MOTT MACDONALD

Ocean Park Tai Shue Wan Water World Project

Operation Phase Monthly EM&A Report October 2022

November 2022

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Mott MacDonald Hong Kong Limited
registered in Hong Kong no. 236497

This Operation Phase Monthly EM&A Report for October 2022 has been reviewed and certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC) as having complied with the requirements as set out in the EM&A Manual in accordance with Condition 3.4 of Environmental Permit No. EP-487/2014/A.

Certified by: 

Gary Chow
Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date: 14 November 2022

Verified by: 

Mandy To
Independent Environmental Checker (IEC)
ERM-Hong Kong Limited

Date: 14 November 2022

Information class: Standard

Contents

Executive summary

Mott MacDonald Hong Kong Ltd. (“MMHK”) has been commissioned by the Ocean Park Corporation to undertake the Environmental Team (ET) services to carry out environmental monitoring and audit (EM&A) for the operation phase of Ocean Park Tai Shue Wan Water World (the Project).

This is the 12th Monthly EM&A Report for the operation phase of the Project summarising the findings on EM&A during the period from 1 to 31 October 2022, and is submitted under the Environmental Permit (No. EP-487/2014/A).

Environmental Monitoring and Audit Progress

A summary of the operation phase monitoring activities during the reporting period is listed as below:

- Monitoring of the Ecological Enhancement Area (monthly): 17 October 2022
- Landscape and visual monitoring (bi-monthly): completed in September 2022

Completion of Operation Phase Environmental Monitoring

Monitoring of the Ecological Enhancement Area, landscape and visual measures for one year of operation phase have been completed by the end of October 2022.

1 Introduction

1.1 Background

On 27 August 2014, the Environment Impact Assessment (EIA) Report and Environmental Monitoring and Audit (EM&A) Manual (Register No.: AEIAR-184/2014) for the "Tai Shue Wan Development at Ocean Park" (the Project) was approved and an Environmental Permit (EP) (Permit No.: EP-487/2014) was issued to the Ocean Park Corporation (Project Proponent). Based on the Application for Variation of Environmental Permit No. VEP-539/2017, the current valid EP (Permit No.: EP-487/2014/A) was issued on 10 January 2018. The location and layout of the Project are presented in **Appendix A**.

Upon the completion of construction of the Project in May 2021 and the approved termination of construction phase EM&A programme in July 2021, the Water World opened on 21 September 2021. Mott MacDonald Hong Kong Ltd. ("MMHK") has been commissioned by the Project Proponent to undertake the Environmental Team (ET) services to carry out operation phase EM&A for the Ocean Park Tai Shue Wan Water World Project.

Under the requirements of Section 3 of EP and the EM&A Manual, environmental monitoring of ecology, landscape and visual are required for one year during operation phase. This is the 12th Operation Phase Monthly EM&A Report summarising the monitoring results for the Project during the reporting period from 1 to 31 October 2022. As the required one-year operation phase environmental monitoring was completed in this month, this is also the last Monthly EM&A Report for operation phase.

1.2 Project Organisation

The project organisation and the contacts of key personnel of the Project are shown in **Appendix B.**

1.3 Environmental Status and Programme

The current monitoring is under the operation phase of the Project with all construction activities completed, thus there were no construction works involved.

Monitoring of ecological enhancement area was conducted with a monitoring programme for once per month for 12 months during operation phase.

Landscape and visual monitoring was conducted with a monitoring programme for once in bi-monthly intervals throughout the 12-month establishment period in operation phase.

Submissions required under the EP that were approved by the EPD and deposited to the EIA Ordinance Register Office are as listed below:

- Detailed Vegetation Survey Report
- Woodland Compensation Plan
- Ardeid Inspection Report
- Short-nosed Fruit Bat Inspection Report
- Baseline Monitoring Report
- Ecological Enhancement Plan
- Visual and Landscape Plan
- Detailed Design Report for the Sewerage Facilities
- Noise Audit Report
- Updated Woodland Compensation Plan

2 Monitoring of Ecological Enhancement Area

2.1 Monitoring Requirement

As required under the Section 8.3.2.4 of the approved EM&A Manual and the approved Ecological Enhancement Plan under EP Condition 2.8, the Ecological Enhancement Area (EEA) should be monitored monthly after establishment, for one year during operation phase to check the effectiveness of the setting.

