

Comparative Environmental Assessment of Alternative Sites

A1 Methodology

A1.1 The evaluation procedure involves the comparison of each site against basic environmental criteria. The broad methodology is as follows:

- ◆ develop a set of main criteria for the sites to be compared against;
- ◆ score each site against the criteria using a grading scale;
- ◆ assign weightings to the criteria within each set based on the relative importance of the criteria and weight the sets of main criteria relative to each other;
- ◆ calculate the weighted score for each site for each set of criteria, as follows:

$$\text{Weighting Average Score of Site}_i = W_s \times \sum (S_{ic} \times W_c)$$

where: W_s = weight of particular set of criteria.

S_{ic} = score of site_i against a particular criterion; and

W_c = weight of a particular criterion within the criteria set.

- ◆ calculate the overall weighted score for each site as follows:

$$\text{Overall Weighted Score of Site}_i = \sum (\text{Weighted Score of Site}_i)$$

- ◆ compare the weighted average for each site and rank accordingly.

A1.2 As required in the Study Brief, Section 3.3.1.2, alternatives which avoid or minimise impacts on the Marine Park and Chinese White Dolphin habitat have been considered and have been factored into this assessment.

A2 Grading Scale

A2.1 The criteria for each of the sites will be assigned with one of the following grading scale scores based upon a low best impacts scale:

Low Impacts Best:	Very Low	=	1.0	High Score Best
	Low	=	0.75	
	Medium	=	0.50	
	High	=	0.25	
	Very High	=	0.00	

A3 Comparison Criteria

A3.1 Background

A3.1.1 In order to provide a reasonable assessment of the sites enabling the comparison and ranking of sites, the criteria sets for the evaluation were divided into construction and operational phases and grouped under the following major headings, noting that cultural heritage and risk factors are relevant to only the construction and operational phases respectively, for all sites, except for Tsing Yi, where construction phase risk is relevant (see A3.2.14).

Construction Phase:

- ◆ air quality;
- ◆ noise;
- ◆ water quality;
- ◆ ecology;
- ◆ landscape and visual;
- ◆ cultural heritage; and
- ◆ risk (Tsing Yi site only).

Operational Phase

- ◆ air quality;
- ◆ noise;
- ◆ water quality;
- ◆ ecology;
- ◆ risk; and
- ◆ landscape and visual.

A3.1.2 Each heading was sub-divided into a number of definable items (criterion) which each site could be scored against. The items identified for assessment under each category are detailed below. Each criterion was assigned a 'weighting proportion' (W_c) which denotes the relative percentage of the item as a fraction of the weighting value for the set of criteria as a whole (W_s).

A3.2 Construction Phase Criteria

Air Quality

A3.2.1 The construction phase air quality criterion used in the evaluation of the sites is detailed in Table A1 below:

Table A1: Construction Air Quality Criterion

Air Quality Criterion	Scoring Principle	Weighting Proportion (W_c)
Construction Air Quality Impacts	Sites which produce lower construction air quality impacts will be scored higher	100%

A3.2.2 Potential construction air quality impacts will be in the form of dust impacts associated with the formation of any required reclamation, and works for the construction of the facility and infrastructure. The assessment will include dust blown from open areas of the site to any adjacent air sensitive receivers.

Noise

A3.2.3 The construction phase noise criteria used in the evaluation of the sites are detailed in Table A2 below:

Table A2: Construction Phase Noise Criteria

Noise Criteria	Scoring Principle	Weighting Proportion (W _c)
Above Ground Noise Impacts	Sites which produce lower above ground noise impacts will be scored higher	20%
Underwater Noise Impacts	Sites which produce lower underwater noise impacts will be scored higher	80%

A3.2.4 Above ground noise will be largely associated with the construction of a reclamation, if required, and the tank farm and associated infrastructure at all sites. Underwater noise may occur as a result of reclamation formation, jetty and pipeline construction and the key sensitive receivers for underwater noise are the Chinese White Dolphins (North Lantau Waters) and, seasonally in south Lantau waters, the Finless Porpoises (South Lantau Waters). Given the sensitivity of these receivers to underwater noise, this category has been weighted much higher than the above ground noise category because NSRs are distant from all sites and noise can be mitigated through selection of construction methods and equipment which has deemed it less significant.

Water Quality

A3.2.5 The construction phase water quality criterion used in the evaluation of the sites is detailed in Table A3 below:

Table A3: Construction Phase Water Quality Criterion

Water Quality Criterion	Scoring Principle	Weighting Proportion (W _c)
Water Quality Impacts	Sites which produce lower water quality impacts will be scored higher	100%

A3.2.6 Potential construction water quality impacts are associated with dredging for any required reclamation and approach channels and the placing of sand where required. Water quality impacts could be potentially widespread due to pipeline dredging and impacts on water quality objectives could occur in the short term. Hydraulic changes associated with newly formed reclamation and the jetty are considered to be associated with the operational phase and thus are not included in this criterion.

Ecology

A3.2.7 The construction phase ecology criteria used in the evaluation of the sites are detailed in Table A4 below:

Table A4: Construction Phase Ecology Criteria

Ecology Criteria	Scoring Principle	Weighting Proportion (W _c)
Marine Fauna Impacts	Sites which produce the least impacts on marine ecology will be scored higher	65%
Designated Sensitive Ecological Receivers (incl. Marine Park, SSSI)	Sites which produce lower impacts on designated ecological receivers will be scored higher	35%

A3.2.8 Construction activities including formation of the reclamation for a number of the sites and the construction of the jetty and the pipeline for all sites could cause deterioration in water quality which could have potential effects on marine ecology in the short term, including the Chinese White Dolphins, finless porpoises, fisheries and benthic species. There would possibly also be for both permanent and temporary habitat losses and thus this category has been allotted a relatively high weighting. The Sha Chau and Lung Kwu Chau Marine Park was designated in November 1996 with the aim of maintaining and enhancing the area, to control development activities and maintain the well-being of and minimise disturbance to the Chinese White Dolphins. Marine Parks are also shortly to be gazetted surrounding the Soko islands and encompassing western Lantau. There are also a number of other sensitive areas in the location of some of these sites, including gazetted beaches and SSSI's. The weighting of this category is relatively high to reflect the importance of minimising impacts on these current or future designated areas.

A3.2.9 Potential impacts on the Chinese White Dolphins and Finless Porpoises from submarine noise could also occur. As such potential impacts are considered under the noise criteria set and to avoid double counting, such impacts are not considered separately here.

Landscape and Visual

A3.2.10 The construction phase landscape and visual criteria used in the evaluation of the sites are detailed in Table A5 below:

Table A5: Construction Phase Landscape and Visual Criteria

Landscape and Visual Criteria	Scoring Principle	Weighting Proportion (W _c)
Baseline Landscape Resources	Sites which produce the least impacts on landscape resource will be scored higher	40%
Visual Impacts	Sites which produce lower visual impacts will be scored higher	60%

A3.2.11 The potential impacts are based upon the nature and quality of the surrounding landscape resources and its sensitivity to changes together with the numbers of viewers, their frequency and duration of viewing. Given the nature of the proposed facility, disturbances to the landscape elements may in some cases be significant and changes to visual quality may also be relatively high due to permanent intrusion of built elements for the PAFF. Visual impacts have been afforded a slightly higher weighting.

