Relevant Extract of the draft minutes of
the Environmental Impact Assessment Subcommittee meeting
held on 13 February 2023

EIA reports on –
(i) Establishment of Fish Culture Zone (FCZ) at Wong Chuk Kok Hoi (WCKH);
(ii) Establishment of FCZ at Outer Tap Mun (OTM);
(iii) Establishment of FCZ at Mirs Bay (MB); and
(iv) Establishment of FCZ at Po Toi (Southeast) (PT(SE))

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Question-and-Answer Session (Open Session)

1. A Member was supportive of the modernisation and sustainable development of local fisheries industry and considered that the proposal should be taken forward as soon as possible. Mr Patrick Lai responded that the project proponent targeted to commence the legislative procedures for amending the FCZ (Designation) Order (Cap. 353B) by 2023 and subsequently grant new licences to operators after obtaining the Environmental Permits for the projects. Mr Lai shared that the total size of all existing FCZs in Hong Kong was about 200 hectares (ha) and the four proposed FCZs would amount to about another 600 ha. The projects were expected to bring a significant growth in local fish supplies.

FCZs Operation

2. In response to two Members' enquiry on the mode of operation, Mr Patrick Lai said that private operators would be required to submit business proposals for the application of marine fish culture licence. Eligible operators might apply for financial assistance from the Sustainable Fisheries Development Fund of AFCD. In view of the high start-up cost, Mr Lai added that the government would explore the possibility of setting up several modernised steel truss cages and other types of deep-water cages in the proposed FCZs for renting to fishermen associations or organisations to lower their start-up cost. Funding to set up such hardware would be subject to the approval of the Finance Committee of the Legislative Council.

3. Highlighting that the water quality of the four proposed FCZs was amongst the best in Hong Kong, three Members expressed concern over possible malpractices of operators and inappropriate use of the FCZs for other purposes. They suggested to impose stringent control to ensure that the operation of the FCZs would not

adversely affect water quality and marine ecology. Mr Patrick Lai indicated that the operators would be required to submit a business proposal on the fish farm operation for AFCD's vetting. Only those operators with a proposal fulfilling the requirements would be granted a license. During the operational stage, there would be a monitoring mechanism to ensure compliance with the licensing requirements. Violators might be subject to prosecution and their licenses might be revoked. On renewal of licenses, the performance of the operators including their fish yields would also be taken into consideration.

4. A Member viewed that self-reliance in food supply was important. He remarked that measures should be taken to ensure the high-quality fish yields of the proposed FCZs were to be consumed locally. Mr Patrick Lai was confident that the fish yields of the four FCZs could be consumed locally as local aquaculture production only contributed about 1% of the total fisheries product consumption in Hong Kong.

5. On a Member's enquiry, Mr Patrick Lai advised Members that the fish cages would be about 6 m to 7 m deep from the sea surface and there would be sufficient space between the cages and the seabed to avoid the accumulation of organic matter and the need for regular maintenance dredging.

6. Noting the very high construction cost of the proposed fish farm structures and steel truss cages, the Chairman shared that modernised deep-water cages could be an alternative with much lower construction cost although the latter would be of shorter lifespan and smaller sizes. He suggested that the project proponent should provide comprehensive information on the different options available with their pros and cons for the potential operators' consideration. Mr Patrick Lai responded that the small-scale deep-water cages would require a separate structure such as a barge to support their operation. As the proposed modernised fish farm structure would be more sustainable and eco-friendly, the operators would be solicited to deploy the proposed structure. On the financial side, Mr Lai projected that the operators should normally manage to pay back the capital cost in around 5 years. With an expected lifespan of about 25 years for steel truss cages, he considered that the FCZ operation should be financially viable.

Water Quality and Marine Ecology

7. A Member was concerned about the conservation of coral communities, Finless Porpoise and amphioxus. She considered that conservation measures

should be devised to protect the near-threatened coral communities in the long run. Mr Raymond Chow explained that in selecting the locations of the proposed FCZs, marine ecological surveys had been conducted to avoid locations with coral communities of high conservation value. Computer modelling indicated that there would be no adverse water quality impact and thus the corals should not be affected by the operation of the FCZs.

8. A Member and the Chairman suggested that the project proponent should draw references from the experiences of other places and put in place measures to boost coral populations such as through deploying artificial reefs beneath the fish rafts / cages. Mr Raymond Chow responded that it would be difficult to deploy artificial reefs in the FCZs due to their offshore soft-bottom locations with high current speed. Having said that, Mr Chow opined that the fish farm structures themselves would serve as artificial substrates which could bring potential benefits for marine ecology.

