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**(ACE Paper 24/2005)**
***For advice***

# Report on the 93rd Environmental Impact Assessment Subcommittee Meeting

## Introduction

At its meeting held on 22 September 2005, the Environmental Impact Assessment (EIA) Subcommittee considered the EIA report on Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung.

## Advice Sought

2. Members are requested to advise whether the EIA report on Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung should be endorsed without condition.

## Views of the EIA Subcommittee

**EIA report on Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung** (ACE-EIA Paper 5/2005)

Need for the project

3. Golf is becoming a very popular sport in Hong Kong and the demand for golf course is on the rise. According to the project proponent, the Hong Kong Jockey Club (HKJC), there is a heavy demand on the Kau Sai Chau Public Golf Course. The average utilization rate per year is 80% and almost 100% utilization of tee-times was recorded on weekends and public holidays. By increasing the economy of scale in using the existing supporting facilities, the new golf course would be able to generate cash for establishing a new Kau Sai Chau Development Fund to finance new services for the benefit of the people of Hong Kong.

Description of the project

4. The project is to construct a new 18-hole golf course to the southeast of Kau Sai Chau adjoining the existing golf course (Fig. 1). The proposed site is currently unzoned and comprises an approximately 300 m wide and 1.5 km long strip of undulating scrubland. The site is bounded to the west by steep rugged uplands and

incised valleys and to the south and east by steep rocky coastline. North of the site is the existing golf course which occupies the northern half of the island. The proposed turfed area is about 20 hectare. The project comprises the following key items of works -

(a) 18 hole golf course (6 holes would be inside the existing golf course area) (Fig. 2);

(b) a closed low flow drainage system including storage tanks and irrigation lakes/ponds to retain surface runoff from 16 holes;

(c) a filter system to intercept surface runoff from holes 5 to 6 prior to discharge to the existing man-made wetland;

(d) a desalination plant to supplement irrigation water;

(e) expanded sewage treatment works at the existing golf course site (from 150 $m^3$ to 225 $m^3$/d); and

(f) a temporary barging point during construction.

Members' views

5. Members noted that the proposed project was an extension of the existing public golf course. In the mid-1990s, a public golf course was proposed by the HKJC at Kau Sai Chau for providing a recreational golf facility with the effect of restoring the land degraded by its use as an artillery range. The first 18-hole golf course was opened to the public in late 1995 and followed by a second 18-hole golf course, a driving range and associated supporting facilities nine months later. The EIA report of the existing golf course had been discussed by the EIA Subcommittee and Advisory Council on the Environment in 1994.

6. Members noted that an increase in biodiversity at the existing golf course site was recorded after its opening and natural succession of habitat and flora was also observed due to protection of habitats from fire. Members noted that the Environmental Protection Department (EPD) had received three returns of public comments up to the date of the Subcommittee meeting but all of them had no comments on the EIA report. The meeting agreed to focus the discussion mainly on land contamination, turf grass management, water quality impact, protection of streams, transplanting of corals and visual impact.

*Land contamination*

7. On the potential problem of land contamination, Members noted with concern that based on the preliminary site investigation results in the EIA report, the site area contained hotspots of contamination of lead and sulphur. The project proponent team explained that most part of Kau Sai Chau was used as an artillery range between

1930's to 1970's. To assess the potential land contamination problem, samples from seven locations were taken by means of random sampling focusing on scarred and exploded area. The contamination levels of these hotspots would be further assessed during the construction stage. A preliminary contamination assessment plan (CAP) had been drawn up to provide guidelines for the land contamination assessment during the construction stage. The contractor would be required to carry out further investigation and submit a CAP to EPD for endorsement prior to the commencement of site investigation work. The contractor would be required, for example, to sweep the area of intended excavation with a metal detector to check any ordnance underneath the ground prior to any excavation. Based on the CAP, the contractor would conduct a contamination assessment and compile a contamination assessment report (CAR) to document the findings and extent of contamination for approval by EPD. If the findings confirmed that the site was contaminated, a remediation action plan (RAP) would be required. These would have to be completed before any development could take place.