Cultural Heritage

A3.2.12 The construction phase cultural heritage criteria used in the evaluation of the sites are detailed in Table A6 below:

Table A6: Construction Phase Cultural Heritage Criteria

Cultural Heritage Criteria	Scoring Principle	Weighting Proportion (W _c)
Terrestrial Cultural Heritage Impacts	Sites which produce the least impacts on terrestrial cultural heritage will be scored higher	20%
Marine Archaeological Impacts	Sites which produce lower impacts on marine archaeology will be scored higher	80%

A3.2.13 Construction of the PAFF in all cases will be on formed land, which will have no terrestrial cultural heritage importance, although indirect effects on any designated archaeological sites or historic structures will need to be assessed. Due to the extent of proposed marine works and the associated potential for direct impacts on marine archaeological resources, a higher significance has been placed on the second category, as reflected by its relative weighting.

Risk

A3.2.14 The construction phase risk criterion that will be used in the evaluation of Sites is detailed in Table A7 below:

Table A7: Construction Phase Risk Criterion

Risk Criterion	Scoring Principle	Weighting Proportion (WC)
Hazard to Life	Sites which affect the least number of people will be scored higher	100%

A3.2.15 Construction of the jetty and subsea pipelines at PAFF will (at Tsing Yi only) be in close proximity to DG vessels en route to, manoeuvring or berthed at adjacent PHI facilities. Accordingly, there is a potential hazard to life through errant movements of construction equipment during the construction of the Jetty at Tsing Yi.

A3.3 Operational Phase Criteria

Air Quality

A3.3.1 The operational phase air quality criterion used in the evaluation of the sites is detailed in Table A8 below:

Table A8: Operational Phase Air Quality Criterion

Air Quality Criterion	Scoring Principle	Weighting Proportion (W _c)
Operational Air Quality Impacts	Sites which produce lower operational air quality impacts will be scored higher	100%

A3.3.2 Potential operational impacts will relate to fugitive emissions from the plant and the vessels delivering the fuel to the PAFF. While these impacts will be for the duration of the facility operation, significant impacts are not expected.

Noise

A3.3.3 The operational phase noise criteria used in the evaluation of the sites are detailed in Table A9 below:

Table A9: Operational Phase Noise Criteria

Noise Criteria	Scoring Principle	Weighting Proportion (W _c)
Above Ground Noise Impacts	Sites which produce lower above ground noise impacts will be scored higher	30%
Underwater Noise Impacts	Sites which produce lower underwater noise impacts will be scored higher	70%

A3.3.4 Above ground noise during the operational phase will result from the general operation of the plant including berthing and maintenance activities. Overall, noise levels are not expected to be significant. Underwater noise during the operational phase will may occur as a result of vessel movement and berthing and the key sensitive receivers for underwater noise are the Chinese White Dolphins and the

Finless Porpoises. Given their sensitivity to underwater noise and the difficulty in mitigating these potential impacts, this category has been weighted much higher than the above ground noise category.

Water Quality

A3.3.5 The operational phase water quality criterion used in the evaluation of the sites are detailed in Table A10 below:

Table A10: Operational Phase Water Quality Criterion

Water Quality Criterion	Scoring Principle	Weighting Proportion (W _c)
Water Quality Impacts	Sites which produce lower water quality impacts will be scored higher	100%

A3.3.6 Potential water quality impacts during the operational phase could result from the changes in sea bed conditions resulting from the need to create suitable vessel access to the berth, including both approach channel and turning basin at the jetty, and the associated potential long term impacts on marine fauna. Hydraulic changes may occur because of newly formed land for sites where reclamation is required, and around the jetty, which could cause local scour/sedimentation. The potential impacts are expected to be localised but as hydraulic changes may lead to the requirement for localised dredging, this factor has also been included in this criteria. The facility will operate a zero discharge policy for the jetty and any land based discharges will be controlled via a license under the Water Pollution Control Ordinance. Based upon this, water quality impacts from polluted discharges are not predicted to be significant.

Ecology

A3.3.7 The operational phase ecology criterion that will be used in the evaluation of the sites is detailed in Table A11 below:

Table A11: Operational Phase Ecology Criterion

Ecology Criterion	Scoring Principle	Weighting Proportion (W _c)
Marine Fauna Impacts	Sites which produce less impacts on marine ecology will be scored higher	100%

A3.3.8 Potential impacts on marine fauna could occur as a result of changes in water quality as a result of maintenance dredging. Other potential operational ecological impacts are limited to collision risks of vessels with Chinese White Dolphins or Finless Porpoises. While the increased traffic associated with the operation of the facility, initially up to 2 vessel movements per week, will not be significant in terms of collision risk, the sensitivity of this sensitive receiver warrants that this be taken into account.

A3.3.9 Key potential ecological impacts during the operational stage will be associated with any accidental oil spillage at the jetty and resulting from any damage to the tanks or pipeline. These factors are dealt with under the risk category and to avoid double counting are not considered separately here. Also, underwater noise impacts on the Chinese White Dolphins or Finless Porpoises could occur but such potential impacts are considered under the noise criteria and not considered separately here.

Risk

A3.3.10 The operational phase risk criteria that will be used in the evaluation of the sites are detailed in Table A12 below:

Table A12: Operational Phase Risk Criteria

Risk Criteria	Scoring Principle	Weighting Proportion (W _c)
Hazard to Life	Sites which affect the least number of people will be scored higher	55%
Environmental Risk	Sites which produce lower environmental risk will be scored higher	45%

A3.3.11 Environmental risk relates to impacts resulting on the environment, particularly water quality and ecology, from an accident at the fuel facility, be it a spill or fire. The environmental impacts of a fuel spill are particularly key and an assessment of the effects has been included in this category. Hazard to life relates to the potential for loss of life in the event of such an accident. In both cases, mitigation and contingency plans can be prepared and implemented to reduce the levels of risk to within acceptable risk levels. However, the hazard to life category is weighted higher to reflect the significance of a loss of life.

Landscape and Visual

A3.3.12 The operational phase landscape and visual criteria that will be used in the evaluation of the sites are detailed in Table A13 below:

Table A13: Operational Phase Landscape and Visual Criteria

Landscape and Visual Criteria	Scoring Principle	Weighting Proportion (W _c)
Baseline Landscape Resources	Sites which produce the least impacts on landscape resource will be scored higher	40%
Visual Impacts	Sites which produce lower visual impacts will be scored higher	60%

A3.3.13 The potential impacts will be based upon the nature and quality of the surrounding landscape resources and their sensitivity to changes and the numbers of viewers, their frequency and duration of viewing. Given the nature of the proposed facility,

disturbances to the landscape elements may in some cases be significant and changes to visual quality may also be relatively high due to permanent intrusion of built elements for the PAFF. Visual impacts have been afforded a slightly higher weighting.

A3.4 Weighting Criteria

A3.4.1 For the comparison of each of the PAFF sites, a weighting set has been defined which best represents a reasonable and balanced basis for a fair and objective environmental comparative assessment of these sites and has been formulated to allow a purely environmental comparison of each site option with the others.