Direct observation and counting of ardeids was made from a vantage point (i.e., point count method) at the evening time from an hour before sunset, and last until the nightfall. Before conducting point count survey, the EEA was also inspected and searched for any ardeids, other birds or faunal groups utilising the habitat. Any aggregation of night roosting ardeids in the EEA or adjacent area would be located, and the ardeid species would be identified and counted throughout the monitoring. Moreover, day roost of Black-crowned Night Heron in the EEA or adjacent area would also be recorded if any.

2.2 Monitoring Findings

Monitoring of the EEA was undertaken on 17 October 2022. The condition of vegetation in the EEA was generally well-maintained, while the pond was also maintained with suitable water level and continuous water inflow (see **Figure 2.1**). The EEA was inspected, but no ardeids or day roost of Black-crowned Night Heron were found in the EEA. Few individuals of Black Kite (*Milvus migrans*) were observed soaring over the area. Other bird species observed in the EEA include Chinese Bulbul (*Pycnonotus sinensis*), Red-whiskered Bulbul (*Pycnonotus jocosus*) and Swinhoe's White-eye (*Zosterops simplex*). Butterfly species Plain Tiger (*Danaus chrysippus*), Common Tiger (*Danaus genutia*) and Blue Tiger (*Tirumala limniace*) were recorded within the EEA (see **Figure 2.2**). Apart from that, a group of Short-nosed Fruit Bat (*Cynopterus sphinx*), which is a species listed as “Near Threatened” in Red List of China's Vertebrates (Jiang *et al.,* 2016)[1], was observed roosting under Chinese Fan-palms within the EEA (see **Figure 2.3**), which echoes the findings of the Short-nosed Fruit Bat Inspection Report submitted prior the construction phase.

Figure 2.1 General view of the freshwater pond and vegetation in the EEA

[1] Jiang, Z. G., Jiang, J.-P., Wang, Y. Z., Zhang, E., Zhang, Y. Y., Li, L.L., Xie, F., Cai, B., Cao, L., Zheng, G. M., Dong, L., Zhang, Z. W., Ding, P., Luo, Z. H., Ding, C. Q., Ma, Z. J., Tang, S. H., Cao, W. X., Li, C. W., Hu, H. J., Ma, Y., Wu, Y., Wang, Y. X., Zhou, K. Y., Liu, S. Y., Chen, Y. Y., Li, J. T., Feng, Z. J., Wang, Y., Wang, B., Li, C., Song, X. L., Cai, L., Zang, C. X., Zeng, Y., Meng, Z. B., Fang, H. X. and Ping, X. G. (2016). Red List of China’s Vertebrates. *Biodiversity Science, 24*(5): 500–551.

Figure 2.2 Butterfly species Plain Tiger (*Danaus chrysippus*) and Common Tiger (*Danaus genutia*)

Figure 2.3 Short-nosed Fruit Bat roosting on frond of Chinese Fan-palm

Point count survey was conducted covering the period from one hour before sunset until nightfall (16:53 to 18:18). Direct observation was made at the vantage point next to the EEA with an unobstructed view covering the EEA, seawall at Tai Shue Wan, Aberdeen Channel and a portion of the East Lamma Channel. The location of the vantage point is indicated in **Appendix C**. Throughout the monitoring period, no ardeids were noted roosting within or flying towards the EEA. Outside the EEA, an individual of Great Egret and an individual of Little Egret were flying towards the typhoon shelter.

2.3 Discussion

Conclusion of EEA monitoring

During the monthly monitoring of EEA between November 2021 to October 2022, no ardeids were seen utilising the EEA for roosting. Establishment of the EEA has not attracted any aggregation of night roosting ardeids.

Outside the EEA, ardeids were occasionally observed at the southern portion of Aberdeen Channel during the point count surveys. Little Egret and Great Egret were seen travelling towards the typhoon shelter or sometimes in the opposite direction, in singletons or in small groups. They were also observed perching or foraging at seawall and rocky shore of Tai Shue Wan or at the seawall at the opposite side of the Aberdeen Channel. Apart from that, Pacific Reef Heron and Black-crowned Night Heron were once recorded at the Tai Shue Wan rocky shore and the Ocean Park Tai Shue Wan Pier respectively. Overall, low ardeids activities were observed around the shore of Tai Shue Wan and the southern portion of Aberdeen Channel between November 2021 to October 2022.

