

**Confirmed Minutes of the 91<sup>st</sup> Meeting of  
the Advisory Council on the Environment  
held on 17 December 2001 at 2:30 p.m.**

**Present:**

Mr. Peter H. Y. WONG, GBS, JP (Chairman)  
Mr. Barrie COOK  
Prof. Anthony HEDLEY, BBS, JP  
Mr. Edward S. T. HO, SBS, JP  
Mr. KWOK Kwok-chuen, BBS  
Prof. Dennis S. C. LAM  
Mr. Peter Y. C. LEE, SBSt.J  
Dr. LEONG Che-hung, GBS, JP  
Dr. NG Cho-nam  
Mrs. Mei NG  
Mr. PAO Ping-wing, JP  
Mr. Otto L. T. POON  
Mr. Michael J. D. RUSHWORTH  
Ms Iris TAM  
Miss Alex YAU  
Ms. Jessie WONG (Secretary)

**Absent with Apologies:**

Mr. Daniel M. C. CHENG  
Prof. Peter HILLS  
Dr. HO Kin-chung  
Prof. LAM Kin-che  
Mr. Edwin C. K. LAU  
Mr. LIN Chaan-ming  
Prof. WONG Yuk-shan, JP  
Mr. LOH Ah Tuan

**In Attendance:**

Mr. Thomas CHOW	Deputy Secretary (C), Environment and Food Bureau (EFB)
Mr. Donald TONG	Deputy Secretary (B), EFB
Mr. Rob LAW, JP	Director of Environmental Protection
Mr. LEE Tak-keung	Assistant Director (Technical Services), Planning Department (PlanD)
Dr. Constance CHAN	Assistant Director, Department of Health
Mr. Cary HO	Senior Forestry Officer, Agriculture, Fisheries and Conservation Department (AFCD)
Mrs. Pauline LING	Chief Information Officer, EFB

Miss Natalia LEUNG Senior Information Officer, Environmental  
Protection Department (EPD)  
Miss Petula POON Chief Executive Officer (C), EFB  
Ms. Cora SO Executive Officer (C), EFB

**In Attendance for Agenda Item 4 :**

Mr. Howard CHAN Principal Assistant Secretary (C)1, EFB  
Mr. W C MOK Principal Environmental Protection Officer (Motor  
Vehicle Emissions), EPD

**In Attendance for Agenda Item 5 :**

Mr. B S CHOW General Manager, Aviation Franchise, Airport  
Authority (AA)  
Mr. Amin EBRAHIM Group Manager, Aviation Franchise, AA  
Mr. Bill ROBERTS Engineering Manager, AA  
Mr. Martin PUTNAM Assistant Environmental Manager, AA  
Miss Tonya KAM Community Relations Manager, AA  
Mr. Steve JONES Director of Environmental Consultancy, Mouchel  
Asia Ltd (MAL)  
Miss Helen COCHRANE Project Manager, MAL

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**Agenda Item 5 : Update on the Progress of the Permanent Aviation Fuel Facility for Hong Kong International Airport**  
*(ACE Paper 50/2001)*

20. The Chairman welcomed Mr. B S Chow and his presentation team to the meeting. Mr. B S Chow briefed Members on the updates of the site selection for the permanent aviation fuel facility (PAFF). He said that a visit to Tuen Mun Area 38 and other relevant sites would be arranged for Members in due course if they were interested.

21. The Chairman said that, based on the information presented, he would agree that Tuen Mun Area 38 would be the most suitable site for the PAFF. However, he asked if the possibility of using the ash lagoons of the China Light and Power Co Ltd for the PAFF had been explored. In response, Mr. Amin Ebrahim said that the Airport Authority (AA), in collaboration with the Government, had discussed with China Light & Power and its major shareholder for Castle Peak Power Station, Exxon Mobil, on the feasibility of co-locating the PAFF with the Castle Peak Power Station. However, based on the findings of an one-year study, the two facilities were incompatible for co-location. In response, the Chairman said that the AA should be fully prepared to answer queries from the public in that regard.

22. Mrs. Mei Ng noted that the Mainland would build its largest oil refinery plant in southern China and asked whether that would affect the choice of aviation fuel supply and in turn the routes of the barges carrying the fuel. She also asked whether the forecast of marine traffic in that area had taken into account future port development and whether the risk arising from all relevant future developments had been assessed. She was also concerned whether the impacts arising from the future expansion of the Airport had been considered.