Table A14: Construction Weighting Criteria

Criteria Group	Balanced Weighting Set (W _s) (relative importance)
Air Quality	10
Noise	15
Water Quality	20
Ecology	30
Landscape and Visual	15
Cultural Heritage	10
TOTAL	100
Risk (Tsing Yi)	35
TOTAL	135

A3.4.2 The rationale for assigning these weightings for the construction phase is as follows:

- ◆ potential air quality impacts can be mitigated and in view of the quite large distance to the closest sensitive receivers during the construction phase this category has been assigned a relatively low weighting;
- ◆ as with air, potential above ground noise impacts during construction can be mitigated to acceptable levels. However, given the sensitivity of the Chinese White Dolphins and Finless Porpoises to underwater noise and the potential effects on its echolocation, this category has been allotted a higher weighting than air quality impacts;
- ◆ potential impacts on water quality will be direct and, while largely reversible, could be widespread during the construction phase and could affect the Water Quality Objectives in the short term. Thus this criteria has been assigned a relatively high weighting;
- ◆ in respect of ecology, there is potential for impacts on fauna, habitats and ecosystems which are sensitive to change. Some permanent impacts may also occur and based upon this, the highest weighting has been assigned;

- ◆ in respect of landscape and visual, most of the options are in locations which are already highly disturbed and have been subject to previous development. However, the number of visual receivers is in general high and they are of mixed sensitivity. Based upon this, a moderate weighting has been assigned to this category; and
- ◆ direct marine archaeological impacts are possible most of the area within which potential sites have been considered have been highly disturbed by development, fill and borrow areas, maintenance dredging and the like. Based upon this and the fact that mitigation can be applied in the form of rescue excavation if required, a low weighting has been given to this criterion.
- ◆ risk is assigned the same relative weighting as adopted in the Operational phase for the same reason. However, during construction, risk only affects Tsing Yi.

A3.4.3 The weighting criteria for the operational phase is summarised in Table A15 below:

Table A15: Operational Weighting Criteria

Criteria Group	Balanced Weighting Set (W _s) (Percentage relative importance)
Air Quality	5
Noise	10
Water Quality	15
Ecology	20
Risk	35
Landscape and Visual	15
TOTALS	100%

A3.4.4 The rationale for assigning these weightings for the operations phase is as follows:

- ◆ potential operational air quality impacts associated with fugitive emissions are expected to be small and can be mitigated through proper plant and operational design and operational procedures. Based upon this, this category has been assigned a low weighting;
- ◆ above ground noise impacts can be mitigated to acceptable levels. However, given the sensitivity of the Chinese White Dolphins and Finless Porpoises to underwater noise and the effects on its echolocation, this category has been allotted a higher weighting than air quality impacts;
- ◆ potential operational water quality impacts will be direct and while largely localised will be long term. To reflect this, a moderate weighting has been assigned;

- ◆ potential ecological impacts are associated with the deterioration of water quality as a result of maintenance dredging and impacts will be long term and could effect a number of sensitive marine fauna. Based upon this, a relatively high weighting has been assigned;
- ◆ careful design and the implementation of operating procedures and processes can reduce the levels of risk associated with such a facility to within the required safety margins. However, based upon the high profile nature of risks to the public and environment and the fact that this is a key issue for the operation of such a facility, the highest weighting has been allotted;
- ◆ in respect of landscape and visual, potential impacts will be long term and difficult to mitigate given the nature of the facility. A number of mixed sensitivity sensitive receivers may have views of some of the sites. However, in a number of cases the sites are in locations which are already highly disturbed and have been subject to previous development. Based upon this, a moderate weighting has been assigned to this category.

A4 Results of Site Assessment

A4.1 Introduction

- A4.1.1 Grading scale ratings and associated numerical scores have been assigned to each of the assessment criteria in accordance with the grading categories detailed in Section A3. The numerical scores enable, after summation, the sites to be ranked in order of preference, enabling an overall qualitative selection of the 'best' option to be made on purely environmental grounds.
- A4.1.2 The summary tables in Sections A4.2 and A4.3 provide detail on the rationale behind how score allocations for the construction and operational phases were derived respectively. An overall summary of the site evaluation and ranking is presented in Table A32 for the construction phase and Table A33 for the operational phase.

A4.2 Construction Phase Criteria

- A4.2.1 Summary and justifications for each site are provided in Tables A16 to A23.

Table A16 Site 1 - Bluff Point

Description of Site

- ◆ Existing Water Depth: 10 metres (Dredging Required)
- ◆ Access Channel: 3500 metres (Dredging Required)
- ◆ Turning Basin: size approx 1100m X 500m wide (Dredging Required)
- ◆ Volume of Capital Dredging: 7.7 million m³ approx.
- ◆ Reclamation for tank farm: Approx 2.7 million m³
- ◆ Pristine seabed area affected: 143 Ha
- ◆ New Pipeline: 5km (Twin Subsea pipelines)

Construction Phase Criterion	Score	Justification
Air Quality		
Construction Air Quality Impacts	L	Reclamation required, sand backfill has potential for dust generation, however site is remote from ASR's.
Noise		
Above Ground Noise Impacts	L	Significant impacts are unlikely and there are no nearby NSR's. Any significant noise can be avoided by mitigation measures.
Underwater Noise Impacts	L	Dolphin monitoring records show that adjacent waters are used by CWD's and there is some potential for noise impact.
Water Quality		
Water Quality Impacts	L	Reclamation required along with substantial capital dredging to form the access channel and turning basin, although the requirement is less than for Sham Wat. Sediment losses will however be localised and water quality impacts are therefore not judged to be very significant.
Ecology		
Marine Faunal Impacts	H	The need for reclamation, access channel and turning basin means there is significant potential for permanent habitat loss of benthic fauna, along with associated secondary impacts. Less extensive requirements than at Sham Wat.
Designated Sensitive Ecological Receivers	M	The San Tau SSSI has the potential to be affected by the works with its seagrass beds and species of conservation interest as does the adjacent North Lantau coastline, which has ecological value, in particular the mangroves at Tai O. Waters off western Lantau are shortly to be gazetted as a Marine Park.
Landscape and Visual		
Landscape Resource	M	Requires new land adjacent to the relatively undeveloped North Lantau coastline and existing land use of nearby land is incompatible.
Visual Impacts	H	Significant disturbance to the existing visual context, including visitors to the adjacent part of North Lantau.
Cultural Heritage		
Terrestrial Cultural Heritage	VL	Will be on reclaimed land with no terrestrial archaeological sites suffering any disturbance.
Marine Archaeology	H	Potential for the proposed reclamation area, access channel, turning basin and pipeline alignment to disturb previously undisturbed areas of high archaeological potential.
Risk		
Construction Stage Risk	VL	Insignificant construction phase risk.