9. The Chairman suggested that the colour of the fish farm structures should be compatible with the surrounding natural environment. A Member further suggested and echoed by the Chairman that there should be control on the use of non-toxic coating materials for fish farm structures and steel truss cages in order to avoid adverse impact on the water quality and marine ecology. Mr Patrick Lai agreed that relevant requirements on the coating or painting materials could be included in the specifications for the fish farm structures.

10. Responding to a Member's question, Mr Raymond Chow advised that red tide occurrences in the four locations were rare in the past ten years, which could be attributed to the deep waters with high water circulation in the areas.

11. Pointing out that the Dissolved Oxygen (DO) level and Total Inorganic Nitrogen (TIN) level would exceed the criteria stipulated in the Water Quality Objectives (WQO) in some locations, a Member enquired about the mitigation measures. Mr Raymond Chow responded that the TIN level of the PT(SE) site was within the acceptable range for mariculture operation according to the national standard. As for the DO level in WCKH, while the depth-averaged 10th percentile level would occasionally exceed the criteria, he stressed that the DO level in the fish rafts / cages near the water surface was within the suitable range for mariculture.

12. A Member sought more details on the baseline level of nitrogen and phosphorous as well as the discharge of wastewater in the vicinity of the PT(SE) site.

Mr Raymond Chow indicated that the closest wastewater discharge would be over 2.5 km away from the project site and it was projected that the water quality of the FCZ would not be affected. With reference to the Member's suggestion on the provision of detailed DO level at different depths of the FCZs, the Chairman shared that there should be a monitoring programme on the DO level of different depths in the environmental monitoring and audit (EM&A) programme. In response to the Chairman's enquiry, Mr Chow explained that the DO and TIN levels mentioned in the EIA report were the projected depth-averaged values whereas the limit levels in the EM&A Manual were set out in accordance with the WQO for the purpose of water quality monitoring during the operational phase. In any event of exceedance, the operators should take appropriate mitigating actions.

13. Pointing out that the use of aeration to increase the DO in the water would incur high energy consumption, carbon emissions as well as operating cost, a Member suggested the provision of the relevant information to the operators so that marine species with suitable DO tolerant level could be selected. Mr Raymond Chow explained that among the four locations, only the DO level of WCKH FCZ might be occasionally slightly lower than the set limit. The operators would only deploy aeration when needed.

14. A Member further enquired about the scope of modelling simulation of the water quality impact and marine ecology outside the project boundary. Mr Raymond Chow replied that the modelling simulations for the MB, WCKH and OTM FCZs covered a large assessment area including Tolo Channel, Sai Kung area and Kwo Chau Islands whereas that of the PT(SE) FCZ reached as far as the Hong Kong Island. The simulations showed that the organic matters would be dispersed and even water sensitive receivers within a few hundred meters of the FCZs would not be affected.

15. Given that particles such as organic matters and food wastage would drift away from the fish farms, the Chairman pointed out that particle tracking modelling should be utilised to analyse their movement pathways with a view to monitoring sediment accumulation outside the fish farms. Mr Patrick Lai concurred with the Chairman that sediment monitoring could be incorporated in the EM&A programme.

16. Noting that the modelling simulations were calculated based on the assumption of 25% of food wastage, the Chairman pointed out that some species such as groupers had higher food wastage rate and suggested the project proponent to take into account the feeding habits of different species to minimise food wastage.

Mr Patrick Lai remarked that AFCD would share with the operators the relevant experiences gained in the demonstration farm in Tung Lung Chau.

17. A Member and the Chairman suggested to put in place appropriate reporting mechanism and guidelines to handle the adverse impact of invasive species such as Sabah Groupers on the local marine ecology in case of fish escape incidents. Mr Patrick Lai advised that due consideration would be given in selecting the appropriate marine species for the fish farms. To minimise the chance of fish escape incidents, he added that the fish cages would be made of durable and weather resilient materials. The operators would be required to report any incidents of fish loss to AFCD. Mr Lai advised Members that appropriate guidelines and requirements would be included in the license or operational manuals for mariculturists. The Chairman opined that the manuals to be provided to the mariculturists should be simple and easy-to-understand which could base on the relevant manuals published by the Food and Agriculture Organization of the United Nations (e.g. *Understanding and Applying Risk Analysis in Aquaculture*, FAO Papers 519 and 519/1).