Ardeid communities along Aberdeen Channel

As mentioned in the approved EIA Report, the roosting population of ardeids was temporarily hosted by Tai Shue Wan between the ardeids moved from Wong Chuk Hang in 2012 and established another major roosting site in wooded area at Ap Lei Chau waterfront in 2013. The night-roosting ardeids at Tai Shue Wan in autumn 2013 dropped to zero while around 400 ardeids were recorded at Ap Lei Chau at that time. In more recent records, the number of ardeids at Ap Lei Chau remained around 400 in 2018 and 2019 (AFCD, 2020[2]; MTR Corporation Limited, 2019[3]).

[2] Agriculture, Fisheries and Conservation Department (AFCD, 2020). Territory-wide Study on Roosting Sites of Ardeids in Winter 2019/20. Hong Kong Biodiversity, AFCD Newsletter Issue No.26, December 2020.

[3] MTR Corporation Limited (2019). South Island Line (East): Monitoring on the Implementation of Ecological Planting & Landscape Plan during 3-year Post-Planting Care and Maintenance Period - Final Monitoring Report.

In October 2022, a voluntary inspection of the ardeid night roost at Ap Lei Chau waterfront was carried out to confirm the latest status of this identified ardeid roosting site. Over 200 ardeids, including Little Egret and Great Egret, were observed arriving to the wooded area at Ap Lei Chau mostly from the west during sunset time for their night roost. The night roost location was the same as that previously recorded in the approved EIA Report and other studies. The number of ardeids recorded in October 2022 was similar to that reported in the monitoring report of South Island Line (East), where around 100 ardeids were recorded in October 2018 and the number increased to around 420 in December 2018 (MTR Corporation Limited, 2019). Therefore, it is considered that the current number of ardeids at Ap Lei Chau night roost in October 2022 was similar to the previous records. No significant drop in number of ardeids was observed and thus it is reasonable to infer that the impact of construction and operation of the Project on ardeid population at the Aberdeen Channel was minimal. This inspection finding also echoed the EIA findings that the ardeids have moved their roosting site from Tai Shue Wan to Ap Lei Chau since 2013 and already established a stable night roost there over all these years.

Discussion on the effectiveness of EEA setting

While ardeid roost was not observed within the EEA, it is considered not the issue of effectiveness of the EEA setting to ardeid species. While the planted trees and shrub species at the EEA were established and being maintained, overall vegetation in the EEA are observed diversified throughout the one-year monitoring period and the established EEA setting is considered suitable for ardeid roost.

It should be noted that ardeid night roosts are known to be highly dynamic and reasons behind relocation of roosting site is usually unknown. Apart from environmental factors, there might be some uncontrollable factors affecting ardeids in choosing and changing roosting sites. The sudden shift from Tai Shue Wan roost to Ap Lei Chau roost during the EIA study of this Project is an example. The other way round, even if an equivalently suitable site is provided near the existing roosting site, the ardeid population might choose to stay at the existing roosting site. This situation occurred in the South Island Line (East) project, in which no ardeids were observed utilising the compensatory planting area at the lower course of Wong Chuk Hang Nullah during the three-year monitoring period after the establishment. Similarly, while the EEA has been established into a suitable potential roosting site in terms of providing windshield, a pond and suitable landscape setting at waterfront location, the ardeid population which has already settled at Ap Lei Chau might not necessarily re-occupy Tai Shue Wan again. Nevertheless, it is concluded that the established EEA has provided suitable environmental settings to serve as an alternative roosting site for the ardeid population at Aberdeen Channel.

3 Landscape & Visual Monitoring

3.1 Monitoring Requirement

Landscape and visual mitigation measures for the operation phase are listed in Table 9.2 of the Approved EM&A Manual, while the detailed implementation plans are presented in the approved Visual and Landscape Plan.

According to Section 9.1 of the approved EM&A Manual, a Registered Landscape Architect (RLA), as a member of the ET team, would be responsible for monitoring the implementation of landscape and visual measures during the operation phase.

As required under the Section 9.5 of the approved EM&A Manual, all landscape planting shall be monitored bi-monthly during the first year of the operation phase to ensure proper establishment and its effectiveness as landscape and visual mitigation measures. The scope of the site audit during this 12-month establishment period in operation phase shall include the following:

- All necessary horticultural operations and replacement planting are undertaken throughout the 12-month establishment period to ensure healthy establishment.

Any observation of unsatisfactory horticultural maintenance works, failure of establishment of soft landscape or poor condition of established planting shall be recorded for Ocean Park operator to undertake any necessary actions to improve the conditions of the landscape planting.

3.2 Audit Summary

Landscape and visual site inspection was last conducted on 22 September 2022 and the 12-month operation phase landscape and visual monitoring was completed. No landscape and visual site inspection was conducted in this reporting period.