Table A17 Site 2 - East of Soko Islands

Description of Site

- ◆ Existing Water Depth: 10 metres (Dredging Required)
- ◆ Access Channel: 3500 metres (Dredging Required)
- ◆ Turning Basin: size approx. 1100m X 500m wide (Dredging Required)
- ◆ Volume of capital Dredging: 7.7 million m³ approx.
- ◆ Reclamation for tank farm: Approx 2.7 million m³
- ◆ Pristine seabed area affected 133 Ha (plus pipeline 57 maximum Ha, if not in bored tunnel)
- ◆ New pipeline 14km Bored Tunnel, 27 km twin subsea pipelines

Construction Phase Criterion	Score	Justification
Air Quality		
Construction Air Quality Impacts	L	Reclamation and associated work has potential for dust generation, however site is remote from ASR's.
Noise		
Above Ground Noise Impacts	VL	No nearby NSR's.
Underwater Noise Impacts	H	Chinese White Dolphins are seasonal visitors to the Soko Islands and Finless porpoises are also commonly sighted in adjacent waters particularly in winter and spring.
Water Quality		
Water Quality Impacts	M	The potential requirement for reclamation along with capital dredging for access channel/turning basin means that there is potential for some, albeit short-term, water quality impacts from sediment loss to suspension. This area is less influenced by Pearl River sediment budgets than some North Lantau Waters sites and a higher score reflects this.
Ecology		
Marine Faunal Impacts	VH	The need for reclamation, capital dredging and pipeline would lead to potential for permanent habitat loss with secondary, albeit minor, impacts on fish and other supported communities in the Soko Islands and SW Lantau area.
Designated Sensitive Ecological Receivers	H	The proposal to designate Southwest Lantau and Soko Islands as two Marine Parks is at an advanced stage, with designation expected in 2002.
Landscape and Visual		
Landscape Resource	M	Requires development and new land in an area previously undisturbed. The value of the 'natural' landscape resource will be elevated when the Marine Park is designated.
Visual Impacts	M	The existing visual context is undisturbed and pristine, which would be impacted significantly if a PAFF developed here.

Construction Phase Criterion	Score	Justification
Cultural Heritage		
Terrestrial Cultural Heritage	VL	No terrestrial archaeological sites would be disturbed.
Marine Archaeology	H	High potential for disturbance of previously undisturbed areas of the seabed with high marine archaeology potential.
Risk		
Construction Stage Risk	VL	Negligible construction phase risk expected.

Table A18 Site 3 - Kau Yi Chau

Description of Site

- ◆ Existing Water Depth: 10 metres (Dredging Required)
- ◆ Access Channel: 1500metres (Dredging Required)
- ◆ Turning Basin: size approx. 1100m X 500m wide (Dredging Required)
- ◆ Volume of Capital Dredging: 6.2 million m³ approx
- ◆ Reclamation for tank farm: Approx 2.7 million m³
- ◆ Pristine seabed area affected: 100 Ha
- ◆ New pipeline 16km (Bored tunnel)

Construction Phase Criterion	Score	Justification
Air Quality		
Construction Air Quality Impacts	L	Reclamation and associated work has potential for dust generation, however site is remote from ASR's.
Noise		
Above Ground Noise Impacts	VL	No nearby NSR's.
Underwater Noise Impacts	L	Chinese White Dolphin/Finless Porpoise sitings in the area are rare but of significance.
Water Quality		
Water Quality Impacts	M	Reclamation would be required along with capital dredging for access channel/turning basin. Sediment losses to suspension would however be localised.
Ecology		
Marine Faunal Impacts	M	The need for reclamation and capital dredging would lead to potential for permanent habitat loss for benthic fauna along with associated secondary impacts.
Designated Sensitive Ecological Receivers	M	Impacts on designated marine ecological receivers is expected to be significant, since there is potential for impacts in nearby fish culture zones.
Landscape and Visual		
Landscape Resource	M	Requires development and new land in a relatively undisturbed area within view of West Hong Kong Island and the harbour and extensive ferry traffic.
Visual Impacts	M	Disturbance to existing visual context of area, highly visible from West HK Island and ferry passengers.

Construction Phase Criterion	Score	Justification
Cultural Heritage		
Terrestrial Cultural Heritage	VL	No terrestrial archaeological sites will be disturbed.
Marine Archaeology	M	Some potential for disturbance to previously undisturbed areas of the seabed with high archaeological potential.
Risk		
Construction Stage Risk	VL	Negligible construction phase risk expected.

Table A19 Site 4 - Sham Shui Kok

Description of Site

- ◆ Existing Water Depth: 10 metres (Dredging Required)
- ◆ Access Channel: 3000 metres (Dredging Required)
- ◆ Turning Basin: size approx. 1100m X 500m wide (Dredging Required)
- ◆ Volume of Capital Dredging: 6.7 million m³ approx.
- ◆ Reclamation for tank farm: Approx 2.2 million m³
- ◆ Pristine seabed area affected 133 Ha
- ◆ New Pipeline: 7km Twin Subsea Pipelines

Construction Phase Criterion	Score	Justification
Air Quality		
Construction Air Quality Impacts	M	Reclamation required, sand backfill has potential for dust generation, however site is remote from ASR's, supplementary tanks may be constructed when planned residential developments go ahead in the future.
Noise		
Above Ground Noise Impacts	M	While significant impacts are unlikely and can be avoided through mitigation, the close proximity of future NSR's to future works means some potential impacts.
Underwater Noise Impacts	L	Dolphin monitoring records show that adjacent waters do not have a high density of Chinese White Dolphin sightings.
Water Quality		
Water Quality Impacts	M	Reclamation required and significant capital dredging to form the access channel and turning basin. Sediment losses to suspension will however be localised and water quality impacts are therefore only given a 'low' score.
Ecology		
Marine Faunal Impacts	H	Based on the need for the reclamation, turning basin and access channel there is quite significant potential for permanent habitat loss of benthic fauna along with secondary impacts.

Construction Phase Criterion	Score	Justification
Designated Sensitive Ecological Receivers	M	The San Tau SSSI has the potential to be affected by the pipeline construction with its seagrass beds, and species of conservation interest, as does Tai Ho Bay which also has a mangrove stand and is an SSSI. However, the scale of impacts would not be very significant.
Landscape and Visual		
Landscape Resource	M	Requires new land adjacent to and in view of the North Lantau highway and Airport Express, but in an area with existing industrial usage. This site falls within the proposed waterfront promenade and next to proposed mixed development.
Visual Impacts	H	There will be disturbance to the existing visual context, including North Lantau Country Park visitors, users of the North Lantau Highway and Airport Express and future nearby residents and promenaders.
Cultural Heritage		
Terrestrial Cultural Heritage	VL	Will be on reclaimed land with no archaeological sites nearby.
Marine Archaeology	H	Potential for the proposed reclaimed area, access channel turning basin and pipeline alignment to disturb previously undisturbed areas of high archaeological potential.
Risk		
Construction Stage Risk	VL	Insignificant construction phase risk.

Table A20 Site 5 - Sham Wat

Description of Site

- ◆ Existing Water Depth: 5 metres (Dredging Required)
- ◆ Access Channel: 6000 metres (Dredging Required)
- ◆ Turning Basin: size approx. 1100m X 500m wide (Dredging Required)
- ◆ Volume of Capital Dredging: 15.45 million m³ approx.
- ◆ Reclamation for tank farm: approx. 2.2 million m³
- ◆ Pristine seabed area affected 193 Ha
- ◆ New Pipeline: 2.5km (Twin Subsea Pipelines)

Construction Phase Criterion	Score	Justification
Air Quality		
Construction Air Quality Impacts	L	Reclamation required, sand backfill has potential for dust generation, however site is remote from ASR's.
Noise		
Above Ground Noise Impacts	L	Significant impacts are unlikely and there are no nearby NSR's. Any significant noise can be avoided by mitigation measures.