8. Regarding the boundary of the historical artillery range, the project proponent team said that based on information gathered and those provided by the Police Force, the core artillery range mainly located in the existing golf course area but the exact boundary could not be identified. The site of the existing golf course was found heavily eroded and a detailed investigation was conducted 10 years ago. Nevertheless, no unexpected ordnances were found during the construction process which involved the overturning of over 1.5 million $m^3$ of soil and rock. Only one abandoned ordnance was found in the existing site during a survey conducted in early 2001 after the issue of the EIA study brief for the current project. On the whole, no evidence of soil contamination was detected in the existing golf course. With the experience of about a decade, no major or insurmountable problems were found in relation to land contamination.

9. The project proponent team noted Members' concern that the parameters used in the preliminary site investigation were mainly heavy metal and sulphur. The team explained that the area was used as an artillery range about 30 years ago. Heavy metal and sulphur were identified as potential sources of contaminants, such as bullets, gun powder, residues of exploded or buried ordnance, at that time. Members agreed that historical review was important in determining the parameters but they suggested the project proponent consider the need to widen the scope of parameters such as toxic organics in the future land contamination assessment and conduct more research on similar cases in overseas countries.

10. Members noted that as in other potential land contamination cases, the Environmental Permit for this project would clearly specify the requirement for the project proponent to conduct a land contamination assessment and submit a RAP if the site was confirmed to be contaminated. The Permit would specify the targets to be achieved and that any identified contaminated land would have to be remediated to the acceptable standards prior to site clearance or excavation works. Members suggested and the project proponent team agreed to conduct a detailed land contamination assessment and study and put in place a RAP for potential contaminated problems.

Moreover, the authority should take necessary actions to ensure the remedial and mitigation measures, if any, would be properly implemented.

*Turf grass management*

11. Members noted the efforts made by the project proponent to maintain a turf grass management plan but hoped that there would be continuous improvement with a view to reducing the application of chemicals. The project proponent team explained that it was part of their commitments to improve the turf grass management techniques over the past decade. The proposal of using Seashore Paspalum, which had a much lower fertilizer and water requirement, in the new golf course was an example. Another example was the significant reduction in the use of nitrogen for fertilization in the existing golf course. The level of nitrogen used had been reduced from 4.6 kg/100$m^2$ in 1997/98 to 3.3 kg/100$m^2$ during last year which was expected to be further reduced to 2.6 kg/100$m^2$ per year in the new golf course after the use of Seashore Paspalum.

12. On the turf grass management plan, the project proponent team said that the Kau Sai Chau Public Golf Course maintained updated information on turf grass management techniques through their regular contacts with international associations such as the Certified Audubon Cooperative Sanctuary for Golf Courses and the Golf Course Superintendent Association of America. The team assured Members that the turf grass management plan would be updated and applied with a certain degree of flexibility by taking into account the availability of better, more safe and environmental-friendly products in the market. Members suggested and the project proponent team agreed to minimize and review the application of chemicals on the turf grass having regard to the technology available in the market. The team also noted that the Subcommittee would like to receive progress reports on the continuous improvement plan of the turf grass management every three years.

13. Regarding Members' suggestion to extend the proposals of turf grass management in the new site, such as the use of Seashore Paspalum, to the existing golf course, the project proponent team explained that it would be their long-term plan to improve the quality of turf grass in the existing golf course. However, the existing course would be due for large-scale renovation after being used for about 15 to 20 years. They would take advantage of the new technology available at the time of renovation. To meet the heavy demand of the public, it was necessary for the new golf course to be completed before the renovation work at the existing golf course could start.

*Water quality impact*

14. On the water quality impact, the project proponent team explained that they had been conducting water quality monitoring on a quarterly basis in four fresh water stations within the golf course and five marine stations. The results all satisfied the water quality objectives. There would be continuous water quality monitoring during the construction and operation phases of the extension project. The monitoring reports would be submitted to EPD for endorsement.

