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Figure 1.1 Location of Project

Figure 2.1 Project Layout

1 INTRODUCTION

1.1 Background

1.1.1.1 In June 2017, The Chief Executive in Council has agreed in principle to the government proposal to grant a piece of land in Tai Po to Sha Lo Tung Development Company Limited (the Project Proponent) in exchange for its private land in Sha Lo Tung which has high ecological values. Under the non-in-situ land exchange proposal, the piece of land at the Shuen Wan Restored Landfill in Tai Po will be granted to the Project Proponent for the development of a private golf course and the Sha Lo Tung site would be considered by government for active conservation management to avoid degradation and damage for long-term public enjoyment. This land exchange proposal is a unique, exceptional and isolated case, and is technically feasible as the private land ownership is largely unified under one entity and both Sha Lo Tung and the land at the landfill site, which has been planned for golf course development, are located in Tai Po.

1.1.1.2 When completed, the proposed 18-hole Shuen Wan Golf Course (the Project) will be the smallest (approximately 53 ha) in Hong Kong and is unique in its location on top of a restored landfill. Despite such physical site constraints and having taken on board the views of district councils and stakeholders wherever practicable, a number of environmental initiatives covering clean energy / energy saving, sponge design, waste minimisation and biodiversity / greening have been recommended for incorporation in the detailed design to enhance sustainability of the Project. Key environmental benefits and achievements of the Project include (Details refer to **Section 2.7**):

- Opportunity to realise the conservation of Sha Lo Tung;
- Minimal export of inert construction & demolition materials;
- No marine construction works;
- No discharge of first flush surface runoff to Tolo Harbour with the implementation of water storage tanks;
- No discharge from water storage tanks to Tolo Harbour;
- Optimal use of agrochemicals;
- Minimisation of fresh water consumption;
- Rehabilitation of landfill site landscape character;
- Reinstatement and enhancement of ex-landfill site planting areas;
- Maximise recycling of natural resources; and

- Ecological enhancements.

1.1.1.3 In November 2017, the Project Proponent commissioned Ove Arup & Partners Hong Kong Limited (Arup) to provide consultancy services in respect of Shuen Wan Golf Course (the Project). This consultancy also includes compilation and submission of an Environmental Impact Assessment (EIA) Report to fulfil the relevant legislative requirements.

1.1.1.4 The Project Profile (No. PP-558/2017) was submitted by the Project Proponent to Environmental Protection Department (EPD) for an EIA Study Brief under Section 5(1)(a) of the EIA Ordinance on 15 September 2017. The EIA Study Brief (EIA Study Brief No.: ESB-303/2017) was formally issued by EPD on 26 October 2017.

1.2 Site Location and History

1.2.1.1 The location of the Project is shown in **Figure 1.1**, with an area of approximately 53 ha. It is bounded by Ting Kok Road to the north, Tai Po Industrial Estate (TPIE) to the west and Tolo Harbour to the east and south.

1.2.1.2 The Project Site was once part of the Tolo Harbour before 1970s. Since the beginning of 1970s, the Shuen Wan Landfill was then progressively reclaimed at the Project Site. The landfill commenced its operation in Year 1973 and ceased operation in Year 1995. Subsequent to the closure of the landfill site, restoration works were implemented and the closed landfill now serves as a 145-bay golf driving range for public use since Year 1999. EPD has been operating the management system for landfill gas and leachate system and will continue after the operation of the Project.

1.3 Scope of the Project

1.3.1.1 The Project makes use of the existing driving range and transforms it into an 18-hole golf course. Alongside with the golf course itself, the Project also includes ancillary facilities which would house various supporting facilities for its daily operation (e.g. office, restaurants, changing facilities, carpark, plant rooms etc.). Furthermore, an internal access road with water storage tank beneath it has been planned under this Project.

1.3.1.2 Given the Project Site was a landfill site, the construction and operation of the Project has been properly planned to ensure that all the existing leachate, water and gas monitoring system are suitably modified to suit the requirements.

1.3.1.3 The Project comprises the following which is classified as a Designated Project (DP) as per Schedule 2, Part I of the EIA Ordinance.

- Item O.1 – An outdoor golf course and all managed turf areas.

1.4 Scope of this EIA Report

1.4.1.1 Pursuant to Section 5(7)(a) of the EIA Ordinance, the DEP issued a Study Brief (No.: ESB-303/2017 dated 26 October 2017) for the EIA study. This EIA study focused on assessing the potential impacts associated with the construction and operation of the Project, including the ancillary facilities and other supporting infrastructures in accordance with the Study Brief requirements.

1.5 Purpose of this Executive Summary

1.5.1.1 This Executive Summary (ES) highlights the key information and findings of the Shuen Wan Golf Course EIA Study.

2 PROJECT DESCRIPTION

2.1 Purposes and Objectives of the Project

2.1.1.1 According to Outline Zoning Plan (OZP) Plan No. S/TP/28, the piece of land at the Shuen Wan Restored Landfill in Tai Po has been zoned for use as “Other Specified Uses (Golf Course)”. Hence, the primary objective of the Project is to implement the prevailing landuse zoning as stipulated in the relevant OZP. The Project involves the construction and operation of an 18-hole golf course, serving both members and the public. The proposed golf course would be a sustainable and environmentally conscious golf course.

2.1.1.2 By implementing the prevailing landuse zoning as “Golf Course”, it would make a better use of the land which was once a landfill site and subsequently used as a driving range. This would also fulfil the aspiration from the district council to implement a golf course as soon as practicable.

“With” and “Without” the Project

2.1.1.3 With the implementation of the proposed Project, the ex-landfill with a temporary driving range will be turned into an 18-hole golf course. According to the traffic forecast, there would be an induced traffic of around 120 vehicles during peak hour due to the operation of the Project at Year 2024 (i.e. commencement year). This is equivalent to about 10% of that along Ting Kok Road.

2.1.1.4 As discussed in **Section 2.1**, while an existing temporary driving range has been being operated within the Project Site for some years, the Project Site has also been zoned as "Other Specified Uses" annotated "Golf Course" (OU(Golf Course)) on the Approved Tai Po OZP No. S/TP/28. Under this landuse zoning, "Golf Course" and "Golf Driving Range" as well as "Utility Installation ancillary to Golf Course/Golf Driving Range/Landfill Restoration Use" are always permitted (i.e. Column I uses).