23. In response to Mrs. Ng's enquiries, Mr. Ebrahim explained that at present 85% of the aviation fuel came from Singapore while the remaining 15% from the Mainland. It was anticipated that the ratio would remain unchanged in the foreseeable future. As regards marine traffic, Mr. Bill Roberts said that a quantitative risk assessment had been conducted on the routing of vessels to the jetty at Tuen Mun Area 38. The forecast of marine traffic up to 2011 and throughout the estimated life span of the PAFF (50 years) was covered in the assessment. It was expected that the aviation fuel traffic frequency in Ma Wan Channel would reduce due to the increased capacity of vessels. A marine traffic impact assessment would be undertaken very shortly. Mr. Bill Roberts also confirmed that the capacity and the design of the PAFF had made allowance for the future expansion of the Airport and port developments.

24. Mrs. Ng asked whether the impacts on fuel supply after China joined the World Trade Organisation had been considered. In response, Mr. Ebrahim said that currently the fuel price was US\$1.4 per gallon in the Mainland and US\$0.8 per gallon in Hong Kong. Due to increasing demand, the Mainland might in future have to rely on imported fuel for its own use. Hence, the Mainland's fuel supply to Hong Kong was expected to drop. Mr. B S Chow supplemented that the AA adopted an "open access system" for the purchase of aviation fuel. In other words, an airline could buy its own fuel from any source it wished.

25. Considering the risk to the residents living near Tuen Mun Area 38, Mr. Peter Lee asked whether AA had considered making use of the proposed bridge linking Zhuhai and Lantau for transporting aviation fuel across the border and then locating the PAFF in the Mainland. In response, Mr. B S Chow explained that the Government had decided that the PAFF should be located within the boundary of Hong Kong. The AA had exhausted all possible sites within Hong Kong waters, details of which had been presented to ACE in the past few years. In addition, since the handling capacity of the temporary facility at Sha Chau would reach saturation by the end of 2005, it would be too late to build the PAFF after the details of the proposed bridge had been confirmed. Mr. Ebrahim supplemented that the current aviation fuel demand was 12,000 m<sup>3</sup>/day. The estimated ultimate demand would increase to 30,000 m<sup>3</sup>/day. It would be impracticable to meet the fuel demand by land transport even if the proposed bridge would allow transportation of dangerous goods on it.

26. Dr. Ng Cho-nam pointed out that the temporary facility at Sha Chau was originally intended to operate for two and a half years only. He agreed that the PAFF should be set up as soon as possible.

27. Noting that Sha Chau was within a Marine Park, Mr. Edward Ho wondered why AA proposed to keep the facility there for emergency use, and why backup facility could not be incorporated in the PAFF. In reply, Mr. B S Chow said that the purpose of the backup facility was to ensure uninterrupted supply of aviation fuel to the Airport in case the PAFF broke down or the aviation fuel was contaminated. Mr. Roberts supplemented that the jetty at the PAFF might be temporarily put out of service in the event of an accident and therefore it was necessary to have available a backup facility in another location.

28. Mrs. Ng asked how often aviation fuel was contaminated and what had been done to address the risk of using contaminated fuel. She also enquired about the life span of the existing pipeline and whether any maintenance would be needed during its life and if so, the impact on the seabed. In response, Mr. Ebrahim said that there were two cases of contaminated fuel in 1995 and one in 1998. If the fuel were found to be contaminated, it would be discharged through the backup facility. The life span of the existing pipeline was 50 years which was approximately the same as that of the PAFF. Mr. Roberts supplemented that it was most unlikely that any maintenance would be needed to the buried subsea pipeline during its life span.

29. Mr. Barrie Cook agreed with Mr. Roberts' point that the vessels might hit and damage the jetty by accident at any time and such accidents did occur in the past. He said that since the 1980s such type of facilities had been planned for Tuen Mun area and the site selected was not an unreasonable one having balanced all factors involved. He also agreed that transporting large quantities of aviation fuel on the road was impracticable. He considered that for goods of strategic importance like aviation fuel, there was a need to diversify the sources of supply rather than relying on one or two major sources.

30. The Chairman invited the views of green group representatives on whether they considered it reasonable to retain the facility at Sha Chau for backup purpose. Dr. Ng said that personally he considered that relocating the facility might necessitate the building of a new pipeline which might cause more impacts to the marine environment. Miss Alex Yau wished to reserve her comments until a full EIA report was available. However, she recalled that when the area was designated as a Marine Park, the understanding was that the fuel facility at Sha Chau was temporary in nature.