15. Regarding Members' concern about the potential runoff during rainstorm events, the project proponent team explained that the proposed closed low-flow drainage system was a closed drainage system designed for storm events up to a 1 in 2-year storm event. Under the proposed system, the sub-surface drainage system would drain and divert surface run-off from the golf course to a system of underground storage tanks and irrigation lakes. The storage facilities would hold the surface run-off from the golf course temporarily. Runoff collected in the underground storage facilities would be pumped to a proposed irrigation buffer from where overflow would be directed into the existing reservoir for irrigation purpose. The drainage system would be a conservative and preventive approach to collect, recycle and reuse the golf course runoff.

16. Regarding storm events larger than a 1 in 2-year event, the project proponent team explained that the storm drainage system including pipes and catchpits connecting to the underground storage tanks and lakes were designed to cater runoff for a 1 in 50- year storm event. Thus, there would not be direct overflow from the golf course when there was severe rainstorm. The controlled overflow points would be at the underground storage tanks, lakes and reservoir by which overflow would be discharged direct to the sea with no overflow to any natural stream course.

17. The project proponent team noted Members' concern about the level of chemical concentration in the cumulated overflow to the marine water. The team explained that the storage tanks and lakes of the drainage system was designed to contain events up to a 1 in 2-year return period and would capture the first flush on all events. As residual chemicals on the turf grass would be washed away during the first flush, the chemical concentration of runoff during more severe rainstorms would be much lower due to larger flows and the fact that the first flush would have been retained. Thus, no water quality impact on marine water was expected for storm events even larger than a 1 in 2-year event. Based on the monitoring results and predictions conducted, the water quality, even for storm events larger than a 1 in 2-year event, would satisfy the water quality objectives. Moreover, the monitoring data collected since the opening of the golf course showed that all the pesticides concentrations were below the level of detectable limit for all existing freshwater and marine monitoring locations. With the use of Seashore Paspalum in the new golf course, the requirement of fertilizers and pesticides would be much lower. Members suggested and the project proponent team agreed that they would closely monitor the overall discharge of surface runoff of the site during the construction and operation phases, especially after heavy rainfall.

18. On the provision of sewage treatment facility for domestic discharge of about 500 workers during the peak period of construction phase, the project proponent team explained that the exact type of treatment facility had not been fixed at this stage. The options included the provision of onsite treatment facilities or discharging of sewage to public sewage plants. They agreed to ensure that the contractor would take account of the possible impact of domestic discharge on the four marine fish culture zones near the site when designing any sewage treatment facility. Regarding the sludge produced by the expanded sewage treatment plant, the project proponent team explained that the existing mechanism in handling the sludge in licensed disposal places would

continue to be adopted for the expanded facility which would be able to cope with the increased demand.

*Protection of streams*

19. On the protection of steams, the project proponent team noted Members' concern about the impact of sediment loads on the streams during the construction phase as the streams were rather small and damages caused would be irreversible. The team explained that there were three streams inside the proposed site. One stream was of a lower ecological value as it had been affected by siltation from the nearby area and the other two streams were more natural with shrimp species (Caridina trifasciata) recorded in the middle courses. To protect the shrimp species, the design of the golf course had been changed to avoid the streams where these shrimp species were found and to prevent all golf course runoff from entering any stream.

20. On the impact of construction works, the project proponent team explained that buffer zones would be provided for all sensitive streams to reduce disturbance during both the construction phase as well as the operation phase. It would be one of the major tasks for the environmental team to frequently check the intactness of the buffer zones. No construction activities would take place except for laying of underground pipe culverts at stream sections of lower ecological value. Pre-cast concrete bridges would be used for permanent stream crossings to minimize works required near the streams. Based on the construction programme, the southern part of the new golf course near the streams would be constructed first within the dry season and would be covered by newly planted turf grass to prevent the problem of sedimentation during the later stage of construction works. Members suggested and the project proponent team agreed that they would exercise care when building any structure on or across the streams during the construction phase to minimize potential impact on the ecology of the streams. Moreover, construction works near the stream courses would be scheduled to avoid wet season as far as possible.

