WQOs)	O	Any effluents arising from the construction and operation of the site would be treated on site and then discharged through Pillar Point Sewage Treatment Works to the North-west WCZ. As such, impacts would be minimal.
4	Potential impacts on groundwater	O	Groundwater may be present as perched water tables above rockhead and in fissures within the underlying rock mass. However, within the vicinity of the site it is believed that, in common with most of Hong Kong, groundwater is not utilised as a resource. Impacts on background groundwater quality would be minimised by design of a suitable impermeable liner for the landfill, that would prevent discharge of significant quantities of contaminants into groundwater beneath the site.
5	Potential cumulative impacts (potential for concurrent projects to exacerbate preceding impacts)	-	There are a number of existing and planned facilities within the vicinity of the PPVNL, all of which ultimately discharge into the North-west WCZ.
6	Overall impact	O	A number of watercourses would be lost within the landfill bowl and there is a possibility of sediment entering the local watercourses. There are unlikely to be any significant impacts to the receiving water body or to groundwater resources, however, there may be a cumulative impact when other facilities are considered. Therefore a **'Neutral'** impact overall.
Waste Management Assessment			
1	Balance of materials (surplus / deficit of public fill needed for landfill development)	O	The PPVNL has been designed to have a balance of cut and fill.
2	GHG emissions from mode of transport for delivery of waste to the site from RTSs	- -	There is no marine access to the site and so all waste would be delivered by road vehicle.
3	Overall impact	-	Although the PPVNL has been designed to achieve a material balance, there is no marine access and so all waste would have to be delivered by road. The overall impact on waste management is considered to be **'Negative – Low'**.

Impacts		Score	Commentary
Ecological Assessment			
1	Potential for secondary environmental impacts on "Areas of Absolute Exclusion"	**O**	The nearest "Areas of Absolute Exclusion" to the site are the SSSIs at Tsing Sham Tsuen (3km east-northeast) and at Castle Peak (1.5km northeast). Both of these SSSIs are designated for their floristic value and the distance separation between these and the site means there is no potential for secondary impacts.
2	Affects an important habitat	**- -**	The majority of this site is mixed scrub and grassland, with pockets of semi-mature woodland. The area is presently undisturbed and given the ecological linkage with areas of conservation importance to the east, north and west, there is good potential that the site holds some importance as a habitat. There are also two watercourses within the site boundary that are good examples of their type.
3	Affects a species of conservation importance	**-**	There are known species of conservation importance in nearby areas. However, because access to the site is prohibited due to unexploded ordinance, it has not been possible to visit and examine the site, nevertheless, the ecological linkage with undisturbed areas nearby means there is good potential that flora of conservation significance is present. There is also some potential that fauna of conservation importance may use the site (e.g., mammals and birds) or, if utilizing adjacent areas, may be disturbed by site formation and operation activities.
4	Potential for cumulative ecological impacts on sites of recognised value	**O**	There are no known developments or activities in the area that would lead to cumulative ecological impact.
5	Overall impact	**-**	Development of a landfill on this site would adversely affect an otherwise undisturbed habitat that supports a mosaic of habitat types. There is potential that flora of conservation importance are within the site, whilst fauna may use the site directly or use the adjacent undisturbed areas. As the site is in a valley area with no other activities planned, there is no potential for cumulative impacts. The overall impact has been assessed as **'Negative – Low'**.

Impacts		Score	Commentary
Fisheries Assessment			
1	Potential for secondary environmental impacts on "Areas of Absolute Exclusion"	**O**	Land based site – no impact anticipated.
2	Affects an important mariculture/ fisheries resources (including spawning / nursery ground)	**O**	Land based site – no impact anticipated.
3	Potential for cumulative fisheries impacts on sites of recognised value	**O**	Land based site – no impact anticipated.
4	Overall impact	**O**	This is a land based site and so there will be no fisheries impacts, i.e., **'Neutral'**.
Cultural Heritage Assessment			
1	Important cultural (Declared, Deemed or Graded sites) / archaeological sites	**O**	There are no important cultural / archaeological sites that would be affected by the PPVNL.
2	Potential for archaeological value	**O**	It is considered unlikely that there is any potential for archaeological value within the site boundary.
3	Potential for cumulative heritage Impacts on sites of recognised value	**O**	There are no important cultural / archaeological sites that would be affected by other developments.
4	Overall impact	**O**	It is unlikely that the PPVNL would cause any impacts to cultural or archaeological sites. Therefore, the overall impact has been assessed as **'Neutral'**.

Impacts		Score	Commentary
Landscape and Visual Impact Assessment			
1	Implications for landscape planning and designations	-	The area of the PPVNL is not covered by any planning designations reflecting landscape values and so there will be no impacts on these values. The landfill reception area and part of the leachate treatment facilities, and the southern section of the access road, however, are located within a Green Belt zone.
2	Landscape resources	-	The site is terrestrial and as a consequence there is an impact upon landscape resources. The key resources consist of: - • steep natural slopes • grassland/ scrub and grassland and tall scrub • short lengths of stream courses which may be ephemeral These are not sensitive resources and given the (relatively) limited size of the landfill, resulting impacts will be low.
3	Landscape character	-	The site falls within the Castle Peak Uplands LCA, a predominantly upland landscape dominated by Castle Peak (Tsing Shan) at 553mPD. The presence of a second peak in close proximity to Castle Peak, will have the effect of reducing slightly its dominance within the surrounding landscape. However, the presence of the existing landfill site will tend to reduce the impacts on landscape character.
4	Visual	-	Because of the location of the site, there are no large areas of population close to the site. Within the primary visual envelope those most affected will be recreational VSRs on Castle Peak. Other affected VSRs are all distant and include occupational/ travelling receivers on the Shekou, Lantau Island and Tuen Mun Ferry, Hong Kong International Airport and the Airport Expressway on Lantau Island.
5	Overall Impact	-	Overall landscape and visual impacts will be **'Negative – Low'**, for the following reasons: • There are no landscape planning designations covering the disposal site, although designations (Greenbelt) do cover the area of the proposed access road and reception area. • There are no significant landscape resources at the disposal site; • Landscape character is already somewhat degraded by the existing Pillar Point Valley Landfill; • Visual receivers are few in number, distant from the disposal site and often transient.