31. Miss Yau referred to para. 21 of the paper and enquired about the actions taken by AA to "fast-track" the project. Regarding the pipeline for the PAFF, she asked whether there were other construction methods that would have minimum impacts on the marine environment and whether the operation of the fuel facility would require regular maintenance dredging. Lastly, she wondered whether the overall weighting for Sham Shui Kok in Table 4 of the paper should be of positive value.

32. In response, Mr. B S Chow said that the word "fast-tracking" was slightly misleading. He ensured Members that the actions taken were in line with the established procedures and all statutory requirements. He also confirmed that the figure in Table 4 should be positive. Mr. Roberts said that the current proposed method for pipeline construction was trench and cover with rock armour. Other methods like horizontal directional drilling, and ploughing the pipe into marine mud were being explored and it was concluded with respect to ploughing, that this method would not allow rock armour protection to be provided.

33. The Chairman thanked AA for the updates and urged them to pay attention to the risk assessment of the cumulative impacts of the project on marine traffic.



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**(ACE Paper 50/2001)**  
*For information*

**UPDATE ON THE PROGRESS OF THE  
PERMANENT AVIATION FUEL FACILITY  
FOR HONG KONG INTERNATIONAL AIRPORT**

**PURPOSE**

The purpose of this paper is to update Members on the progress to date on the development of a Permanent Aviation Fuel Facility (PAFF).

**PROGRESS SINCE DECEMBER 2000**

2. The Authority last updated Members in December 2000 (ACE Paper 38/00) on three potential options to the north of Lantau which became feasible following completion of the Ma Wan Channel risk assessment update.
3. Members are advised that significant progress has been made since then.
4. The three potential options, were site locations in Tuen Mun West, Tuen Mun Area 38 and Sham Shui Kok.
5. In early 2001, it was determined that Tuen Mun West would not be pursued further as the use of this area for a PAFF would pose a constraint on future port development.
6. A preliminary assessment of likely environmental issues and challenges at both remaining sites indicated that neither option should present any insurmountable problems within the context of a full EIA. The Authority undertook to compare and carefully consider the environmental benefits and disbenefits of the two options in selecting a preferred option. The comparative environmental assessment is described below.
7. In addition, a preliminary comparison of the two options was made based on length of time required to complete a PAFF at either of the sites. Tuen Mun Area 38 was the preferred option because land is already available for development there.

## Comparative Environmental Assessment

8. Pursuant to the above, the Authority engaged an Environmental Consultant to undertake an objective environmental comparison of the remaining two options, Sham Shui Kok and Tuen Mun Area 38.

9. A "matrix comparison" assessment approach was adopted, which allowed for the scaling and weighting of environmental criteria during the construction and operational stages. Environmental criteria were established and a set of weightings was determined based on the relative level of importance attached to each environmental criterion. Criteria weightings were then adjusted to increase arbitrarily the importance of each criterion against the others by way of "sensitivity tests".

10. The results of the comparative assessment were very conclusive, showing that when using the agreed set of environmental criteria weightings, Tuen Mun Area 38 is very convincingly the preferred environmental option during both the construction and operational stages. In addition, even in the sensitivity tests, Tuen Mun Area 38 is still preferred over Sham Shui Kok, in every case. The results of the comparative assessment are summarised briefly in Attachment 1.

11. The main reasons for the preference were that the Tuen Mun Area 38 site will be on existing reclaimed land (whereas a new reclamation would be required at Sham Shui Kok). Further, Tuen Mun Area 38 has deep water access (whereas at Sham Shui Kok the water depths are inadequate, necessitating considerable capital and maintenance dredging). Additional reasons are that during operations, visual impacts are likely to be greater at Sham Shui Kok because of its proximity to planned residential developments, the busy Airport Express Railway and the North Lantau Expressway.

12. Taking into account timing, the immediate availability of land at Tuen Mun Area 38 means that PAFF development there can be completed in time to meet the anticipated growing demand for aviation fuel at HKIA.

13. Significant technical drawbacks were also identified with the Sham Shui Kok option, partly relating to complications with the Sui Ho Wan Sewage outfall alignment, which is underneath the site of the proposed reclamation and the dredged manoeuvring basin.



14. The Authority thus determined, based on the comparative environmental assessment results together with timing, compatibility of land use issues and technical feasibility, that Tuen Mun Area 38 is the best available location for the PAFF.