2.1.1.5 Hence, the Project is to implement the prevailing landuse zoning as stipulated in the relevant OZP. This would also fulfil the aspiration from the district council to implement a golf course as soon as practicable.

2.1.1.6 By implementing the prevailing landuse zoning as “Golf Course”, it would make a better use of the land, which was once a landfill site and subsequently used as a driving range, including provision of sport facilities for the communities, long-term and environmentally

conscious management, opportunities to enhance biodiversity and landscape context through the introduction of various featuring landscape elements, etc.

2.1.1.7 If the Project is not proceeded, the intended landuse as golf course could not be materialised and probably would maintain as the existing driving range. This would not address the views from Tai Po District Council to establish a proper golf course in Tai Po area.

2.1.1.8 It is also observed that majority of the existing trees within the Project Site are pioneer or exotic species with varying tree conditions, low amenity value individually and with many of them in poor condition. It is largely due to the dense and sloping growing condition. Invasive and weedy tree species also account for a number of trees. Without the Project, all these existing trees species would remain as their existing conditions, gradually decrease and replaced by young trees or weedy species, under limiting management resources and natural succession process. The implementation of the Project would allow an opportunity for comprehensive management of tree resources and introduction of more native and locally adopted species into the future tree mix. Vegetation composed of diverse species combination would be aesthetically and ecologically contribute to the local context. With sufficient time allowed and proper tree management, local biodiversity within the Project Site would be enhanced and create stable habitats for flora and fauna species.

2.1.1.9 To summarise, the Project would help to materialize the intended landuse zoning as Golf Course. Besides, it would also enable opportunities for a swift implementation of any long-term active management by government for Sha Lo Tung as well, which would help to enhance the overall biodiversity of the community.

2.2 Tackling Environmental Challenges and Options Considered

2.2.1.1 Due consideration has been given in formulating the golf course design to overcome environmental challenges facing by the Project. The hierarchy of “Avoid, Minimize and Mitigate” has been fully adopted during the process to protect the environment as much as practicable. The key principles adopted to tackle all the environmental challenges are discussed below.

- Avoidance of marine works during construction;
- Avoidance of effluent discharge to Tolo Harbour;

- Optimal use of agrochemicals;
- Minimization of fresh water consumption;
- Minimization of potential impact of runoff bypass;
- Ecological considerations and constraints during development of layout options;
- Minimization of landscape and visual impact;
- Minimization of odour impact to the Project Site; and
- Optimize project design in other environmental aspects.

2.2.2 Avoidance of Marine Works During Construction

2.2.2.1 The Project is all land-based and would neither involve modification of the existing sea wall, dredging nor require any construction barges. Hence, the Project have avoided any adverse impacts on marine ecology and fisheries resources in the vicinity during construction phase.

2.2.3 Avoidance of Effluent Discharge to Tolo Harbour

2.2.3.1 *Convey sewage generated to Tai Po Sewage Treatment Works (TPSTW)* - Considering the daily population during operational phase, only a small amount of sewage will be generated (i.e. only about 500m³/day of Average Dry Weather Flow (ADWF)). Instead of constructing a new STW within the Project Site, it is proposed to convey the sewage generated to a neighbouring government sewer that connects back to TPSTW located in Tai Po Industrial Estate (TPIE). Since TPSTW would have sufficient capacity to handle the additional sewage, the Project will not discharge any sewage to the marine water and it would not cause any adverse water quality and hence ecological and fishery impacts.

2.2.3.2 *Recycling Surface Run-off during both Construction and Operational Phases* - During the operational phase, the surface runoff from the turf area would inevitably contain certain amount of agrochemicals including fertilizers, pesticides, herbicides, etc. The concentration would generally be higher during the first flush but would decrease with increase rainfall duration/rate. Besides, higher rainfall density would also help dilute the concentration of agrochemicals as well.

2.2.3.3 Nevertheless, water storage tanks with a total capacity of 30,000m³ have been proposed to intercept agrochemicals containing storm flow from the Project Site. The capacity of the water storage tanks have been determined based on historical rainfall data to ensure that the

runoff from the majority of the rainfall events can be contained within the water storage tanks. Only during very heavy and prolonged rainfall events would the surface runoff bypass the water storage tanks to Tolo Harbour.

2.2.3.4 The water storage tanks will also serve dual functions for both construction and operational phases. Apart from receiving the Project Site runoff during operation phase, the water storage tanks also serves as part of the temporary drainage system during the construction phase to receive construction runoff. Temporary drainage system would be installed around the site perimeter to intercept all the construction runoff and divert to the water storage tanks which would enable sufficient sedimentation before the effluent is discharged to Tolo Harbour.

2.2.4 Optimal Use of Agrochemicals

2.2.4.1 Tolo Harbour has a very long retention time similar to that as Deep Bay. Given that the occurrence of red tides is highly related to the abundance of nutrient content and long retention time, the higher occurrence records of red tides in Tolo Harbour reveals the importance to have due consideration on the use of agrochemicals which includes fertilizer. To this end, an outline environmental conscious Turfgrass Management Plan which would be further optimised during the detailed design stage.

2.2.5 Minimisation of Fresh Water Consumption

2.2.5.1 According to the current golf course design, the average daily consumption of water during the operational phase for irrigation of green, tee, fairway, vegetation etc. would be approximately 1,800m³/day during dry season. This water consumption would be relatively less during wet season. In order to fulfil the irrigation need and minimize such consumption for fresh water from Water Supplies Department (WSD), a number of options including seawater desalination, re-use of treated effluent from TPSTW, rainwater harvesting, grey water recycling, etc. have been exhaustively considered and it has been concluded that a combination of following method deems as the optimal scheme for irrigation purpose:

- Rainwater harvesting;
- Water extraction from existing open channel; and
- Freshwater supply from WSD as backup supply.

2.2.6 Minimisation of Potential Impact of Runoff Bypass

2.2.6.1 To reduce the water quality impact by the turf area runoff, special considerations have been formulated in designing the drainage system of the Project. In particular for the outfall location, it has been duly situated to allow an optimum distance from the adjacent water sensitive receivers and ecological resources. As such, potential water quality impact at receivers could be further minimised.