Throughout the monitoring period, the recommended landscape and visual mitigation measures for operation phase as provided in **Appendix D** were checked. In general, implementation of most of the landscape and visual measures was observed, except for the woodland compensation measures which is pending to be implemented during planting phase and post-planting phase in accordance with the approved Updated Woodland Compensation Plan.

Overall, the landscape planting of the Project has been well-established and properly maintained. There were some trees occasionally observed in poor health conditions or damaged by wild boar. Follow-up actions were observed in most cases where improvements in health condition or leaning issue were recorded. Replacement planting to replace trees in poor health condition was also observed. During the monitoring period, tree saplings of invasive species such as *Leucaena leucocephala* were observed on the green roof floor. Removal work of this invasive species was recommended once safety access was available.

4 Conclusions

Operation phase EM&A works including the monitoring of the EEA and the inspection of whip tree planting / maintenance were conducted in accordance with the EM&A Manual during the reporting period.

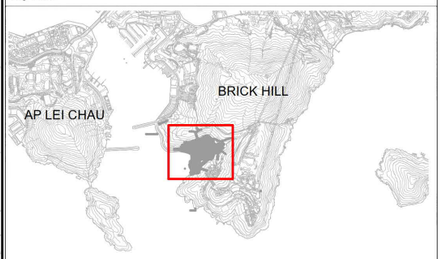
In this month of monitoring of the EEA, survey was conducted on 17 October 2022 covering the period from one hour before sunset until nightfall. No ardeids were noted roosting in the EEA, while a species of conservation importance, Short-nosed Fruit Bat, was observed within the EEA.

To conclude the one-year EEA monitoring between November 2021 to October 2022, although no ardeids were seen utilising the EEA for roosting while the ardeids were found staying at the Ap Lei Chau night roost, the vegetation and landscape of EEA has been established and the site has the potential to be an alternative ardeid roosting site.

For bi-monthly landscape and visual monitoring, the landscape establishment monitoring was completed in September 2022. Overall, the implementation of recommended landscape and visual mitigation measures were generally observed. The landscape planting of the Project is considered well-established throughout the monitoring period.

Appendix A Project Layout

Key Plan:



Notes:

Key to symbols:

LEGEND

PROJECT AREA

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 2021	KN		HL	GC

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Ocean Park Hong Kong 香港海洋公園

Project

TAI SHUE WAN DEVELOPMENT AT OCEAN PARK

Title

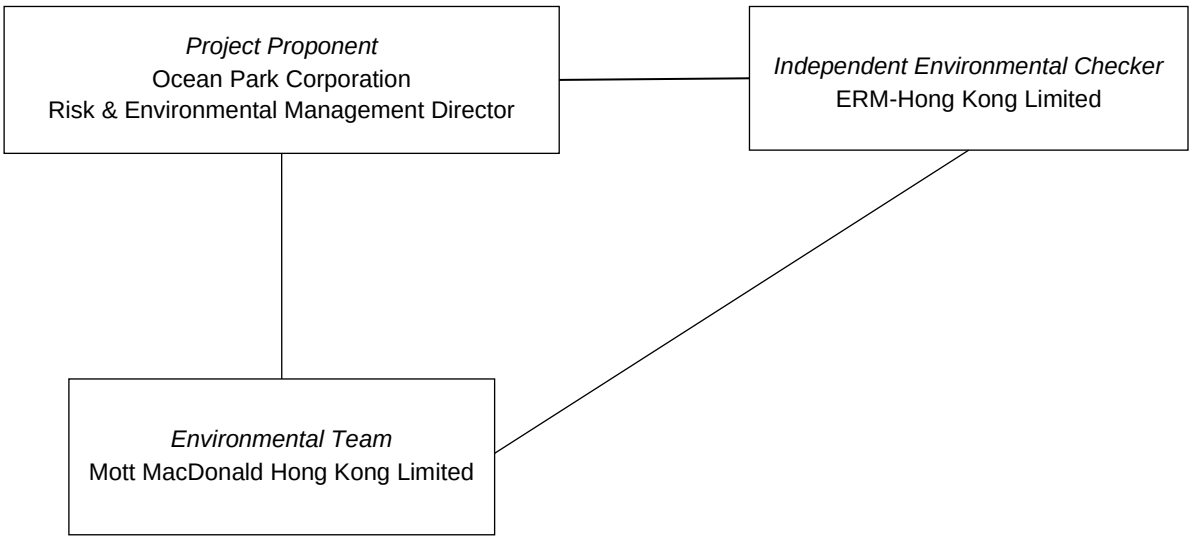
LOCATION OF THE PROJECT

Designed			Eng check		
Drawn			Coordination		
Dwg check			Approved		
Scale at A3		Status		Rev	