15. The Authority made a presentation to the Tuen Mun District Council, which included site search for PAFF since 1994 and the results of the comparative environmental assessment shown below concluding that Tuen Mun Area 38 is the best location for PAFF. In addition, the presentation covered visual impacts and hazard to life, both of which show that there would not be any risk posed to public. Despite that, the Council raised strong objections to locating PAFF at Tuen Mun Area 38. The Authority is working on overcoming these.

#### **Environmental Impact Assessment (EIA) for PAFF at Tuen Mun Area 38**

16. An EIA is now being undertaken on the proposed Tuen Mun Area 38 PAFF and submarine pipeline, based on EIA study brief Number ESB -- 072/2001. The study brief has scoped the key issues to be addressed in the EIA study and the EIA report must demonstrate that the criteria in the relevant sections of the Technical Memorandum on the EIA process of the EIA Ordinance are fully complied with.

17. Part of the study is determining if it is feasible to make use of the existing submarine pipeline from the Sha Chau Fuel Receiving Facility to the airport. The EIA will consider both a shorter pipeline option connecting to Sha Chau and a longer alternative, requiring the burial of six additional kilometres of new subsea pipeline, connecting direct to the western side of the airport platform. The alternative pipeline routing options are shown in Attachment 2.

18. Although the shorter pipeline option to Sha Chau would require approximately 400 metres of new pipeline within the Marine Park, EIA results to date indicate that the shorter pipeline would result in significantly reduced overall environmental impacts and is therefore the preferable option, as shown in Attachment 3. The connection to Sha Chau is also preferred on operational grounds.

19. Presentations on the initial findings of the EIA study have now been made to the Country and Marine Parks Board and the Marine Parks Committee regarding the pros and cons of each pipeline routing option. The Marine Parks Committee had no objection in principle to the shorter pipeline option connecting into the existing AFRF, pending confirmation of the initial findings in the EIA report. A further presentation to the Country and Marine Parks Board will be undertaken early next year.

20. The Authority is committed to undertaking a thorough and robust EIA in full compliance with all requirements of the EIA Ordinance and the study is now well underway. Apart from conducting the EIA study, a Marine Traffic Impact Assessment as well as submissions required under the Foreshore and Seabed Ordinance and planning permission from the Town Planning Board under Section 16 of the Town Planning Ordinance will also be undertaken.

### **Way Forward**

21. The Authority remains committed to expediting the completion of a PAFF and is now fast-tracking the development process so that Sha Chau can revert to an emergency back up facility as soon as possible.

22. Tuen Mun Area 38 has been demonstrated to be the best available environmental option; its development as a PAFF would allow fuel deliveries to commence by early 2006; it is technically feasible; and the location is compatible with other land uses/planned land uses in the vicinity. The general arrangement of the tank farm and jetty layout is shown on Attachment 4.

23. The Authority would like to come back for further consultation when the full results of the EIA are known, probably in April 2002.

**Airport Authority**  
**December 2001**

## Attachment 1

**COMPARATIVE ENVIRONMENTAL ASSESSMENT**

A "Goal Achievement Matrix Comparison" assessment approach was used, which allowed Tuen Mun Area 38 and Sham Shui Kok to be evaluated by the numerical 'scaling' and 'weighting' of a set of environmental criteria. Environmental criteria were defined as a "Balanced Weighing Set" for both the construction and operational stages with relative importance being assigned to each individual criterion.

Assessment criteria used for the construction and operational phase assessments were grouped as follows: -

Construction Phase

- (i) Air Quality
- (ii) Noise
- (iii) Water Quality
- (iv) Ecology
- (v) Landscape and Visual
- (vi) Cultural Heritage

Operational Phase

- (i) Air Quality
- (ii) Noise
- (iii) Water Quality
- (iv) Ecology
- (v) Risk
- (vi) Landscape and Visual

Some of the above criteria were further subdivided into several 'definable items', for example for the construction phase, noise was sub-divided into 'above ground noise impacts' and 'underwater noise impacts' and for these cases, weighting proportions were also defined. The scores for each definable item were added to give a combined score for each criterion. Criteria weightings were then adjusted to increase the importance of each criterion in turn against the others, by way of "sensitivity tests".

***Construction Phase Results***

The results of the construction phase comparison of the site options, using the balanced set of weightings, are shown in Table 1. The weighting column shows the level of importance defined for each criterion as a percentage. The score column shows the value for each criterion as a combination of the values for each definable item. **Values which are low reflect a medium or high impact. High values reflect a low impact.** A comparison of the overall scores for each site shows that Tuen Mun Area 38 is significantly preferred over Sham Shui Kok.