2.2.7 Ecological Considerations and Constraints during Development of Layout Options

2.2.7.1 Ecological considerations have been the priority during the design and development of various golf course layout scheme options. As the ecological survey findings had revealed, night roosting behaviours of bird species of conservation importance (i.e. Collared Crow (CC) and Black Kite (BK)) within the Project Site were confirmed and constituted a constraint for the layout design.

2.2.7.2 Some key inherent constraints of the Project Site are identified as follows:

- Constraints due to bird species of conservation interest;
- Constraints due to small site size; and
- Constraints due to waste boundary and topography.

2.2.7.3 The locations of plantations with records of night roost usage are quite scattered. It is neither feasible for the golf course design nor viable for the Project to fully preserve all plantations with night roost records, as it would mean the area size becomes infeasible for an 18-hole golf course layout.

2.2.7.4 Alternatively, it is proposed to preserve existing roosting location plantation as much as practicable, in particular those to be used more frequently. For those roosting locations which could not be avoided, similar habitats will be re-provided (planting new trees in groups) in the design of the golf course.

2.2.7.5 It is also important to prevent disturbance to the preserved tree groups and the adjacent new planting trees to facilitate the continuous usage of these trees as night roosts by both bird species.

2.2.7.6 Construction activities in the Project Site will be implemented by phases. This will enable existing plantation trees to be removed gradually, and new planting will also be provided in advanced during the construction, rather than after all construction is finished as in other projects. Upon completion of site formation at each phase, landscape planting will be implemented immediately before the

beginning of next phase such that new tree groups aiming for roosting site provision will be planted before site clearance in the next phase. Heavy standard trees will be included in the planting list to provide mature trees as early as possible.

2.2.7.7 Construction hours will also be restricted to daytime when CC and BK mainly use areas outside the Project Site. Work hours of construction plants at eastern portion of Area 2 (near the preserved tree groups), Area 3 of the Construction Programme (i.e. the southern part of the Project Site, near the major preserved tree group) and ancillary facilities (including part of the water storage tanks and the associated traffic along the existing access road) will be restricted to end at least one hour before sunset time. Therefore, given these multiple protection measures, the potential construction disturbance to the preserved tree group for CC and BK would be minimised.

2.2.8 Minimise Landscape and Visual Impact

Avoidance and Minimization of Affecting Important Trees and Protected Tree Species

2.2.8.1 This Project has strived to avoid and minimize influencing any important tree (mature specimen) and tree species as far as possible. Two nos. of trees were identified within the Project Site, including *Ficus elastica* and *Ficus microcarpa*, which can meet the criteria of registrable old and valuable trees due to their large sizes. They are located along the northern boundary and centre north-west of the Project Site. These trees will be preserved and retained in situ.

2.2.8.2 Two numbers of *Aquilaria sinensis* were identified in the tree survey. This species is a tree species protected under Endangered Species of Animals and Plants Ordinance Cap. 586, listed as near threatened species under the Rare and Precious Plants of Hong Kong (Status in China), and considered vulnerable under China Plant Red Data Book. One of them is located at the western edge of the boundary abutting to the TPIE and the other *Aquilaria sinensis* is located at the north-eastern portion of the Project Site. Both of them will be retained in-situ.

Avoidance and Minimization of Affecting Existing Trees

2.2.8.3 According to the recent field survey carried out in October 2018, a total of 11,198 trees were identified within the Project Site, which was 16% less when compared to the field survey carried out in early 2018. The loss of trees is mainly due to the inclement weather brought by typhoon Mangkhut hoisted in September 2018.

2.2.8.4 Over 60% of the Project site is covered by trees for temporary landscape measures for ex-landfill site. They are densely planted on slopes for screening and restoration purposes. They are either largely exotic or pioneer species. It is inevitably to affect these trees for accommodating an 18-hole golf course, ancillary facilities and access road. As such the proposal has sought to retain trees as much as possible to minimize the impact on existing trees, particularly for those are important and have high amenity value.

2.2.8.5 The current design has minimized the site formation works as far as possible to maintain the existing sloping profile for the retaining the trees at their original ground levels, especially those along the edge of the site, so as to continue their contribution to the landscape context as well as maintain screening effect and buffer in the views of the adjoining visually sensitive receivers. Development set back at the north-west, west, south and east of the site maximizes trees preservation. Approximately 1,874 nos. of the existing trees (16.7%) are retained at its original location and 326 nos. of trees (2.9%) will be transplanted within site. Compensatory tree planting is proposed to maximise tree coverage within Project Site by planting 4,180 trees and 4,818 whips. With the selection of good quality trees and use of diverse tree planting mix including native and locally adapted tree species, amenity and ecological value of the vegetation in Project Site will subsequently be enhanced.

Minimization of Site Formation Work and Maintenance of Existing Sloping Profile

2.2.8.6 Site formation works at north west, west, south and east along the boundary are limited to maintain the sloping profile. Site formation work is mainly found at the inner part of the site and is unavoidable for accommodating necessary ancillary facilities for golf course. The site has minimized the increase of site level with majority of the site area within +1m site level changes. Such minor amendment of site level change assists to maintain visual context of the site prominent to the waterfront and to reduce the visual impact to its adjoining sensitive receivers.

Use of Green Roof and Limitation of Number of Building Structure and its Height

2.2.8.7 The current layout only has a small number of ancillary facilities within the Project Site, including but not limited to car parks, food and beverage, storage, offices, golf cart parking and maintenance area, nursery, pump rooms / plant rooms etc.

2.2.8.8 Among the above mentioned ancillary facilities, one of them is the driving range of a 2-storey low-rise platform with building height of 9m located at the southwest boundary of the site, which will be partially screened by the preserved tree and the newly planted trees when viewing northwest from Tai Po Waterfront Pier. The ancillary facilities building is located at the southeast edge fronting to Tolo Harbour. It is a 2-storey building with building height of 9m with carpark. The building is covered by green roof which is specially designed to blend in with the surrounding golf course amenity. Such design assists to reduce the building bulk when viewing from the east and the south across Tolo Harbour in distance. Besides, integrated design of access road and E&M facilities under the road, e.g. water storage tanks and pump room, will minimize cumulative impacts on existing landscape resources including existing trees and visual mass on Project Site.