Drawing Number

FIGURE 1.1

Appendix B Project Organisation



Contact information

Company / Department	Position	Name	Telephone / Mobile	Fax No.
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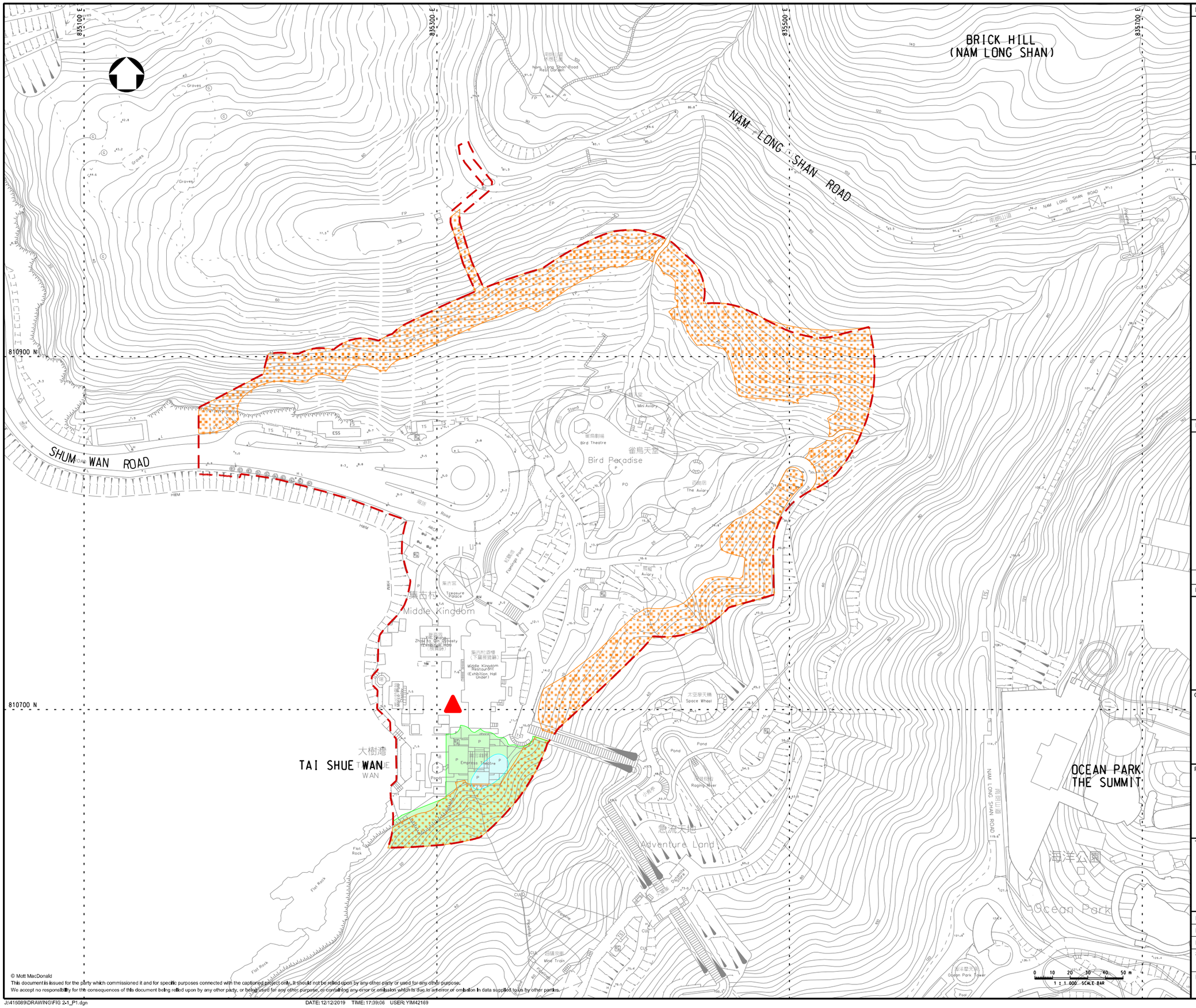
ERM-Hong Kong Ltd.	Independent Environmental Checker	Ms Mandy To	2271 3113	3015 8052
Mott MacDonald Hong Kong Ltd.	Environmental Team Leader	Mr Gary Chow	2828 5874	2827 1823