18. Two Members highlighted the importance of proper usage and dosage of pharmaceutical products and disinfectants in the fish farms so as to avoid adverse impact on water quality and marine ecology. The Chairman suggested that there should be control on the handling of dead fishes as mariculturists often disposed of them in the sea. A reporting mechanism should be in place for problems such as outbreak of fish diseases and local veterinary institutions or experts should be consulted in such cases. Mr Patrick Lai advised that AFCD had been liaising with the City University of Hong Kong on the provision of veterinary advice on fish disease management as well as the usage of pharmaceutical products. One of the above Members commended the use of smart data management and suggested that the project proponent should make good use of the real-time data in collaboration with local institutions for analysis and studies of the correlations between operational and environmental parameters including water quality.

Carbon Emissions

19. A Member suggested and Mr Patrick Lai agreed that more durable materials should be used to reduce embodied carbon and to extend the lifespan of the fish rafts / cages. To achieve carbon neutrality, another Member added that carbon reduction measures, such as through using low-carbon materials, local production for the fish farm structures, renewable energy in marine vessel traffic as well as proper treatment of the fish farm structures at the end of their lifespan, should be adopted. Mr Lai

indicated that the consumption of local fish supplies would contribute to the reduction of carbon footprint in comparison with imported fisheries. He highlighted that in the Tung Lung Chau Demonstration Farm, 95% of the energy required for operating the fish farms would be met by renewable energy such as solar and wind energy. Mr Lai added that the project proponent would liaise with the operators to minimise carbon emissions by minimising marine transportation.

20. A Member enquired if there would be any positive environmental impact in relation to the proposed projects. Mr Patrick Lai considered that the proposed FCZs might bring positive impacts to the fisheries resources due to the reduction in capture activities in the proposed 600 ha FCZs, though further studies might be needed to collect the relevant data in the operational phase.

Conclusion

21. There being no further questions from Members, the Chairman thanked the project proponent team for their presentation and clarification. Mr Patrick Lai thanked Members for their valuable comments which would be taken into consideration in the projects.

(Three Members left during the Q&A Session while the presentation team left the meeting at the end of this session.)

Internal Discussion Session (Closed-door Session)

22. The Chairman advised Members that the EIASC could make recommendations to the ACE on the four EIA reports such as -

(i) endorse the EIA report(s) without condition; or
(ii) endorse the EIA report(s) with conditions and / or recommendations; or
(iii) defer the decision to the full Council for further consideration, where issues or reasons for not reaching a consensus or issues to be further considered by the full Council would need to be highlighted; or
(iv) reject the EIA report(s) and inform the project proponent of the right to go to the full Council.

23. The Chairman proposed and Members agreed to endorse the four EIA reports with conditions and recommendations.

24. A Member was concerned about the risk of inappropriate use of the fish farms and the adverse impact associated with the invasive species that might be reared in the FCZs. Another Member suggested that AFCD should keep in view of the need to impose control or guidelines on the marine species to be reared in the fish farms having regard to the ecosystem protection. Three other Members were of the view that there might be difficulty to impose control on the species to be reared as the operators would need to consider profits in their business. Another Member and two of the above Members suggested that appropriate monitoring mechanism such as real-time surveillance should be deployed to ensure the proper operation of the farms as well as for research purposes. The Chairman explained that real-time monitoring data of basic water quality parameters would be available within the fish rafts / cages whereas manual data collection would be required outside the fish farm.

25. In response to a Member's suggestion on assisting mariculturists to sell their fish products, the Chairman said that AFCD had implemented the Accredited Fish Farm Scheme to help local mariculturists increase the competitiveness of their products by the Scheme branding. Another Member added that it might be useful for AFCD to issue guidelines on the ratio for local sale and export of the fisheries.

26. A Member suggested the adoption of visual image technology to record the fish farm operations which might help future analysis and research. Another Member enquired about the possibility of extending the surveillance to bird foraging activities in the site. Dr Jackie Yip responded that based on the EIA study, no adverse impact on birds was anticipated as there should be no migratory birds in the area. Surveillance on birds was thus not relevant to the project. Dr Mak Yiu-ming added that it would be unlikely for sea birds to eat the fishes in the rafts / cages based on previous experience.

