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26 November 2020

Clerk to Finance Committee  
Legislative Council Secretariat  
Legislative Council Complex  
1 Legislative Council Road  
Central, Hong Kong

[Attn: Ms Anita SIT, Clerk to Finance Committee]

Dear Ms SIT

**Views from the Hong Kong Institution of Engineers  
on Studies Related to Artificial Islands in the Central Waters**

On behalf of the Institution, I am pleased to present to you our views and suggestions as set out in the enclosure for your kind consideration on the captioned subject.

With our expertise and experience, the Institution welcomes the opportunity to work with the Government on areas of concern for the benefits of the profession and the general public as a whole.

Thank you.

Yours sincerely



Ir Prof P L YUEN  
President

Enc

PLY/CKH/EK/SW

Enclosure

**Legislative Council  
Finance Committee**

**Views from the Hong Kong Institution of Engineers on  
Studies related to artificial islands in the Central Waters**

**INTRODUCTION**

The Hong Kong Institution of Engineers (HKIE) has expressed support to the Lantau Tomorrow Vision (“Vision”) since the announcement of the Vision in the 2018 Policy Address and advocated to pursue detailed studies related to forming artificial islands in the Central Waters to provide more scientific information and facilitate public consumption and deliberation. The HKIE has submitted views from the engineering perspective on the Government’s proposed “Studies Related to Artificial Islands in the Central Waters, Lantau Conservation Fund and Work Progress of the Sustainable Lantau Office” (“Studies”) to the Legislative Council (“LegCo”) Panel on Development on 25 March 2019 when the subject matter was about to be discussed by the Panel. Such views comprised our various suggestions on the related technical and environmental issues, land use and transportation network planning. We acknowledge and also welcome the endorsement of the funding proposal for the Studies by the Public Works Subcommittee in May 2019. The HKIE considers the Vision will prove to be strategically important to the sustained long-term development of Hong Kong. We therefore look forward to the approval of the funding proposal by the Finance Committee so as to facilitate early commencement of the Studies which is conducive to addressing various issues of concerns raised by members of public.

**LAND SUPPLY**

2. Shortage of developable land has been a severe challenge to Hong Kong for years. This has been affecting not only the social and economic development, but also the quality of living of the people of Hong Kong. We note the establishment of the Task Force on Land Supply (TFLS) in September 2017 to review and evaluate land supply options, conduct public engagement exercise and make related recommendations. In its report entitled “Striving for Multi-pronged Land Supply”<sup>1</sup> published in December 2018, the TFLS pointed out categorically that the Government’s estimated land shortage of 1,200 hectares was grossly conservative.

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<sup>1</sup> “Striving for Multi-pronged Land Supply”, Report of the Task Force on Land Supply, Chapter 2.  
Retrieved from: [https://www.devb.gov.hk/filemanager/en/content\\_1171/Report%20\(Eng\).pdf](https://www.devb.gov.hk/filemanager/en/content_1171/Report%20(Eng).pdf)

3. The HKIE echoes the Task Force's recommendation of using multi-pronged approach to increase land supply and the eight land supply options for priority of implementation. Amongst the various land supply options, we attach great importance to reclamation for artificial islands which can create a significant source of new land capable of being developed into new towns and/or business areas no different to those built in the last century for addressing the mounting demand for housing, social, commercial and other development needs in the long run. The newly created land of around 1,000 hectares on artificial islands is expected to generate housing supply of about 150,000 to 260,000 units together with about 200,000 sqm of commercial development. It is envisaged that the more abundant land supply arising from the Vision can help create sizable and livable environment for our community, especially for our younger generation. We also note that 70% of these units are for public housing (i.e. 105,000 to 182,000 units) and this will serve to alleviate the situation of housing shortage particularly for lower income families<sup>2</sup>.