Construction Phase Criterion	Score	Justification
Underwater Noise Impacts	L	Dolphin monitoring records show that adjacent waters are used by CWD's and there is some potential for noise impact.
Water Quality		
Water Quality Impacts	M	Reclamation required along with significant capital dredging to form the access channel and turning basin. Sediment losses will however be localised and water quality impacts are therefore judged to be of only moderate significance.
Ecology		
Marine Faunal Impacts	VH	The need for reclamation and a substantial access channel and turning basin means there is significant potential for permanent habitat loss of benthic fauna, along with associated secondary impacts.
Designated Sensitive Ecological Receivers	M	The San Tau SSSI has the potential to be affected by the works with its seagrass beds and species of conservation interest as does the adjacent North Lantau coastline which has ecological value. Sham Wat itself also has mangroves.
Landscape and Visual		
Landscape Resource	M	Requires new land adjacent to the relatively undeveloped North Lantau coastline and existing land use of nearby land is incompatible.
Visual Impacts	H	Significant disturbance to the existing visual context, including visitors to this part of North Lantau.
Cultural Heritage		
Terrestrial Cultural Heritage	VL	Will be on reclaimed land with no terrestrial archaeological sites suffering any disturbance.
Marine Archaeology	H	Potential for the proposed reclamation area, access channel, turning basin and pipeline alignment to disturb previously undisturbed areas of high marine archaeological potential.
Risk		
Construction Stage Risk	VL	Insignificant construction phase risk.

Table A21 Site 6 - Tsing Yi

Description of Site

- ◆ Existing Water Depth: 20 metres
- ◆ No Access Channel or Manoeuvring Basin are required
- ◆ No reclamation required
- ◆ Pristine seabed area affected by pipeline: 40Ha (if pipeline is all subsea)
- ◆ New Pipeline 18km (Bored Tunnel or twin subsea / land pipeline)

Construction Phase Criterion	Score	Justification
Air Quality		
Construction Air Quality Impacts	VL	No reclamation required, remote from ASR's and residential.
Noise		
Above Ground Noise Impacts	VL	No nearby NSR's.
Underwater Noise Impacts	VL	No nearby underwater NSR's.
Water Quality		
Water Quality Impacts	VL	No reclamation, deep water access.
Ecology		
Marine Faunal Impacts	L	Limited additional impacts expected on already highly disturbed area.
Designated Sensitive Ecological Receivers	VL	No nearby sensitive ecological receivers.
Landscape and Visual		
Landscape Resource	L	In an area with extensive existing (and similar) industrial use.
Visual Impacts	L	Limited disturbance to the existing visual context of South Tsing Yi Island.
Cultural Heritage		
Terrestrial Cultural Heritage	VL	Adjacent land areas already developed with similar industry and land use, no undisturbed archaeological sites nearby.
Marine Archaeology	VL	Required construction work unlikely to disturb previously undisturbed areas of high archaeological potential.
Risk		
Construction Stage Risk	H	Construction undertaken in close proximity to DG vessels manoeuvring and berthing at adjacent PHI facilities.

Table A22 Site 7 - Tuen Mun Area 38

Description of Site

- ◆ Existing Water Depth: 18 metres
- ◆ No Access Channel or Manoeuvring Basin are required
- ◆ No reclamation required
- ◆ Pristine seabed area affected by pipeline: less than 10Ha
- ◆ New Pipeline 5km (Twin Subsea Pipelines)

Construction Phase Criterion	Score	Justification
Air Quality		
Construction Air Quality Impacts	VL	No reclamation required; distant air sensitive receivers, therefore no dust nuisance, AQO's not expected to be impacted and effective mitigation measures possible.
Noise		
Above Ground Noise Impacts	VL	No nearby NSR's.
Underwater Noise Impacts	H	Site adjacent to waters abundant with Chinese White Dolphins; construction noise may result in need for mitigation measures; but area already subject to high noise levels from existing marine traffic.
Water Quality		
Water Quality Impacts	VL	No reclamation or capital/dredging required, no significant impacts on WQO's expected from pipeline installation; high natural SS levels in area.
Ecology		
Marine Faunal Impacts	L	Impacts largely related to any water quality deterioration arising from construction, but marine fauna already adapted to relatively high SS levels of the area.
Designated Sensitive Ecological Receivers	VL	Although the site is relatively close to the Sha Chau and Lung Kwu Chau Marine Park, the potential for impacts on species of conservation interest (including dolphins) is not considered significant.
Landscape and Visual		
Landscape Resource	L	Located on already reclaimed land designated for industrial use, in an area of generally low landscape quality.
Visual Impacts	L	There will be some disturbance to the existing visual context, but this will be minor.
Cultural Heritage		
Terrestrial Cultural Heritage	VL	On already formed land with no archaeological sites nearby.
Marine Archaeology	L	Potential for the pipeline alignments to pass through undisturbed areas of high archaeological potential exists, But over a relative by short length.
Risk		
Construction Stage Risk	VL	Negligible construction phase risk expected.

Table A23 Site 8 - Tuen Mun West

Description of Site

- ◆ Existing Water Depth 10: metres (Dredging Required)
- ◆ Access Channel: None
- ◆ Turning Basin: size approx. 1100m X 500m wide (Dredging Required)
- ◆ Volume of Capital Dredging: 5.45 million m³ approx.
- ◆ Reclamation for tank farm: Approx 2.7 million m³
- ◆ Pristine seabed area affected: 92 Ha
- ◆ New Pipeline: 9km (Twin Subsea Pipelines)

Other Factors

Dredging for pipeline will have an impact on the cooling water for Castle Peak power station. The subsea pipelines will also need to avoid the sewer outfall from Lung Kwu Sheung Tan.

Construction Phase Criterion	Score	Justification
Air Quality		
Construction Air Quality Impacts	M	Reclamation required, sand backfill has potential for dust generation, however site is some distance from nearby village ASR's. Effective mitigation measures possible.
Noise		
Above Ground Noise Impacts	M	Significant impacts are unlikely, however, village NSR's are quite distant. Significant noise can be avoided by mitigation measures.
Underwater Noise Impacts	H	Site adjacent to waters abundant with CWD's; construction noise may result in need for mitigation measures, although underwater noise already high in the area from existing marine traffic.
Water Quality		
Water Quality Impacts	M	Reclamation required along with significant capital dredging to form the access channel and turning basin. Sediment losses will however be localised and water quality impacts are therefore not judged significant.
Ecology		
Marine Faunal Impacts	H	The need for reclamation, an access channel and turning basin means there is significant potential for permanent habitat loss of benthic fauna, along with associated secondary impacts.
Designated Sensitive Ecological Receivers	M	The Sha Chau and Lung Kwu Chau Marine Park is relatively close, although there is only modest potential for impacts on species of conservation interest.

Construction Phase Criterion	Score	Justification
Landscape and Visual		
Landscape Resource	M	Requires new land in as yet undeveloped bay area, although some nearby land uses are compatible. (e.g. Black Point Power Station)
Visual Impacts	M	Some disturbance to the existing visual context.
Cultural Heritage		
Terrestrial Cultural Heritage	VL	Will be on reclaimed land with no terrestrial archaeological sites suffering any disturbance.
Marine Archaeology	H	Requirement for seabed disturbance is high, with attendant high potential to disturb previously undisturbed areas of high archaeological potential.
Risk		
Construction Stage Risk	VL	Insignificant construction phase risk.

A4.3 Operational Phase Criteria

A4.3.1 Summary and justifications for each site are provided in Tables A24 to A31.