Table 1: Construction Phase Balanced Weighting

Criteria	Weighting (%)	Score for Tuen Mun Area 38	Score for Sham Shui Kok
Air quality	10	10.00	5.00
Noise	15	6.00	7.00
Water Quality	20	10.00	7.50
Ecology	30	8.38	4.25
Landscape and Visual	15	7.50	3.50
Cultural Heritage	10	6.00	4.00
	100%		
Score as weighted sum		8.14	5.25
Rank		1	2

Sensitivity tests were run to emphasise the importance of each of the environmental criterion in turn. In these, a weighting of 50% was given to the criterion being tested, with all other criterion assigned only a 10% weighting each. Finally a test was run with all criteria being given equal weighting. The results of the construction phase sensitivity tests are shown in Table 2.

Table 2: Construction Phase Sensitivity Tests

Sensitivity Test on each Criterion	Score for Tuen Mun Area 38	Score for Sham Shui Kok
Air quality	8.79	5.13
Noise	7.19	5.93
Water Quality	8.79	6.13
Ecology	8.14	4.83
Landscape and Visual	7.79	4.53
Cultural Heritage	7.19	4.73
Overall Weighting	7.98	5.21

### Operational Phase Results

The results from the operational phase comparison of the site options, using the balanced set of weightings, are shown in Table 3. Again, Tuen Mun Area 38 is clearly preferred over Sham Shui Kok.

Table 3: Operational Phase Balanced Weighting

Criteria	Weighting (%)	Score for Tuen Mun Area 38	Score for Sham Shui Kok
Air quality	5	10.00	7.50
Noise	10	10.00	7.50
Water Quality	15	10.00	7.50
Ecology	20	10.00	7.50
Risk	35	8.88	7.50
Landscape and Visual	15	8.50	4.50
	100%		
Score as weighted sum		9.38	7.05
Rank		1	2

Sensitivity tests were again run, adding emphasis to each of the environmental criteria against the others. The results of the operational phase sensitivity tests are shown in Table 4.

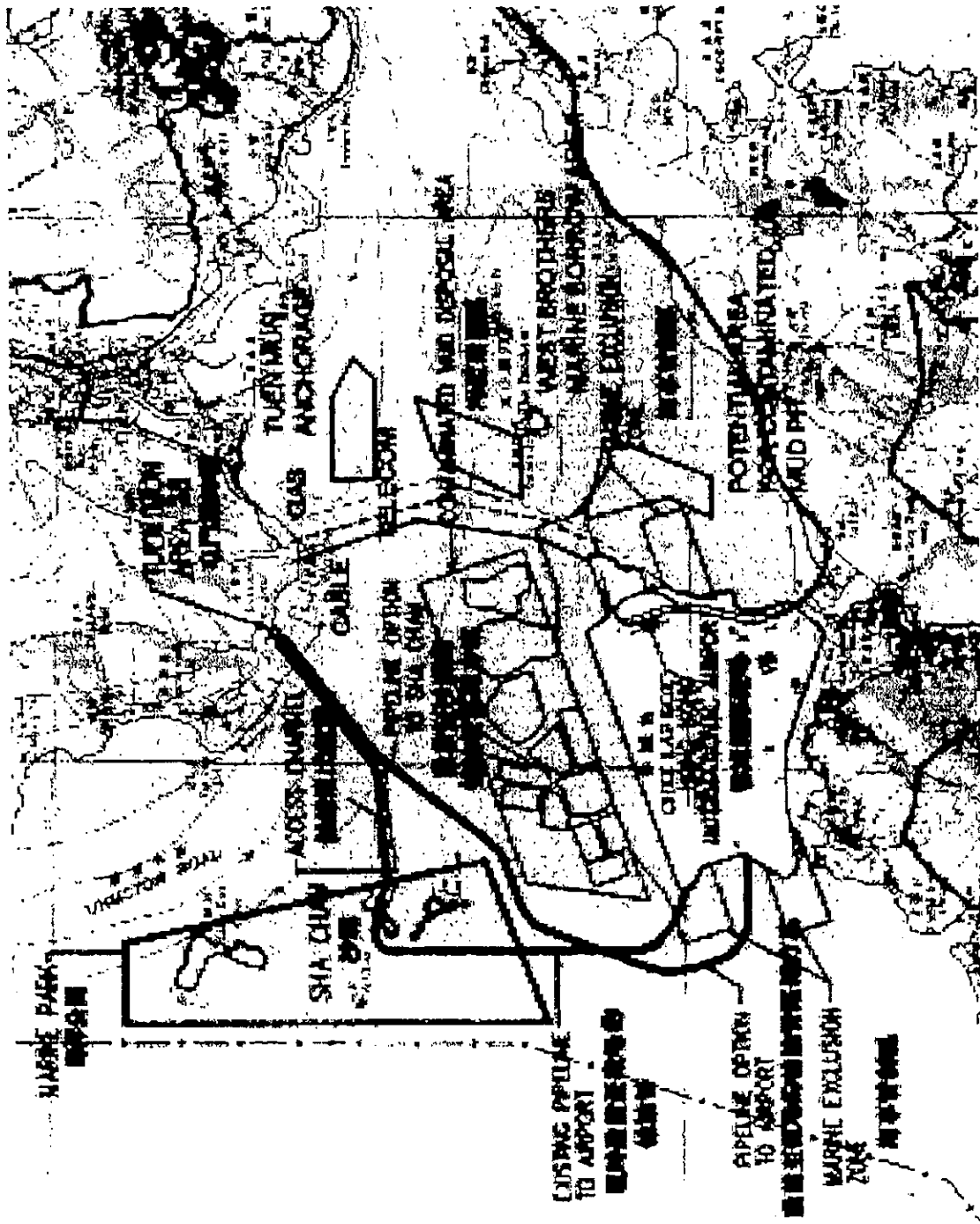
Table 4: Operational Phase Sensitivity Tests