4. Land formed from reclamation is free from the administratively and legally arduous land resumption processes involving compensation and rehousing arrangements for affected landowners, households and businesses. With a sizable amount of virgin land made available, it allows adequate flexibility of adopting innovation and technology and full deployment of smart and sustainable initiatives in a holistic planning manner for building up liveable communities based on smart city concepts. One can also practise important visions not feasible now such as development of near carbon-neutral pilot zones, adoption of smart, blue and green and resilient measures, providing decanting space to support large-scale urban redevelopment and alleviating the dense population in the urban area. Given that 24.5% of the 270 km<sup>2</sup> developed land in Hong Kong is created through reclamation, including the Hong Kong International Airport and the new towns, we believe that Hong Kong is fully equipped with the necessary expertise and experience in accomplishing large scale reclamation projects. We are also mindful that presently many tonnes of construction and demolition materials are being shipped daily to Taishan, Mainland for lack of reclamation sites in Hong Kong. When these can be used locally as reclamation materials for the artificial islands, carbon emissions arising from such deliveries to the Mainland can be eliminated as well as huge saving can be achieved on reusing these resources locally.

5. Moreover, as an important corollary of the reclamations, it enables planning for a more strategic transportation network between the metropolitan central area and the western parts of Hong Kong and hence with various municipalities of the

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<sup>2</sup> The blog of Mr. WONG Wai-lun, Michael, JP, Secretary for Development (2019) "Lantau Tomorrow Vision." Retrieved from: [https://www.devb.gov.hk/tc/home/my\\_blog/index\\_id\\_330.html](https://www.devb.gov.hk/tc/home/my_blog/index_id_330.html).

Greater Bay Area via the Hong Kong-Zhuhai-Macau Bridge and Kong Sham Western Highway. More importantly, the proposed strategic rail link and road corridor could offer great relief to the existing West Rail and strategic highways such as Route 3 and Tsing Ma. It can be perceived that the transport links will help to soothe the loading of traffic flow in the Northwest New Territories and improve the general performance of the transportation networks of the whole territories, and thereby releasing land development potential along the coastal areas at Tuen Mun.

## **NEEDS FOR UNDERTAKING THE STUDIES**

6. The HKIE notes the growing apprehension about the huge construction costs of implementing the Vision with such a scale and complexity. We note that this mega-scale project will last a long period of time, i.e. 10 to 15 years, and will be implemented in phases. The relevant construction cost of the Vision, with a ballpark estimation of \$624 billion (in the price level of September 2018), would be expended across the entire period of construction in a level manner, representing approximately \$40 to \$50 billion each year<sup>3</sup>. However, with the outbreak of COVID-19 pandemic and its impact on the global economic environment, concerns on the Special Administrative Region's financial capability is well recognised. The Government is suggested to conduct detailed assessments on the financial and social risks against benefits that may be generated including incomes from land sales, provision of developmental areas for education, recreation or innovation endeavours purposes with a view to fostering consensus among different sectors of the community and communicating with the general public.

7. On the more technical front, despite that reclamation of artificial islands may necessitate higher construction cost and technical complications relative to near-shore reclamation projects arising from the longer sea walls and the deeper water depth, such obstacles are not new to Hong Kong and can be addressed by conducting a comprehensive survey of the marine seabed geology for allowing selection of the most cost-effective and feasible method of reclamation while maintaining environmental friendliness and resilience against severe weather. More detailed study could be proceeded along this direction.

8. Environmental impact of the Vision is no doubt another major concern of the public, in particular to the potential impacts on marine ecology. The HKIE notices that the Government has identified the maritime area around the future reclamation site of the Kau Yi Chau (KYC) artificial island as ecologically less

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<sup>3</sup> The blog of Mr. WONG Wai-lun, Michael, JP, Secretary for Development (2019) "Lantau Tomorrow Vision." Retrieved from: [https://www.devb.gov.hk/tc/home/my\\_blog/index\\_id\\_330.html](https://www.devb.gov.hk/tc/home/my_blog/index_id_330.html).

sensitive area in comparison with the nearby maritime space and based on this identification, the west of KYC was designated as a dumping ground previously, and the waters to the north, east and south of KTC are currently being utilised as vessel's anchorage areas. The Government is suggested to further confirm this identification by the ecology studies yet to be undertaken. We also welcome the policy directives of "Conservation to precede Development" being advocated and suggest the Government to retain the existing natural shorelines of relatively higher ecological value as far as possible and establish eco-shorelines at artificial islands if situation warrants. The accumulated experience gained on eco-shoreline design shows that it would not only serve for ecological conservation but also enhance biodiversity and promote water friendly culture and leisure enjoyment by the local community.