Table A24 Site 1 - Bluff Point

Description of Operational Aspects

- ◆ Volume of Maintenance dredging every 3 to 4 years: 0.5 million m³
- ◆ Area of seabed affected by maintenance dredging: 50Ha
- ◆ Continued regular barging of fuel is required to Sha Chau to keep fuel in the pipeline fresh
- ◆ Sensitive receivers: Close proximity to the sensitive (unspoilt) North Lantau Coastline
- ◆ Nearby population: None

Operation Phase Criterion	Score	Justification
Air Quality		
Operation Air Quality Impacts	VL	Impacts of fugitive emissions during handling and storage of fuel and vessel delivery emissions are expected to be negligible for the duration of the life of the facility and within AQO's.
Noise		
Above Ground Noise Impacts	VL	Above ground noise generation is expected to be infrequent and insignificant given the low number of berthing requirements.
Underwater Noise Impacts	L	Underwater noise associated with PAFF activity and vessel deliveries will not be significant, but quiet existing background noise levels means there is potential for some impact.
Water Quality		
Water Quality Impacts	M	Intermittent requirement for access channel/ turning basin maintenance dredging, resulting in periodic localised elevations in suspended solids.

Operation Phase Criterion	Score	Justification
Ecology		
Marine Faunal Impacts	L	Intermittent maintenance dredging may result in on-going disturbance to the sea bed as well as potential impacts to fisheries and coral resources and the San Tau SSSI, as well as mangroves at Tai O. Overall, impacts will not be significant. In addition, SW Lantau may shortly be designated as a Marine Park, with greater importance attached to minimising any disturbance to the area.
Risk		
Hazard to Life	VL	Hazards to life posed by the jetty tank farm and pipeline are considered limited. No nearby populations present here.
Environmental Risk	M	The risks of significant fuel spillage is very low, but in the very unlikely event of a spill incident nearby, sensitive ecological resources may be adversely impacted. Potential designation of SW Lantau as a Marine Park enhance the value of the local ecological resources.
Landscape & Visual		
Landscape Resource	H	The PAFF facility and vessel movements will impact the local landscape context given the pristine nature of the adjacent coastline and local environment and Country Park and future Marine Park Designation.
Visual Impacts	H	Potential for significant impact on the visual quality of the area given the undeveloped nature of the adjacent coastline.

Table A25 Site 2 - East of Soko Islands

Description of Operational Aspects

- ◆ Volume of Maintenance dredging every 3 to 4 years: 0.5 million m³
- ◆ Area of seabed affected by maintenance dredging: 50Ha
- ◆ Continued regular barging of fuel is required to Sha Chau to keep fuel in the pipeline fresh
- ◆ Maintenance of Bored Tunnel is required (if Bored Tunnel is used)
- ◆ Sensitive receivers: close proximity to the proposed Marine Park
- ◆ Nearby population: None

Operation Phase Criterion	Score	Justification
Air Quality		
Operation Air Quality Impacts	VL	Impacts of fugitive emissions during handling and storage of fuel and vessel delivery emissions are expected to be negligible for the duration of the life of the facility and within AQO's.

Operation Phase Criterion	Score	Justification
Noise		
Above Ground Noise Impacts	VL	Above ground noise generation is expected to be infrequent and insignificant given the low number of berthing requirements.
Underwater Noise Impacts	VL	Underwater noise associated with PAFF activity and vessels is unlikely to be discernible above background due to existing levels of marine traffic (e.g. Macau Ferries).
Water Quality		
Water Quality Impacts	M	There will be an intermittent requirement for access channel and turning basin maintenance dredging resulting in periodic localised elevations in suspended solids.
Ecology		
Marine Faunal Impacts	VH	Intermittent maintenance dredging may result in ongoing disturbance to the sea bed as well as associated secondary ecological impacts. The value of the ecological resource will be elevated when the Soko Islands Marine Park is designated.
Risk		
Hazard to Life	VL	Hazards to life not significant given remoteness of location.
Environmental Risk	H	The risks of significant fuel spillage is very low, but in the very unlikely event of a spill incident nearby sensitive ecological resources may be adversely impacted.
Landscape & Visual		
Landscape Resource	M	The PAFF facility and vessel movements will impact the local landscape context given the undeveloped nature of the adjacent coastline. Potential designation of marine waters around the Soko Islands as a Marine Park will increase the value of the natural environment.
Visual Impacts	M	Potential for significant impact on the visual quality of the area given the undeveloped nature of the adjacent coastline. Potential designation of marine waters around the Soko Islands as a Marine Park will increase the value of the natural environment.

Table A26 Site 3 - Kau Yi Chau

Description of Operational Aspects

- ◆ Volume of Maintenance dredging every 3 to 4 years: 0.5 million m³
- ◆ Area of seabed affected by maintenance dredging: 50Ha
- ◆ Continued regular barging of fuel is required to Sha Chau to keep fuel in the pipeline fresh
- ◆ Maintenance of Bored Tunnel is required
- ◆ Sensitive receivers: Kau Yi Chau Island and, more remotely, Disneyland

- ◆ Nearby population: None

Operation Phase Criterion	Score	Justification
Air Quality		
Operation Air Quality Impacts	VL	Impacts of fugitive emissions during handling and storage of fuel and vessel delivery emissions are expected to be negligible for the duration of the life of the facility and within AQO's.
Noise		
Above Ground Noise Impacts	VL	No nearby NSR's.
Underwater Noise Impacts	L	Underwater noise associated with PAFF activity and vessel deliveries will not be significant, but a generally quieter existing background noise levels means there is potential for minor impacts to Chinese White Dolphins/finless porpoises.
Water Quality		
Water Quality Impacts	M	There will be an intermittent requirement for access channel and turning basin maintenance dredging resulting in periodic localised elevations in suspended solids.
Ecology		
Marine Faunal Impacts	L	Intermittent requirement for maintenance dredging may result in on-going disturbance to the sea-bed.
Risk		
Hazard to Life	VL	Hazards to life not significant given remoteness of location.
Environmental Risk	L	The risks of significant fuel spillage is very low, but in the very unlikely event of a spill incident nearby, sensitive ecological resources may be adversely impacted.
Landscape & Visual		
Landscape Resource	L	Visible from west Hong Kong Island, harbour traffic and ferries with some impact on local landscape context.
Visual Impacts	L	Some intrusion into current visual context, but visual impact less than during construction.

Table A27 Site 4 - Sham Shui Kok

Description of Operational Aspects

- ◆ Volume of Maintenance dredging every 3 to 4 years: 0.5 million m³
- ◆ Area of seabed affected by maintenance dredging: 50Ha
- ◆ Continued regular barging of fuel is required to Sha Chau to keep fuel in the pipeline fresh
- ◆ Sensitive receivers: Users of airport Express and Lantau Highway, Residents at nearby proposed development
- ◆ Nearby population: Future residents, at a distance of about 1km

Operation Phase Criterion	Score	Justification
Air Quality		
Operation Air Quality Impacts	L	Impacts of fugitive emissions during handling and storage of fuel and vessel delivery emissions are expected to be negligible for the duration of the life of the facility and within AQO's. Because of future planned nearby residential development, the potential exists for some minor odour nuisance in the future.
Noise		
Above Ground Noise Impacts	L	Above ground noise generation is expected to be infrequent and insignificant given the low number of berthing requirements. Because of future planned nearby residential development, the potential exists for some minor disturbance in the future.
Underwater Noise Impacts	L	Underwater noise associated with PAFF activity and vessel deliveries will not be significant, but low existing background noise levels means there is potential for minor impact.
Water Quality		
Water Quality Impacts	M	There will be an intermittent requirement for access channel and turning basin maintenance dredging resulting in periodic localised elevations in suspended solids.
Ecology		
Marine Faunal Impacts	L	Intermittent maintenance dredging may result in on-going disturbance to the sea bed as well as potential impacts to fisheries and coral resources and the San Tau SSSI, as well as Tai Ho Bay which has a mangrove stand and is an SSSI. Overall, impacts will not however be significant.
Risk,		
Hazard to Life	L	Hazards to life from the jetty and pipeline options are considered low with limited risk to life posed to neighbouring tenants. A slight hazard is posed to the surrounding populations (e.g. proximity to road and rail links).
Environmental Risk	L	The risks of significant fuel spillage is very low, but in the very unlikely event of a spill incident nearby sensitive ecological resources may be adversely impacted.
Landscape & Visual		
Landscape Resource	L	The 6 hectare facility (and vessels at berth) will have minor impact on the local landscape context given the 'industrial' nature of existing neighbours.
Visual Impacts	H	Has potential for significant impact on the visual quality of the area, associated largely with the adjacent transport corridor and future residential development nearby.