Sensitivity Test on each Criterion	Tuen Mun Area 38	Sham Shui Kok
Air quality	9.74	7.20
Noise	9.74	7.20
Water Quality	9.74	7.20
Ecology	9.74	7.20
Risk	9.29	7.20
Landscape and Visual	9.14	6.00
Overall Weighting	9.56	-7.00

### *Conclusion*

The results of the comparative assessment are conclusive, showing that even when high weightings are attached to each environmental criterion, Tuen Mun Area 38 is still preferred over Sham Shui Kok in every case at both the construction and operational phases.

# Attachment 2 - Pipeline Routing Options







## Attachment 3

## Summary of Pipeline Route Options 1 and 2

		Pipeline Route from Tuen Mun Area 38		
Factors		to AFRF at Sha Chau (Option 1)	to Airport (Option 2)	
1. Physical Factors				
<ul style="list-style-type: none"> <li>• Length</li> <li>• Length within Marine Park</li> <li>• Volume of Dredging (cubic metres)</li> <li>• Duration of Pipelaying</li> <li>• Cost Estimate (HK\$million)</li> </ul>	<ul style="list-style-type: none"> <li>~4.8 km</li> <li>~400 m</li> <li>~360,000</li> <li>~50 days</li> <li>~200</li> </ul>	<ul style="list-style-type: none"> <li>~11.2 km</li> <li>nil</li> <li>~835,000</li> <li>~100 days</li> <li>~400</li> </ul>		
2. Potential Environmental Impacts				
2.1 During Construction	<ul style="list-style-type: none"> <li>• Indo-Pacific Humpbacked Dolphins</li> <li>• Ecology</li> <li>• Marine Archaeology</li> <li>• Contaminated Mud Pits</li> </ul>	<ul style="list-style-type: none"> <li>Base Case</li> <li>Base Case</li> <li>Base Case</li> <li>No Disturbance</li> </ul>	<ul style="list-style-type: none"> <li>More than double that of the Base Case</li> <li>More than double that of the Base Case</li> <li>More than double that of the Base Case</li> <li>Potential Disturbance</li> </ul>	
2.2 During Operation	<ul style="list-style-type: none"> <li>• Normal operations</li> <li>• Maintenance dredging needed at Sha Chau?</li> </ul>	<ul style="list-style-type: none"> <li>No impact</li> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>No impact (but barges would still need to visit the AFRF)</li> <li>Yes</li> </ul>	
3. Operational Aspects	<ul style="list-style-type: none"> <li>• Method of replenishing fuel in pipeline</li> <li>• Use of PAFF tanks for storage during emergency</li> <li>• Affects operation of airport during construction?</li> </ul>	<ul style="list-style-type: none"> <li>Not required</li> <li>Yes</li> <li>No</li> </ul>	<ul style="list-style-type: none"> <li>Achieved by barges to Sha Chau every 6 weeks or so</li> <li>No</li> <li>Yes</li> </ul>	
4. Overall Preference		Preferred	Not preferred	