Impacts		Score	Commentary
Landfill Gas Assessment			
1	Distance between the new / extended landfill and SRs	**O**	There are no sensitive receivers within 250m.
2	Number of receivers within 250m (i.e. Consultation Zone)	**O**	There are no sensitive receivers within 250m.
3	Man-made / natural pathways for LFG migration	**O**	There are no known man-made or natural pathways between the PPVNL and any sensitive receivers.
4	Additional utilisation of LFG to reduce GHG emissions	**O**	There are no potential off-site users of LFG at this time.
5	Overall impact	**O**	There are no particular issue regarding LFG and so the impact is considered to be **'Neutral'**.

Table 18.2: Summary of Pillar Point Valley North Landfill SEA

Overall Impacts	Score	Commentary
Overall Air Quality Impact	**-**	Negative **–** Low
Overall Noise Impact	**O**	Neutral
Overall Water Quality Impact	**O**	Neutral
Overall Waste Management Impact	**-**	Negative – Low
Overall Ecological Impact	**-**	Negative – Low
Overall Fisheries Impact	**O**	Neutral
Overall Cultural Heritage Impact	**O**	Neutral
Overall Landscape & Visual Impact	**-**	Negative – Low
Overall Landfill Gas Impact	**O**	Neutral

Table 18.3 Assessment of Significance of Visual Impacts for Pillar Point Valley North Landfill During Construction / Operation Phase (Note: All impacts adverse unless otherwise noted)

VSR	Key Visually Sensitive Receiver (VSR)	Approx. Minimum Distance Between VSR and Source(s)	Nos. of Receivers (order of magnitude only)	Magnitude of Impact During Construction (Negligible, Small, Intermediate, Large)	Receptor Sensitivity (Low, Medium, High)	Impact Significance before Mitigation (Insubstantial, Slight, Moderate, Substantial)	Significance of Residual Impacts (Insubstantial, Slight, Moderate, Substantial)
Residential Receivers							
VR21	Tung Chung	10.5km	Many	Negligible	High	Insubstantial	Insubstantial
Occupational Receivers							
VR22	Hong Kong International Airport	6.6km	Moderate	Negligible	Moderate	Insubstantial	Insubstantial
VR23	Shekou, Lantau Island and Tuen Mun Ferries	4km	Very Few	Small	Low	Slight	Insubstantial
Recreational Receivers							
VR10	Castle Peak	1.3km	Few	Large	Low	Moderate	Moderate
VR20	Lantau Peak	15km	Few	Negligible	Low	Insubstantial	Insubstantial
VR24	Sunset Peak	14.6km	Few	Negligible	Low	Insubstantial	Insubstantial
Travelling Receivers							
VR25	Hong Kong International Airport	6.6km	Many	Small	Low	Slight	Insubstantial
VR26	Airport Expressway	9.5km	Moderate	Small	Low	Slight	Insubstantial
VR27	Shekou, Lantau Island and Tuen Mun Ferries	4km	Moderate	Small	Low	Slight	Insubstantial

Notes: Assessment of Impacts does not account for possible off-site visual mitigation, which may have the effect of reducing certain impacts further.
Locations of most important visual sensitive receivers shown in Figure 18.5.

Table 18.4 Assessment of Significance of Visual Impacts for Pillar Point Valley North Landfill During Afteruse Phase (Year 10 after Restoration)
(Note: All impacts adverse unless otherwise noted)

	Key Visually Sensitive Receiver (VSR)	**Approx. Minimum Distance Between VSR and Source(s)**	**Nos. of Receivers (order of magnitude only)**	**Magnitude of Impact During Afteruse** (Negligible, Small, Intermediate, Large)	**Receptor Sensitivity** (Low, Medium, High)	**Impact Significance before Mitigation** (Insubstantial, Slight, Moderate, Substantial)	**Significance of Residual Impacts** (Insubstantial, Slight, Moderate, Substantial)
Residential Receivers							
VR21	Tung Chung	10.5km	Many	Negligible	High	Insubstantial	Insubstantial
Occupational Receivers							
VR22	Hong Kong International Airport	6.6km	Moderate	Negligible	Moderate	Insubstantial	Insubstantial
VR23	Shekou, Lantau Island and Tuen Mun Ferries	4km	Very Few	Small	Low	Slight	Insubstantial
Recreational Receivers							
VR10	Castle Peak	1.3km	Few	Intermediate	Low	Moderate	Moderate
VR20	Lantau Peak	15km	Few	Negligible	Low	Insubstantial	Insubstantial
VR24	Sunset Peak	14.6km	Few	Negligible	Low	Insubstantial	Insubstantial
Travelling Receivers							
VR25	Hong Kong International Airport	6.6km	Many	Small	Low	Slight	Insubstantial
VR26	Airport Expressway	9.5km	Moderate	Small	Low	Slight	Insubstantial
VR27	Shekou, Lantau Island and Tuen Mun Ferries	4km	Moderate	Small	Low	Slight	Insubstantial

Notes: Assessment of Impacts does not account for possible off-site visual mitigation, which may have the effect of reducing certain impacts further.
Locations of most important visual sensitive receivers shown in Figure 18.5.