Table A28 Site 5 - Sham Wat

Description of Operational Aspects

- ◆ Volume of Maintenance dredging every 3 to 4 years: 1.9 million m³
- ◆ Area of seabed affected by maintenance dredging: 140Ha
- ◆ Continued regular barging of fuel is required to Sha Chau to keep fuel in the pipeline fresh
- ◆ Sensitive receivers: Close proximity to the sensitive (unspoilt) North Lantau Coastline
- ◆ Nearby population: Local village at Sham Wat

Operation Phase Criterion	Score	Justification
Air Quality		
Operation Air Quality Impacts	VL	Impacts of fugitive emissions during handling and storage of fuel and vessel delivery emissions are expected to be negligible for the duration of the life of the facility and within AQO's.
Noise		
Above Ground Noise Impacts	VL	Above ground noise generation is expected to be infrequent and insignificant given the low number of berthing requirements.
Underwater Noise Impacts	M	Underwater noise associated with PAFF activity and vessel deliveries will not be significant, but a generally quieter existing background noise level means there is potential for some impact given otherwise quiet underwater environment.
Water Quality		
Water Quality Impacts	M	There will be an intermittent requirement for access channel and turning basin maintenance dredging resulting in periodic localised elevations in suspended solids. The access channel is likely to pass close to the Western Lantau Waters Marine Park.
Ecology		
Marine Faunal Impacts	M	Intermittent maintenance dredging may result in ongoing disturbance to the sea bed as well as potential impacts to fisheries and coral resources and the San Tau SSSI and the future Marine Park.
Risk		
Hazard to Life	VL	Hazards to life posed by the jetty tank farm and pipeline are considered limited. Very limited nearby residential populations present.
Environmental Risk	M	The risks of significant fuel spillage is very low, but in the very unlikely event of a spill incident nearby sensitive ecological resources may be adversely impacted. Potential designation of SW Lantau as a Marine Park enhances the value of local ecological resources.

Operation Phase Criterion	Score	Justification
Landscape & Visual		
Landscape Resource	H	The PAFF facility and vessel movements will impact the local landscape context given the undeveloped nature of the adjacent coastline.
Visual Impacts	H	Potential for significant impact on the visual quality of the area given the undeveloped nature of the adjacent coastline and the Marine and Country Parks.

Table A29 Site 6 - Tsing Yi

Description of Operational Aspects

- ◆ Volume of Maintenance dredging every 3 to 4 years: None
- ◆ Area of seabed affected by maintenance dredging: None
- ◆ Continued regular barging of fuel is required to Sha Chau to keep fuel in the pipeline fresh
- ◆ Maintenance of Bored Tunnel is required (if bored tunnel option is used)
- ◆ Sensitive receivers: adjacent to existing PHIS
- ◆ Nearby populations: workers at nearby PHIS

Operation Phase Criterion	Score	Justification
Air Quality		
Operation Air Quality Impacts	VL	Impacts of fugitive emissions during handling and storage of fuel and vessel delivery emissions are expected to be negligible for the duration of the life of the facility and within AQO's.
Noise		
Above Ground Noise Impacts	VL	No nearby NSR's.
Underwater Noise Impacts	VL	No nearby underwater NSR's.
Water Quality		
Water Quality Impacts	VL	No maintenance dredging required.
Ecology		
Marine Faunal Impacts	VL	No maintenance dredging required; area already highly disturbed.
Risk		
Hazard to Life	H	Vessel manoeuvring and berthing activities will take place in an area already congested with DG vessel traffic and PHI facility activities.
Environmental Risk	L	Risks of fuel spillage low.
Landscape & Visual		
Landscape Resource	L	An area with extensive existing (and similar) industrial use.
Visual Impacts	L	Development fits into the existing visual context of the area.

Table A30 Site 7 - Tuen Mun Area 38

Description of Operational Aspects

- ◆ Volume of Maintenance dredging every 3 to 4 years: None
- ◆ Area of seabed affected by maintenance dredging: None
- ◆ Continued regular barging of fuel is not required to Sha Chau to keep fuel in the pipeline fresh
- ◆ Sensitive receivers: adjacent to nearby industrial operations (but remote from Tuen Mun residents)
- ◆ Nearby population: workers at nearby industrial operations

Operation Phase Criterion	Score	Justification
Air Quality		
Operation Air Quality Impacts	VL	Impacts of fugitive emissions during handling and storage of fuel and vessel delivery emissions are expected to be negligible for the duration of the life of the facility and within AQO's.
Noise		
Above Ground Noise Impacts	VL	Above ground noise generation is expected to be infrequent and insignificant given the low number of berthing requirements.
Underwater Noise Impacts	VL	Underwater noise associated with PAFF activity and vessels is unlikely to be discernible above background due to existing marine traffic and industrial activity in the area.
Water Quality		
Water Quality Impacts	VL	No maintenance dredging required.
Ecology		
Marine Faunal Impacts	VL	No maintenance dredging required so negligible impact anticipated.
Risk		
Hazard to Life	L	Hazards to life from the jetty and pipeline options are considered low with limited risk to life posed to neighbouring tenants.
Environmental Risk	L	The risks of significant fuel spillage is very low, but in the very unlikely event of a spill incident, nearby sensitive ecological resources may be adversely impacted.
Landscape & Visual		
Landscape Resource	VL	The 6 hectare facility (and vessels at berth) will have limited impact on the local landscape context given the 'industrial' nature of existing neighbours.
Visual Impacts	L	There will be a minor change to the visual quality of the area, particularly from view points (including vessels) to the south.