Condition and Recommendations

27. In the light of the discussions made, the Chairman suggested and the meeting agreed to –

(a) impose a condition to require the project proponent to devise a Sediment Monitoring Plan (the Plan) to be incorporated in the EM&A programme. The Plan should identify appropriate locations for sediment monitoring by grab samples based on modelling simulations for tracking the particles flow, and propose monitoring parameters and frequency with a view to monitoring any potential impacts on sediment quality of the seabed due to sediment deposits caused by the project. The

Plan should be submitted to the DEP for approval before commencement of construction of the project; and

(b) recommend the project proponent to:

(i) explore ways to achieve carbon neutrality in the project such as through the use of renewable energy in the operation of the FCZs as well as the marine transportation involved, as well as low-carbon but durable materials for constructing the fish rafts / cages;

(ii) seek veterinary advice on the appropriate usage and dosage of any pharmaceutical products including prescription drugs and disinfectant for diseases so as to minimise potential impacts on water quality and marine ecology;

(iii) deploy non-toxic and eco-friendly coating materials for fish raft / cage so as to minimise potential impacts on water quality and marine ecology; and

(iv) explore the use of big data as well as technologies such as satellite images and video image analytics for real-time surveillance and monitoring with a view to ensuring compliance with licensing requirements and to supporting related research and analysis.

28. There being no other comments from Members, the meeting agreed that the EIA reports could be endorsed by ACE with one condition and four recommendations. The project proponent team would not be required to attend the subsequent full ACE meeting.

*(Post-meeting notes: The list of proposed condition and recommendations was circulated to Members for comment on 16 February 2023. A Member further expressed concerns on the potential impact on the environment which could be brought by the economic activities and eco-tourism of the project on 6 March 2023. The project proponent provided their written responses on 9 March 2023, which were attached at **Appendix**, for Members' consideration.)*

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EIA Subcommittee Secretariat
March 2023

Appendix

Supplementary Information for EIASC Meeting on 13 Feb 2023
Fish Culture Zone (FCZ) Projects: Economic activities and Eco-tourism

Potential impact and corresponding mitigation measures on the environment

As presented in Section 2.1 of the EIA Report, the main purpose and objective of the FCZ projects are to provide opportunities to develop newer type of deep-water mariculture, create room for the mariculture sector to grow further and attract new entrants, potentially allowing capture fishermen to switch to a ***sustainable*** mode of operation. On-site economic activities will be restricted to mariculture related operations and transportation of fisheries produce. AFCD, as the authority of the Marine Fish Culture Ordinance (Cap. 353), will only grant licenses to the licensees who have financially viable mariculture plan and adopt good site practice to minimize impacts on the environment. Traditional cages on rafts (e.g. raft built of timber) and recreational fishing will ***not*** be permitted in the new FCZs. There will be no facilities to support on-site living at the new FCZs. AFCD will specify license conditions such that each and every licensee has to follow the necessary requirements to minimise impacts on the environment. AFCD will conduct regular inspections and review on FCZ operation to determine appropriate use of the licensed area and consider the renewal of licenses where applicable. Performance criteria will be monitored and audited for the mariculture operations to ensure the appropriate use of the licensed area and the implementation of proper fish farm management. In case a licensee does not comply with the license conditions, the license may be suspended or revoked.

While eco-tourism is not the objective of the project, guided visits and educational field studies may be organised to the modernised mariculture farms in the new FCZs for promoting sustainable mariculture development.

Unlike traditional fish farms in Hong Kong, the four proposed FCZs are situated in more remote and deeper waters to support the more advanced type of deep-water mariculture in line with the international standards and practice. Stringent assessment and management measures are adopted to ensure the environmental sustainability / benefits of the projects, including:

- Site selection for sustainable mariculture has been conducted with reference to international guidelines (e.g. the Food and Agriculture Organization (FAO). The four proposed FCZs have avoided encroaching into ecological sensitive

receivers (e.g. marine parks, coral habitats of high ecological value and areas of high fisheries importance) to avoid impacts to marine ecology and fisheries. The new FCZ sites are also located at remote area to minimise impacts on air quality, noise, and visual sensitive receivers.