Phasing of Construction Works to Facilitate Tree Transplantation

2.2.8.9 The Project is divided into 3 areas to reduce the impact of the development. The construction phasing is designed to split the Project Site into top, middle and bottom portions. The programme allows early preparation of recipient site for tree transplanting and encourages direct tree transplanting.

Provision of Landscape Area in the Development

2.2.8.10 The preservation of existing trees / tree planting along the site boundary continue their contribution to the landscape context and maintained landscape buffer to screen off the development in views of sensitive receivers. New tree planting is planned in strategic locations where do not interfere the golf playing or endangered the safety of the players. Avenue trees are planted along access road and maintenance path within the Project Site. Landscape ponds/lakes are designed to create watered habitat and new landscape elements in the site as to enhance the landscape context and visual amenity and biodiversity of the site.

2.2.9 Minimize Odour Impact to the Project site

2.2.9.1 Four odour sources including TPSTW, the committed food waste pre-treatment facilities (FWPF), the proposed upgraded Sewage Pumping Station (SPS) at Ting Kok Road and the proposed SPS within the Project Site, could have potential impact to the Project Site in operational phase. Quantitative assessment have demonstrated that the cumulative odour impacts within the Project Site would fully comply with the 5OU requirement. Nevertheless, the current golf course

layout has proactively allowed for a buffer planting of approximately 20m wide between the TPSTW, the committed FWPF and the Project Site. This would help to create a more positive environment for the golfers at the western side of the golf course.

2.2.10 Optimise Project Design for Other Environmental Aspects

Hazard-to-Life

2.2.10.1 Having considered the Project Site would be partially fall within the Consultation Zone (CZ) of Tai Po Gas Production Plant (TPGPP), the design of the Project has proactively avoided facilities that would be more densely populated (i.e. ancillary facilities) outside the CZ. The ancillary facilities would be located at the far southeast corner of the Project Site with more than 1200m separation from the TPGPP.

2.2.10.2 Furthermore, population arrangements would be made to limit the population size to be occurred within the Project Site that is partially encroaching to the CZ to minimise potential impacts on the hazards-to-life.

Waste Management

2.2.10.3 According to the best available information such as as-built drawings, the locations of the ancillary facilities and the access road with its water storage tanks underneath, are located on area outside the waste boundary. Any excavation works for these facilities would not encroach into the waste boundary. The proposed ancillary structures and box culvert will not be constructed on the capping layer of the Shuen Wan Landfill. Only a maximum of 300mm thick top soil would be excavated within the landfill area at the Project Site. Certain amount of top soil and inert C&D materials would be excavated during construction. Approximately 70% of the excavated top soil and almost all excavated inert materials would be reused on site for site formation and roadworks at the Project Site.

Landfill Gas Hazards

2.2.10.4 To avoid potential landfill gas hazards, current layout and locations of landfill facilities, such as landfill gas management system, leachate management system, engineering capping layer etc. have been reviewed and incorporated to formulate the current layout of the proposed golf course. The current layout has been optimised to and maintain accessibility of existing landfill facilities such as gas monitoring probes, passive venting trenches and leachate wells etc., while maximise the utilisation of land for the development of 18-hole

golf course. The current layout minimises the needs of alteration of existing landfill facilities so as to avoid potential landfill gas hazards associated with the construction/modification works.

2.3 Proposed Development Scheme

2.3.1 Overall Design

2.3.1.1 **Figure 2.1** presents the latest layout of the golf course. A summary of the key development parameters is given in **Table 2.1**.

Table 2.1 Key development parameters of the Project

Development Parameters	Units
Number of Holes	18 holes
Number of bays in driving range	28 bays
Total Site Area	53ha approx.
Terrain Level	8 – 40 mPD approx.
Water Storage Tanks	30,000m ³ approx.
Number of carparks	300 numbers approx.

2.3.2 Irrigation and Surface Runoff Control System

2.3.2.1 A number of options have been duly considered to minimise freshwater consumption. After considering the practicability of all these options, it has been recommended to adopt a combination of 3 options (i.e. Option 1 – rainwater harvesting, Option 2 – water extraction from existing open channel and Option 3 – freshwater supply from WSD as back-up).

- **Option 1 – rainwater harvesting:** the rainwater within the Project Site would be collected and conveyed into the proposed water storage tanks beneath the car park and the access road;
- **Option 2 – water extraction from existing open channel:** water extraction from existing 5.4m drainage channel next to the Project Site. Most of the proposed pipe works would be along the northern edge of the boundary of Project Site and only around 60m pipe works would be laid outside of the boundary of the Project Site to connect with the extraction point; and
- **Option 3 – freshwater supply from WSD as back-up:** at dry season from the existing fresh water main along Ting Kok Road.

2.3.2.2 There would be water storage tanks of a total capacity of 30,000m³ within the Project Site. According to the latest design, two interconnected water storage tanks, one of them will be located underneath the access road running generally along the eastern side of the Project and another one will be located underneath the car park. A pumping station will be constructed to pump the water inside the water storage tanks to feed to the golf course turf irrigation system, the landscape irrigation system for building and access road area.

2.3.2.3 The surface runoff from both the golf landscape area and the golf playing area would be collected by surface channels and then conveyed back to pumping stations, and from which the surface runoff would be pumped back to the water storage tank under the car park. Similarly, the surface runoff from buildings and access road would be collected by road drains and pumped to the lakes within the golf course for pollution removal treatment and then reach the water storage tank under the access road. These lakes would provide certain pollutant removal capability through settling and biological uptake by aquatic vegetation. Any overflow from these lakes will be drained via gravity pipes back to the water storage tank underneath the access road.

2.3.2.4 The water storage tanks would also receive freshwater from WSD and water flow to be extracted from an existing DSD's open channel.

2.3.2.5 The water storage tanks would be sufficient to reduce the likelihood of bypassing surface runoff to Tolo Harhour and most time of the year while maintaining sufficient water supply for irrigation purposes. Only during very heavy and prolonged rainfall events would the surface runoff bypass the water storage tanks to Tolo Harbour.