9. The HKIE attaches great importance to control impact of engineering projects on the environment and support the Government to conduct full scale Environmental Impact Assessment (EIA) studies for the artificial islands and related infrastructure pursuant to the stipulations in the EIA Ordinance which provides a comprehensive, scientific, objective and transparent assessment mechanism to control any negative influence to the environment. All reclamation projects should strictly follow the statutory EIA assessment process, and where necessary, mitigation measures should be introduced accordingly.

10. The HKIE is aware that there are safety concerns among the public on the susceptibility of the artificial islands to storm surge arising from climate change. In fact, the location of the proposed artificial islands is not in an open sea and therefore the impact of tide and storms is expected to be similar to the other islands of Hong Kong. It is worth mentioning that the maximum storm surge (above astronomical tide) induced at Quarry Bay was recorded as 2.35 metres during the time when Typhoon Mangkhut hit Hong Kong in September 2018<sup>4</sup> which is still below the height of the current reclaimed land formation which is in general 6 metres above the Principal Datum. Furthermore, well proven engineering techniques such as building higher sea walls or placing wave breakers or planning a wider leisure promenade along the seafront would be some of the feasible measures to address these concerns on wave impact. As to promoting scientific and objective discussions on this subject, experts of various engineering disciplines in the HKIE are willing to offer solutions and prevention measures on marine, coastal, geotechnical, drainage and infrastructure for strengthening the public confidence in this regard.

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<sup>4</sup> HKSAR Government (2018) "Press Release: A September marked by strike of Mangkhut." Retrieved from: <https://www.info.gov.hk/gia/general/201810/03/P2018100300711.htm>.

11. To reach collective consensus among the general public on pursuing the Vision, the Government is suggested to conduct all-rounded preliminary and detailed studies covering fiscal, environmental, safety, and all other relevant engineering aspects in order to facilitate a well-informed decision-making process based on scientific and objective information. Additionally, a continuous monitoring and reporting mechanism about the development of the Vision should better be established by the Government for the purpose of informing and engaging various stakeholders and parties.

### **CONSERVING LANTAU**

12. The HKIE appreciates the endeavours by the Administration to remain on an environmentally protective path whilst pressing ahead with infrastructure development by establishing the \$1,000 million Lantau Conservation Fund (LCF). We understand that the LCF is designed for providing financial incentive so as to engage landowners with fragmented ownership, non-governmental organisations, and locals in championing conservation initiatives which could serve the purposes of conserving habitats and cultural assets by strengthening infrastructural support and offering community education on awareness of environmental conservation. The HKIE believes that revitalisation of areas like Pui O and Tai O is important to the overall development of the Vision as it embraces cultural and ecological conservation and integrating them into the infrastructural and economic development in the region.

13. In terms of sustainability, the HKIE proposes adoption of sustainable construction methodology in taking forward engineering projects under the Vision. There can be many examples along this front. Adopting Building Information Modelling (BIM) to generate and manage building data throughout the entire assets life cycle from design, construction to operation will facilitate project management and communication with relevant stakeholders for better risk management, and more particularly in the aspect of conservation. Maximising the use of Modular Integrated Construction (MIC) and components manufactured using the Design for Manufacture and Assembly (DfMA) method will help in minimising construction waste; improving safety at work; and reducing site operations which could generate environmental nuisance. Apart from construction aspects, we also recommend the Government to start conceiving long-term decarbonisation strategies for the new communities established under the Vision. Ideas like carbon emission reduction in building operations; encouragement to using electric vehicles; better management of waste recycling, recovering and reuse etc. should be explored. We believe the common expectation is that future communities to be established shall be sustainable, smart and green.

## CONCLUSION

14. The HKIE, as the unique professional organization championing engineering excellence, maintains her staunch support to the Vision for reason of its long term benefit to Hong Kong. We believe that with the progressive completion of various studies in the pipeline, more scientific data and assessment would become available so that there could be better informed and more rational deliberations on both the feasibility and cost-effectiveness of this strategic initiative which will affect many generations to come. The HKIE with her large pool of engineering expertise, stands ready to assist the society in making decisions on the way forward. Apart from helping to overcome any technical challenges, we can offer advice and assistance to resolve differences of all concerned in maintaining the right balance among economic development, environmental conservation and social acceptability for a better future of Hong Kong.