Table A31 Site 8 - Tuen Mun West

Description of Operational Aspects

- ◆ Volume of Maintenance dredging every 3 to 4 years: 0.25 million m³
- ◆ Area of seabed affected by maintenance dredging 50Ha
- ◆ Continued regular barging of fuel is not required to Sha Chau to keep fuel in the pipeline fresh
- ◆ Sensitive receivers: future adjacent users
- ◆ Nearby population: None

Operation Phase Criterion	Score	Justification
Air Quality		
Operation Air Quality Impacts	VL	Impacts of fugitive emissions during handling and storage of fuel and vessel delivery emissions are expected to be negligible for the duration of the life of the facility and within AQO's.
Noise		
Above Ground Noise Impacts	VL	Above ground noise generation is expected to be infrequent and insignificant given the low number of berthing requirements.
Underwater Noise Impacts	VL	Underwater noise associated with PAFF activity and vessels is unlikely to be discernible above background due to existing marine traffic and industrial activity in the area.
Water Quality		
Water Quality Impacts	M	There will be an intermittent requirement for access channel and turning basin maintenance dredging resulting in periodic localised elevations in suspended solids.
Ecology		
Marine Faunal Impacts	M	Intermittent maintenance dredging may result in ongoing disturbance to the sea-bed, but area subject to naturally high SS levels.
Risk		
Hazard to Life	L	Hazards to life from the jetty and pipeline options are considered low with negligible risk to life posed to the nearest tenants at Lung Kwu Tan.
Environmental Risk	M	The risks of significant fuel spillage is very low, but in the very unlikely event of a spill incident nearby, sensitive ecological resources may be adversely impacted.
Landscape & Visual		
Landscape Resource	L	The 6 hectare facility (and vessels at berth) will have minor impact on the local landscape context given the 'industrial' nature of existing neighbours (e.g. Black Point Power Station).
Visual Impacts	L	There will be a change to the visual quality of the area, particularly from view points near Lung Kwu Tan Village.

A6 Conclusion

- A6.1 Of the alternative sites considered it is clear, on the basis of this qualitative environmental assessment of both construction and operational phases and of non-environmental factors, that Tuen Mun Area 38 is preferred on all counts.

Table A32 Summary of Construction Phase Environmental Comparison

Criteria	Weighting	Site 1 Bluff Point	Site 2 East of Soko Islands	Site 3 Kau Yi Chau	Site 4 Sham Shui Kok	Site 5 Sham Wat	Site 6 Tsing Yi	Site 7 Tuen Mun Area 38	Site 8 Tuen Mun West
Air Quality									
Construction Air Quality Impacts	10 10.00	Low (0.75) 7.50	Low (0.75) 7.50	Low (0.75) 7.50	Medium (0.5) 5.00	Low (0.75) 7.50	Very low (1.0) 10.00	Very low (1.0) 10.00	Medium (0.5) 5.00
Max Score									
Score out of 10									
Noise									
Above Ground Noise Impacts	15 3.00	Low (0.75) 11.25	Very low (1.0) 6.00	Very low (1.0) 12.00	Medium (0.5) 10.50	Low (0.75) 11.25	Very low (1.0) 15.00	Very low (1.0) 6.00	Medium (0.5) 4.50
Underwater Noise Impacts	12.00								
Score out of 15									
Water Quality									
Water Quality Impacts	20 20.00	Low (0.75) 15.00	Medium (0.5) 10.00	Medium (0.5) 10.00	Medium (0.5) 10.00	Medium (0.5) 10.00	Very low (1.0) 20.00	Very low (1.0) 20.00	Medium (0.5) 10.00
Max Score									
Score out of 20									
Ecology									
Marine Faunal Impacts	30 19.50	High (0.25) 10.13	Very high (0) 2.63	Medium (0.5) 15.00	High (0.25) 10.13	Very high (0) 5.25	Low (0.75) 25.13	Low (0.75) 25.13	High (0.25) 10.13
Designated Ecological Receivers	10.50								
Score out of 30									
Landscape and Visual									
Landscape Resource	15 6.00	Medium (0.5) 5.25	Medium (0.5) 7.50	Medium (0.5) 7.50	Medium (0.5) 5.25	Medium (0.5) 5.25	Low (0.75) 11.25	Low (0.75) 11.25	Medium (0.5) 7.50
Visual Impacts	9.00								
Score out of 15									
Cultural Heritage									
Terrestrial Cultural heritage	10 2.00	Very low (1.0) 4.00	Very low (1.0) 4.00	Very low (1.0) 6.00	Very low (1.0) 4.00	Very low (1.0) 4.00	Very low (1.0) 10.00	Very low (1.0) 8.00	Very low (1.0) 4.00
Marine Archaeology	8.00								
Score out of 10									
Risk									
Construction Stage Risk	35 35.00	Very low (1.0) 35.00	Very low (1.0) 35.00	Very low (1.0) 35.00	Very low (1.0) 35.00	Very low (1.0) 35.00	High (0.25) 8.75	Very low (1.0) 35.00	Very low (1.0) 35.00
Max Score									
Score out of 35									
Maximum Score									
Score (out of 135)	135	88.13	72.63	93.00	79.88	78.25	100.13	115.38	76.13
RANKING		4	8	3	5	6	2	1	7

Table A33 Summary of Operational Phase Environmental Comparison

Criteria	Weighting	Site 1 Bluff Point	Site 2 East of Soko Islands	Site 3 Kau Yi Chau	Site 4 Sham Shui Kok	Site 5 Sham Wat	Site 6 Tsing Yi	Site 7 Tuen Mun Area 38	Site 8 Tuen Mun West
Air Quality Operational Air Quality Impacts Max Score Score out of 5	5 5.00	Very low (1.0) 5.00	Very low (1.0) 5.00	Very low (1.0) 5.00	Low (0.75) 3.75	Very low (1.0) 5.00	Very low (1.0) 5.00	Very low (1.0) 5.00	Very low (1.0) 5.00
Noise Above Ground Noise Impacts Underwater Noise Impacts Max Score Score out of 10	10 2.00 8.00	Very low (1.0) Low (0.75) 8.00	Very low (1.0) Very low (1.0) 10.00	Very low (1.0) Low (0.75) 8.00	Low (0.75) Low (0.75) 7.50	Very low (1.0) Medium (0.5) 6.00	Very low (1.0) Very low (1.0) 10.00	Very low (1.0) Very low (1.0) 10.00	Very low (1.0) Very low (1.0) 10.00
Water Quality Water Quality Impacts Max Score Score out of 15	15 15.00	Medium (0.5) 7.5	Medium (0.5) 7.5	Medium (0.5) 7.5	Medium (0.5) 7.5	Medium (0.5) 7.50	Very low (1.0) 15.00	Very low (1.0) 15.00	Medium (0.5) 7.5
Ecology Marine Faunal Impacts Max Score Score out of 20	20 20.50	Low (0.75) 15.00	Very high (1.0) 20.00	Low (0.75) 15.00	Low (0.75) 15.00	Medium (0.5) 10.00	Very low (1.0) 20.00	Very low (1.0) 20.00	Medium (0.5) 10.00
Risk Hazard to Life Environmental Risk Max Score Score out of 35	35 19.25 15.75	Very low (1.0) Medium (0.5) 27.13	Very low (1.0) High (0.25) 23.19	Very low (1.0) Low (0.75) 31.06	Low (0.75) Low (0.75) 26.25	Very low (1.0) Medium (0.5) 27.13	High (0.25) Low (0.75) 16.63	Low (0.75) Low (0.75) 26.25	Low (0.75) Medium (0.5) 22.31
Landscape and Visual Landscape Resource Visual Impacts Max Score Score out of 15	15 6.00 9.00	High (0.25) High (0.25) 3.75	Medium (0.5) Medium (0.5) 7.50	Low (0.75) Low (0.75) 11.25	Low (0.75) High (0.25) 6.75	High (0.25) High (0.25) 3.75	Low (0.75) Low (0.75) 11.25	Very low (1.0) Low (0.75) 12.75	Low (0.75) Low (0.75) 11.25
Maximum Score (out of 100)	100	66.38	73.19	77.81	66.75	59.38	77.88	89.00	66.06
RANKING		6	4	3	5	8	2	1	7