2.3.3 Sewerage Connection

2.3.3.1 It is estimated that approximately 500m³/day will be generated from the guests and staff using the ancillary facilities.

2.3.3.2 A new sewage SPS will be provided to collect and convey the sewage flows generated from the Project to the existing sewer along Ting Kok Road, which will be connected back to TPSTW for proper treatment.

2.3.3.3 The following initial contingency measures can be considered to control the emergency overflows from the SPS thereby polluting the receiving water bodies at Tolo Harbour:

- Dual feed power supply for the SPS;
- Standby pump.

2.3.3.4 As the sewage flows is relatively small (around 500 m³/day ADWF), sewage tanker vehicles (each vehicle can remove 12m³ of sewage) could also be considered to remove sewage from the SPS to existing public sewer manhole located in front of main entrance of golf development on Ting Kok Road at during emergency case.

2.3.4 Freshwater and Flushing Water Supply

2.3.4.1 For the purpose of potable water, flushing water and fire service water, water supply from WSD will be sought. It is proposed to tee from the existing fresh water main and salt water flushing water main running along Ting Kok Road. It is estimated that approximately 150m³/day and 30m³/day of fresh water demand and saltwater demand respectively, these quantities are deemed insignificant to the existing water mains.

2.3.5 Site Formation Works

2.3.5.1 The existing landfill site profile would be modified to support the construction of the Project. Based on the preliminary findings, the stability of the landfill area is stable to accommodate the proposed development. To avoid damaging the geomembrane in the capping layer, the layer of soil fill covering the waste in the landfill would not be adversely disturbed. However, to facilitate the site formation work, the top soil of not more than 300mm will be removed. Thus, extensive excavation works is not recommended and only re-profiling of the Project would be conducted by filling instead. The stability of the landfill area for further development shall be subject to the findings of the detailed geotechnical assessment to be conducted in design stage and before the commencement of construction works. Prior written approval from EPD will be obtained before commencement of any excavations within the landfill area.

2.3.6 Access Road

2.3.6.1 An access road with a road width of approximately 7.3m is proposed for the Project. A 1.6m wide single-sided footpath will be built along the eastern side of the access road to connect Ting Kok Road to the waterfront area. The access road will have a total length of about 1,100m and will be constructed above the existing ground with a water tank and other utilities connect underneath.

2.3.7 Ancillary Facilities

2.3.7.1 Other than the above key infrastructure elements of the Project, there would also be a number of ancillary facilities to support the operations of the Project. These facilities include but not limited to car parks,

food and beverage, storage, offices, golf cart parking and maintenance area, nursery, pump rooms / plant rooms, VR training rooms, administrative office etc.

2.3.8 Provision of Staff Quarters and Overnight Accommodations

2.3.8.1 In order to allow for more flexible uses and development of the Project to suit contemporary circumstances and operational requirements, the provision for staff quarters and overnight accommodations have been duly considered as an additional project development scenario.

2.3.8.2 These staff quarters and overnight accommodations are located close to and overlooking onto the east and south seafront instead of Ting Kok Road and the Tai Po Industrial Estate. The separation distances from Ting Kok Road and Tai Po Industrial Estate are about 350 – 780m and 320 – 520m respectively. Besides, all the staff quarters and overnight accommodations are 1-2 storeys only and the upper roof structures are built into the slope and form part of the golf course. Hence, both the staff quarters and overnight accommodations would be substantially screened by the proposed golf course terrain which would reach a maximum height of about 42mPD. These overnight accommodations would not induce significant additional traffic, waste, sewage etc as well.

2.3.9 Modification of Existing Landfill Monitoring Facilities

2.3.9.1 To facilitate the construction and operation of the Project, the capping layer or liner during the relocation of the landfill gas wells and leachate wells would require some relatively minor works. Any affected liner will be properly sealed with new liner and sufficient overlapping will be provided between the old and new liners. Capping layer will be reinstated after the completion of the modification of wells.

2.3.9.2 To facilitate the future monitoring works in the restored landfill, the project proponent will install the advance monitoring system for remote / automatic monitoring for groundwater, landfill gas and leachate including data loggers and transmitters system. The proposed automatic monitoring system with the aims to improve the productivity, reliability and availability as well as to enhance the overall environmental performance of the restored landfill / golf course.

2.3.9.3 During the design stage, the Project Proponent shall employ a Specialist Contractor/Landfill Consultant who shall prepare and

provide a Design Plan and a Works Plan to the EPD for approval after the certification of an independent Landfill Consultant regarding the proposed demolition, relocation, reprovisioning and modification works and associated mitigation measures, with the aim to minimise the disruption to the landfill operation and to avoid adverse environmental impact.

2.4 Construction of the Project

2.4.1.1 The construction area is divided into three stages from north to south. **Table 2.2** summarises the construction works involved in each construction phase of the Project.

Table 2.2 Construction works at different phases of the Project

Phase	Scope of Works
1	<ul style="list-style-type: none"> • Site formation works for Area 1 and access road • Construction of water storage tanks • Landscaping works for Area 1
2	<ul style="list-style-type: none"> • Site formation works for Area 2 and access road • Construction of water storage tanks • Construction of ancillary facilities • Landscaping works for Area 2
3	<ul style="list-style-type: none"> • Site formation works for Area 3 and access road • Construction of ancillary facilities • Construction of water storage tanks • Landscaping works for Area 3

2.4.1.2 Apart from providing temporary drainage arrangement (e.g. perimeter channels, sand bags, etc.), water storage tanks (including water storage tank below the ancillary facilities) will be constructed in early stage to enhance the surface runoff flow control and storage for protecting marine environment. During Phase 2 and 3, surface runoff could be temporarily stored in the water storage tanks constructed in Phase 1 intercept surface runoff and avoid direct discharge of site runoff.

2.4.1.3 In order to reduce the visual impact to the nearby sensitive receivers, the construction sequence has been adjusted to allow tree planting and turfing to be carried out subsequent to the completion of site formation works.

2.4.1.4 To avoid affecting the habitat for Collared Crows near the southern end of the Project Site, powered mechanical equipment used at the eastern part of Area 2, Area 3 and the ancillary facilities shall be ceased to work at least one hour before earliest sunset of the month during construction.