Appendix C Location of Vantage Point



Notes

Key to symbols

- PROPOSED PROJECT BOUNDARY
- PROPOSED WOODLAND COMPENSATION AREA
- PROPOSED ECOLOGICAL ENHANCEMENT AREA
- PROPOSED FRESHWATER POND
- PROPOSED VANTAGE POINT

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	DEC 19	MING	FIRST ISSUE	HY	EC

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Ocean Park Hong Kong 香港海洋公園

Project

TAI SHUE WAN DEVELOPMENT AT OCEAN PARK

Title

LOCATION OF VANTAGE POINT FOR MONITORING

Designed	HY		Eng check	HY	
Drawn	MING		Coordination	HY	
Dwg check	HY		Approved	EC	
Scale at A1	1:1000	Status	PRE	Rev	P1

Drawing Number

APPENDIX C

Appendix D Recommended Landscape & Visual Mitigation Measures for Operation Phase

Mitigation Code	Responsible Agent for Mitigation Implementation	Mitigation Measures
OP01	OPC via Contractor	**Sensitive Design and Disposition** • All proposed hard structures should be sensitively designed in a manner that responds to the existing and planned landscape context, and minimises potential adverse landscape and visual impacts. The structural design should seek to reduce the apparent visual mass through the use of natural materials such as wooden frame and semi-transparent panels. Subdued tones should be considered for the colour palette with non-reflective finishes to reduce glare effect. Site specific measures, such as the disposition of the key structures closer to the northern slopes, the design of building forms as extension along the existing slope topography, the use of concave roof form and the location of ride platforms on or near the slopes to minimise structural support, should also be considered for better integration with the surroundings and minimisation of potential visual impacts.
OP02	OPC via Contractor	**Compensatory Tree Planting** • Existing trees to be felled should be compensated as far as practicable. Native species should be proposed as far as practicable to re-create a native landscape, restore the ecological habitats and blend in with the existing native vegetation. A compensatory tree planting proposal should be submitted together with the tree removal application for approval by relevant authorities in accordance with LAO Practice Note No. 7/2007. It is recommended that approximately 608 heavy standard trees and approximately 18,202 whip trees***** could be planted on-site. The availability of off-site compensatory tree planting area is still subject to further investigation and agreement with relevant authorities.
OP03	OPC via Contractor	**Enhancement Planting** • Other than compensatory tree planting, additional trees, shrubs, groundcovers and lawn should also be considered to maximise greening within the redevelopment area.
OP04	OPC via Contractor	**Green Roofs and Vertical Greening** • Green Roofs and Vertical Greening should be provided where feasible and appropriate to screen and soften the hard edges of building structures.
OP05	OPC via Contractor	**Reprovision of Flamingo Pond** • A pond is recommended to replace the demolished Flamingo Pond as compensation for the loss of semi-natural ponds, where wildlife, such as birds, can utilise.
OP06	OPC via Contractor	**Responsive Lighting Design** • Overall lighting design would carefully consider a reasonable level of functional and thematic lighting with due consideration of possible light pollution and night-time glare to the surroundings. Consideration shall be made by the lighting designers to the following measures: - Lighting shall be designed with due consideration of mounting height and direction of light fixtures so as not to point directly towards any sensitive receiver. - Lighting shall be arranged with due consideration of reflectance so as to avoid glare effect. - Lighting shall be regularly monitored during operation. - Lights located adjacent or in proximity to neighbours shall be carefully designed to prevent possible light intrusion. - Lighting operation schedule shall specify only lights necessary for security to be left on after business hours. - Paving materials should be selected as necessary to reduce potential glare from surface reflectance. - Particular attention should be paid to the use of lighting having a high intensity or harsher tone (e.g. metal halide lamps). - Lights shall generally be models having precise cut-off range (such as full cut-off optics where available and practicable) and if necessary be fitted with adjustable anti-glare shields.
OP07	OPC via Contractor	**Woodland Compensation** • 1.53ha of affected woodland is recommended to be reinstated / compensated by 1.62ha of whip tree planting adjacent to the existing unaffected woodland and tall shrubland. Native species should be proposed as far as practicable to re-create a native landscape, restore the ecological habitats and blend in with the existing native vegetation.

***** With reference to the updated Tree and Preservation Removal Proposal, no. of heavy standard trees and whip trees should be 534 and 2,309 respectively.