- The proposed FCZ locations are situated in deeper waters with higher flushing rate to facilitate water circulation to avoid accumulation of pollutants that may affect fish health, thus minimizing impacts on water quality and marine ecological and fisheries resources of the surrounding environment. Organic content is also not built up on the seabed and maintenance dredging and sediment removal are therefore not required for FCZ in deep waters, and the associated water quality impacts and related ecological and fisheries impacts can be avoided.
- The modernized mariculture farms are weather-resistant and durable to withstand strong waves and surges to reduce general / floating refuse on the sea and can effectively reduce impact of fish escape on local ecology and fisheries and offsite impact as a result of fish cage relocation due to adverse weather.
- Only pellet feed or alternative feed with better feed conversion ratio will be allowed at the proposed FCZs. This could effectively reduce organic loading due to feed wastage, and reduce potential transmission of parasitic and infectious disease which in return may cause organic loading due to fish carcasses and dead fish arising from the fish culture operation;
- Use of technology (e.g. real-time surveillance and water quality monitoring, renewable energy sources such as solar and wind) and automation (e.g. fish feeder) at FCZs to reduce labour intensive activities, hence reduce potential disturbance to ecology and environment from feed wastage, workforce wastes, vessel trips, etc.;
- The carrying capacity (i.e. maximum standing stock level) for each FCZ has been estimated using computational model and mariculture operation will only be permitted within the maximum standing stock level to control potential water quality impacts to acceptable levels. AFCD will ensure the production scale of the Project site will not exceed the maximum standing stock level by controlling the mariculture production scale permitted under individual license.

Impact assessment has been conducted to assess the key environmental impacts from setting up of FCZs and their operations, including water quality, marine ecology, fisheries, waste management, visual, air quality, noise and cultural heritage. Environmental protection measures and mitigation measures are recommended to further minimise impacts during construction and operation phases. The details are discussed in the EIA Reports. The summary of environmental impacts and mitigation measures is provided in Table 5.1 of the Executive Summary for each FCZ. The key mitigation

measures are extracted as follows:-

- Water quality, Ecology and Fisheries
  - Any sewage / wastewater generated should be collected at the transportation / work vessel(s) for disposal at appropriate facilities on land.
  - AFCD will ensure the production scale of the Project site will not exceed the maximum standing stock level by controlling the mariculture production scale permitted under individual license.
  - In case of potential circumstances (e.g. red tide event, outbreak of fish disease), the licensees will review the need of fish raft relocation and propose the fish raft relocation plan as necessary for agreement with AFCD.
  - Only pellet feed or alternative feed with better feed conversion ratio will be permitted within the proposed FCZ.
  - No chemically-laden solution from culture gears disinfection should be discharged into the sea.
  - Littering of the sea should be prohibited.
  - Avoid construction and operation works at areas identified with high density of amphioxus.
- Waste Management
  - Provision of sufficient waste disposal points and regular collection for disposal.
  - Regular removal of organic wastes within the licensed area with proper storage using enclosed containers and dispose at the nearest accessible FEHD refuse collection points with public pier.
  - Regular clearance and disposal of waste to avoid odour and litter impact.
  - Use of properly designed fish cages/ rafts with no sharp turns or abrupt indentation to minimise trapped or accumulated floating refuse.
  - The uneaten feeds should be cleaned up immediately to minimise leaching to the adjacent water.
- Visual
  - The new structures will be designed in accordance with relevant marine safety standards and regulations. Sensitive architectural design will be considered where practicable. This should take into account material texture, colour, finishes to structures to ensure the fish rafts / cages blend into the existing context, cause least disturbance to the existing seascape, and are the most visually appealing.
  - Light intensity and beam directional angle should be controlled at the Project site at the design stage to reduce light pollution and glare (e.g. hooded lights, specific directional focus, etc.).

- Cultural Heritage
    - A buffer area of 20m radius from the identified sonar contacts to avoid any tug boat anchoring and anchoring of the fish rafts / cages in the area.

Environmental Monitoring & Audit (EM&A) mechanisms have been recommended to verify the accuracy of the EIA predictions to ensure the effectiveness of the recommended mitigation measures. AFCD will appoint an Environmental Team and Independent Environmental Checker to implement the EM&A Programme to verify that appropriate environmental protection and pollution control mitigation measures are properly implemented in accordance with the EIA. Water quality monitoring will also be conducted under the EM&A Programme to confirm no unacceptable change in water quality at the nearby water sensitive receivers. AFCD will also conduct regular mariculture water quality monitoring and set up real-time water quality monitoring equipment at the FCZs to closely monitor the water quality. AFCD may also organise guided visits to modernised mariculture farms in the new FCZs for educational purpose.

With the project designs and mitigation measures in place, the projects would be environmentally viable and in compliance with the relevant assessment standards / criteria of the EIAO-TM. They will also contribute to the sustainable development of Hong Kong's mariculture as well as the heritage of our fisheries sector.

Agriculture, Fisheries and Conservation Department
March 2023