2.5 Environmental Conscious Turfgass Management Plan- An Outline

2.5.1.1 The Turfgass Management Plan (TMP) would be formulated based on the following four guiding principles:

- To comply with all local statutory requirements and best practices relevant to the industry;
- To establish an environmentally responsible golf course achieving international quality;
- To ensure that the procedures for agrochemical applications and course management are followed in an environmentally acceptable manner; and
- To demonstrate / promote sustainable design suitable for golf course and ancillary facilities.

2.5.1.2 Best practices and managerial guidelines would also be incorporated in the future TMP to reduce the potential environmental impact, such as encourage the reuse of resources such as water and agrochemicals, maintain the soil quality and carrying capability, minimise the surface runoff, provide constant monitoring on the condition of the turf grass.

2.5.1.3 Turf grass species, cultivars and agrochemicals would be carefully selected to suit the local ecological conditions, micro-climate, soil characteristics, etc. in order to reduce the potential impact to the marine ecology and water quality during operations of the Project.

2.6 Environmental Initiatives

2.6.1.1 While a number of design initiatives have been proactively implemented to tackle various environmental challenges, the Project aims to achieve more than the statutory requirements. In order to achieve that, a number of environmental initiatives has been identified for the Project. These initiatives cover different aspects including:

- Clean Energy / Energy Saving;
- Sponge Design;
- Waste Minimisation; and
- Enhance Biodiversity / Greening.

2.6.1.2 However, while these initiatives are generally considered as practicable at this stage, the extent of applications and other details have to be revisited and further established during the detailed design stage when more engineering information becomes available. The following table summarises all those environmental initiatives envisioned at this stage.

Table 2.3 Environmental Initiatives to be further developed during detailed design stage

Aspect	Environmental Initiatives	Environmental Benefits
Clean energy / energy saving (Photo 1 and 2)	<ul style="list-style-type: none"> • E-shuttles and associated charging facilities in basement carpark • Charging facilities for visitor car parks in basement carpark • PV panels (eg street lights along the access road, external lighting system for ancillary facilities etc) • Wind scoop / wind turbine for the ancillary facilities • Priority using of LED lighting 	<ul style="list-style-type: none"> • Promote the use of e-cars to abate road side air quality emissions • Use of solar energy to minimise energy consumption • Seize the opportunity to capitalise on renewable wind energy
Sponge design (Photo 3 and 4)	<ul style="list-style-type: none"> • Rainwater harvesting and recycling • Certain permeable surface for the public area in the Ancillary Facilities 	<ul style="list-style-type: none"> • Minimise freshwater consumption which is an important source for the society • Enable rainfall infiltration and minimise surface runoff quantity
Waste minimization (Photo 5 and 6)	<ul style="list-style-type: none"> • Foodwaste decomposing for organic farming for restaurant and landscaping areas • Use recycle glass bricks for footpath • Make use of felled trees to produce wood chips for garden mulch • Compost grass clippings and food waste 	<ul style="list-style-type: none"> • Minimise the generation of organic waste that need to be disposed off-site • Promote the use if recycle materials / products
Enhance Biodiversity / Greening (Photo 7 and 8)	<ul style="list-style-type: none"> • Plant native species in landscaping as much as practicable • Vertical green walls along the at grade water tanks 	<ul style="list-style-type: none"> • Promote seamless integration of biodiversity and greening into golf course design



Photo 1: Electric car and charging facilities



Photo 2: PV Panels



Photo 3: Rainwater harvesting system
(Photo credit: Green Power)



Photo 4: Permeable surfaces



Photo 5: Food waste composting system
(Photo credit: Green Power)



Photo 6: Eco Bricks
(Photo credit: Green Power)



Photo 7: Vertical greenings
(Photo credit: Green Power)



Photo 8: Landscape with local species

2.7 Summary of Environmental Benefits and Environmental Achievements of the Project

2.7.1.1 It is important to active conservation at Sha Lo Tung by exercising the land-exchange mechanism to implement the Project. Given the landuse history of the site, all the engineering and environmental constraints have been identified and the design and construction of the golf course has been reviewed to ensure that all those constraints are duly addressed and the environmental impacts are avoided or minimised as practicable. Comments from district councils and stakeholders have also been reviewed and incorporated where practicable. An outline for the environmental conscious turfgrass management plan has also been prepared to guide the selection and management of turf and agrochemicals suitably. Last but not least, a number of environmental initiatives covering clean energy / energy saving, sponge design, waste minimisation and enhance biodiversity / greening have been recommended for incorporation in the detailed design.

2.7.1.2 A summary of the key environmental benefits and achievements of the Project is given below for reference:

Key Environmental Benefits / Achievements	Remarks
Opportunity to realize the conservation of Sha Lo Tung	Upon completion of the non-situ land exchange procedure, the majority of the valley in Sha Lo Tung will be consolidated as government land and it would be feasible for the government to implement long-term active management
Minimal export of inert construction & demolition materials	The terrain profile of the Project has been designed to minimise the export of fill materials. This would minimise the need for dump trucks on Ting Kok Road
No marine construction works	Given the hydraulic characteristics of Tolo Harbour and the presence of marine ecological resources in the vicinity, the construction methodology has been designed to avoid marine construction works such as dredging etc.
No discharge of first flush surface runoff to Tolo Harbour with the implementation of water storage tanks	The by-pass from the water storage tanks would be triggered when the amount of stored water reaches 30,000m ³ (total capacity of the water storage tanks) and any additional water would be bypass the tank to Tolo Harbour.
No discharge from water storage tanks to Tolo	A water storage tank of 30,000m ³ has been proactively included in the design to intercept and recycle surface runoff as much as