*Transplanting of corals*

21. On the transplanting of corals, the project proponent team explained that corals found near the site for the desalination plant would be transplanted to the bedrock at about 80 m south of the existing pier where coral communities were also recorded. The corals found were all common species, small in size and scattered on isolated boulders. Among the 79 coral colonies found, all of them were smaller than 30 cm and about 60% of them were smaller than 10 cm. The transplanting process would be conducted manually by putting the boulders into baskets with floating bags. The impacts from the transplantation process on the water quality in the vicinity would be minimal. Water quality assessment had been conducted which indicated that the bedrock would be suitable for coral transplanting. Similar transplanting exercises had been conducted successfully in Hong Kong. As the coral colonies were only moved by about 80 m, potential impact on the fish colonies feeding on the corals would be minimal.

*Visual impact*

22. On Members' concern about the visual impact from the sensitive receiver groups of the general public, in particular from the Sai Kung country parks and High Island Reservoir, the project proponent team explained that majority of the visual sensitive receiver groups were located at distances longer than 1 km away from the development and Sai Kung country parks were quite far away (about 1.2 to 1.5 km). The closest place from the public's point of view would be the fishing village in Tai Tau Chau and the visual impact would be minimal. The team pointed out that partial restoration of eroded scars or slopes would be carried out in the extension project which would have significant beneficial impacts on the landscape resources.

*Other issues*

23. On Members' concern about the potential off-site environmental impact such as the Sai Kung market due to the increased number of patrons after the completion of the extension project, the project proponent team explained that the estimated maximum increase of golf players was about 220 per day for 18 holes. Taking into account some additional visitors, the maximum increase was estimated to be about 300 per day. The increase would be within the current capacity of ferry service which ran at about 20 minutes intervals from the Sai Kung pier. Thus, the disturbance to the Sai Kung market or nearby area would be minimal.

24. Members suggested the project proponent consider promoting environmental education, such as by green procurement, publicity programmes and building of education centers in the site, with a view to establishing an environmental-friendly golf course as golfing was often associated with the use of pesticides and chemicals. With the natural environment and scenery of the island, the project proponent could consider launching programmes and activities which would benefit not only golf players but also the general public. The project proponent team explained that they had been putting much effort to environmental education in the past years which had also help ease the misunderstanding that golf courses were not environmental-friendly. They had organized a series of educational and outreaching programmes for students and the public. The golf course had recently been certified by the Audubon International as a "Certified Audubon Cooperative Sanctuary" under the Golf Course programme, for being an environmental-friendly golf course. With the establishment of the Kau Sai Chau Development Fund and further liaison work with relevant parties, more activities would be launched and more services would be provided on environmental education for the benefit of the general public.

Conclusion

25. Having regard to the findings and recommendations of the EIA report, the meeting agreed to recommend the report to the Council for endorsement without condition. The meeting also made the following recommendations and suggestions -

(a) the project proponent should conduct a detailed land contamination assessment and study and put in place a RAP for potential contaminated problems. The authority should take necessary actions to ensure the remedial and mitigation measures, if any, would be properly implemented;

(b) the project proponent should minimize and review the application of chemicals on the turf grass having regard to the technology available in the market. The Subcommittee would like to receive progress reports on the continuous improvement plan of the turf grass management every three years;

(c) the project proponent should closely monitor the overall discharge of surface runoff of the site during the construction and operation phases, especially after heavy rainfall;

(d) the project proponent should exercise care when building any structure on or across the streams during the construction phase to minimize potential impact on the ecology of the streams. Construction works near the stream courses should be scheduled to avoid wet season as far as possible; and

(e) the project proponent was encouraged to consider promoting environmental education, such as by green procurement, publicity programmes and building of education centers in the site, with a view to establishing an environmental-friendly golf course.

**EIA Subcommittee Secretariat**
**September 2005**