Harbour	practicable. There would not be any surface runoff during normal conditions
Optimal use of agrochemicals	An outline turfgrass management plan has been prepared to ensure that all the best practices are incorporated, establish an environmentally responsible golf course, and establish procedures for agrochemical applications
Minimisation of fresh water consumption	Rainwater harvesting has been adopted as the key strategy to minimise fresh water consumption
Rehabilitation of landfill site landscape character	Replace amenity landscape of ex-landfill site with recreational landscape enhanced the local landscape character and bio-diversity Benefit the general public with increase of recreation uses in Tai Po district
Reinstatement and enhancement of ex-landfill site planting areas	Existing tree and vegetation were densely planted on slopes for amenity and screening purposes only. Majorities are getting health degraded and have defective form due to their age and growing condition, which is a necessary process of natural succession. In addition, many trees were found damaged due to subsequent adverse weather, particularly after the super typhoon Mangkhut in 2018. New tree planting surrounding the play areas and in-fill whip planting on preserved slopes with native and locally adopted species would enhance the structure of the forest habitat and character.
Maximise reuse of natural resources	Reuse wood and bark recovered from trees and shrubs as mulching for planting areas as much as possible, subject to detailed design.
Ecological enhancements	The existing plantation are either largely exotic or pioneer species. After the implementation of the Project, local species will be given the priority. This would improve the overall ecological values for the nearby wildlife.

2.8 Tentative Implementation Programme

2.8.1.1 Construction is scheduled to commence at the beginning of Year 2021 and completed by end 2023. The exact schedule of construction depends upon factors such as the granting of necessary permit for its construction and the awarding of the contract to the contractor.

3 SUMMARY OF ENVIRONMENTAL IMPACT ASSESSMENT

3.1 Approach to Environmental Impact Assessment

3.1.1.1 The EIA process provides a means of scoping, assessing and reporting the environmental impacts and benefits of the Project. It is an iterative process that has been followed in parallel with the design process to identify the potential environmental effects of various design options, and develop alternatives as well as mitigation measures to be incorporated into the design, construction and operation of the Golf Course. Public concerns have also been duly considered and incorporated where appropriate. Mitigation measures have been proposed to avoid some potential environmental impacts, or to minimise or mitigate to acceptable levels.

3.2 Air Quality

3.2.1.1 Potential air quality impacts associated with the Project have been assessed in accordance with Clause 3.4.4 and Appendix B of the Study Brief and Section 1 of Annex 4 and Annex 12 of the Technical Memorandum on EIA Process (TM-EIAO) to ensure compliance of the Hong Kong Air Quality Objectives (HKAQOs) and relevant criteria and guidelines.

3.2.2 Construction Phase

3.2.2.1 Construction dust would be potentially generated mainly from the land-based construction works including vegetation cutting and trimming, site formation, site reprofiling works, and wind erosion of open sites. The construction of the Project will preserve existing planted areas as far as practicable to minimise the actual works area and the associated dust emissions. Furthermore, the entire construction would be conducted in phases to reduce the short term cumulative dust impacts.

3.2.2.2 With the implementation of the mitigation measures as stipulated in the Air Pollution Control (Construction Dust) Regulation, dust control measures, including watering once per hour on exposed worksites and haul road, and good site practices, the predicted 1-hour Total Suspended Particulate (TSP), 24-hour and annual Respirable Suspended Particulate (RSP) / Fine Suspended Particulate (FSP) concentrations on area in the vicinity of the construction sites would comply with the respective criteria. Hence, adverse residual air quality impacts during construction phase are not anticipated.

3.2.2.3 Results of the assessment have indicated that with the implementation of suitable dust mitigation measures as stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices, the predicted dust levels at representative ASRs would comply with relevant HKAQOs and TM-EIAO criteria under conservative assumptions as presented in **Table 3.1**. Adverse air quality impact due to construction of the Proposed Development is therefore not anticipated.

Table 3.1: Summary of predicted cumulative construction dust levels with mitigation measures (in $\mu\text{g}/\text{m}^3$)

	TSP	RSP		FSP		Compliance
	Highest 1-hr	10 th highest 24-hr	Annual	10 th highest 24-hr	Annual	
Existing ASRs	221 – 439	74 – 88	32 – 39	56 – 58	23 – 24	Yes
HKAQOs/ TM-EIAO Criteria	500	100	50	75	35	---

3.2.3 Operational Phase

3.2.3.1 Quantitative operational phase air quality assessment has been conducted taking into account the industrial emissions from Tai Po Industrial Estate (TPIE), vehicular emission impacts associated with the Project and nearby existing road network, marine emissions associated with the operational of the cement depot cum concrete batching plants at Yu On Street.

3.2.3.2 It is worth noting that the operation of the Project would not be a future air pollutant emission source, except the very limited amount of induced traffic (i.e. 120 vehicles in peak hour). Furthermore, due to the height difference between nearby receivers (around 10-15m above local ground) and the chimneys (25-50m above local ground), all ASRs including the Project would not be adversely affected by various industrial emissions source including those inside the TPIE.

3.2.3.3 Background air quality has been extracted from EPD's regional scale model Pollutant in the Atmosphere and the Transport over Hong Kong (PATH) which has covered all major emission sources within Hong Kong and the Pearl River Delta Economic Zone. Nitrogen Dioxide (NO₂), RSP and FSP have been chosen as representative criteria air pollutants for the assessment.

3.2.3.4 Results of the assessment have indicated that the predicted concentrations of key representative pollutants at representative ASRs

would comply with HKAQOs under conservative assumptions as presented in **Table 3.2**.

Table 3.2: Summary of predicted concentrations of representative air pollutants during operational phase (in ng/m³)

	NO ₂		RSP		FSP		Compliance
	19 th highest 1-hr	Annual	10 th highest 24-hr	Annual	10 th highest 24-hr	Annual	
Existing and Planned ASRs	70 – 121	11 – 21	74 – 79	32 – 36	56 – 57	23 – 24	Yes
Ancillary Facilities and other facilities at the Project Site	76 - 78	13	76 - 80	33 - 35	57	23 - 24	Yes
HKAQOs/ TM-EIAO Criteria	200	40	100	50	75	35	---

3.2.3.5 Quantitative odour assessment has been conducted taking into account contribution from TPSTW, the committed Food Waste Pre-treatment Facilities (FWPF). The assessment results showed that odour concentrations at the Project Site would comply with the 50U criterion.

3.2.3.6 An onsite sewage pumping station (SPS) of around 500 m³/day have been proposed. Given the implementation of appropriate mitigation measures, such as installation of deodourising units of at least 99.5% odour removal efficiencies, adverse odour impacts from the proposed SPS would not be anticipated.

3.3 Hazard to Life

3.3.1.1 Potential hazard to life impacts associated with the Project have been assessed in accordance with Clause 3.4.5 and Appendix C of the Study Brief and Annexes 4 and 22 of the TM-EIAO to ensure compliance of relevant standard and guidelines. Approximately 1/3 of the Project site partially falls within the 1000m Consultation Zone (CZ) of the Tai Po Gas Production Plant (TPGPP).

3.3.2 Construction Phase

3.3.2.1 Arrangements have been made to minimise the construction phase hazard to life impact. The number of construction workers within the CZ would be capped at 50.

3.3.3 Operational Phase

3.3.3.1 In order to minimise the hazard-to-life, the indicative layout of the golf course has been proactively adjusted such that future ancillary facilities such as offices, changing rooms, restaurants, access road, etc. are located outside the CZ. Only turf area, tee, bunkers and landscape area would be located in the area in the CZ. As such, there would be no permanent working or residential population within the CZ. It is expected that there would only be daily average of 20 transient visitors within the CZ.

3.4 Noise Impact

3.4.1.1 Potential noise impacts associated with the Project have been assessed in accordance Clause 3.4.6 and Appendix D of the Study Brief and Annexes 5 and 13 of the TM-EIAO to ensure compliance of relevant standards and guidelines.

3.4.2 Construction Phase

3.4.2.1 Construction noise impact assessment associated with the use of Powered Mechanical Equipment (PME) for different phases of construction has been conducted. With the implementation of practical mitigation measures including good site management practices, use of movable noise barrier, use of “quiet” plant and working method, the construction noise impacts at all representative existing residential noise sensitive uses would be controlled to acceptable levels.

3.4.3 Operational Phase

3.4.3.1 Fixed noise sources assessment has been conducted. Noise impacts from planned fixed noise sources could be effectively mitigated by implementing noise control measure at source during project implementation stage. With the adoption of the maximum permissible sound power levels for the proposed fixed noise sources, the noise levels at representative existing and planned Noise Sensitive Receivers (NSRs) complies with the relevant noise criteria.

3.5 Water Quality

3.5.1.1 Potential water quality impacts associated with the Project have been assessed in accordance with Clause 3.4.7 and Appendix E of the Study Brief and Annexes 6 and 14 of the TM-EIAO to ensure compliance of relevant standards and guidelines. No dredging or marine works is required under the Project.

3.5.1.2 Major Water Sensitive Receivers (WSRs) located in the vicinity including the corals at the South of the Project Site and seawater intake point in Tai Po, etc. have been considered.

3.5.2 Construction Phase

3.5.2.1 Construction site runoff and sewage arising from the on-site construction workforce are the key identified environmental impacts. According to the current design, the construction works would be land-based and there would not be any marine works. Water storage tanks of total volume of 30,000m³ will be constructed in phases underneath the access road / caparks and temporary sedimentation tanks will be installed to intercept the surface runoff. Once one of these water storage tanks are available, they would be used to intercept any surface runoff for sedimentation.

3.5.2.2 Good site practices in accordance with Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94) would be implemented and proper temporary sanitary facilities (e.g. portable chemical toilet) would be provided to properly collect the on-site sewage generated from the construction workers. With the proper implementation of those good practices and mitigation measures, it is anticipated that there would be no residual adverse water quality impact.

3.5.3 Operational Phase

3.5.3.1 During the operational phase, the stormwater from the surface runoff, sewage effluent and wastewater from ancillary facilities are the key identified environmental impacts. Stormwater runoff includes turf area runoff, access road runoff and landscape area runoff. Agrochemicals will be applied to the turf area during operational phase. The residual agrochemicals may be carried by the turf area runoff and conveyed by the drainage system to the water storage tanks. Drainage system and water storage tanks with a total volume of 30,000m³, together with a proper location of outfall sited away from the WSRs are designed to reduce the water quality impact by stormwater bypass. The sewage from the Project would be conveyed to TPSTW for treatment. Discharge license and discharge standards according to Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems Inland and Coastal Waters (TM-DSS) will be applied for the wastewater from ancillary facilities to comply with Water Pollution Control Ordinance (WPCO). With the mitigation measures implemented, residual adverse water quality impacts are not anticipated.

3.6 Waste Management Implications

3.6.1.1 Waste management implications associated with the Project have been assessed in accordance with Clause 3.4.8 and Appendix F of the Study Brief and the criteria and guidelines stipulated in Annexes 7 and 15 respectively of the TM-EIAO.

3.6.2 Construction Phase

3.6.2.1 Potential waste management implications from the generation of waste during the construction phase have been evaluated. Strategic mitigation measures, including the opportunity for on-site sorting, reusing construction and demolition (C&D) materials, etc., are devised to minimise the surplus materials to be disposed. Opportunities of making use of felled trees as wood chips for garden mulch would be explored during the detailed design stage. Recommendations have been made for implementation by the Contractor during the construction period to minimise waste generation and off-site disposal. With the proper implementation of the recommended mitigation measures, adverse environmental impacts from waste management during construction phase are not anticipated.

3.6.3 Operational Phase

3.6.3.1 The types of waste that would be generated during the operational phase would be general refuse from golf course staff, users and visitors, chemical waste and grass clips from golf course management, as well as food waste produced from canteens at the golf course. Recommendations have been made to ensure proper treatment and disposal of these wastes. In particular, food waste and other organic waste generated onsite such as grass clippings could be composted with onsite composting system. With the proper implementation of the recommended mitigation measures, adverse environmental impacts from waste management during operational phase are not anticipated.

3.7 Land Contamination

3.7.1.1 Potential land contamination impacts associated with the Project have been assessed in accordance with Clause 3.4.9 of the Study Brief and Appendix G and the guidelines as stipulated in Section 3.1 and 3.2 of Annex 19 of the TM-EIAO.

3.7.2 Construction Phase

3.7.2.1 The land contamination assessment has examined the potential contaminative landuses within the boundary of the Project and the

works of the Project and their potential impacts to future use. The assessment involved desktop review, site survey and identification of potentially contaminated site etc.

3.7.2.2 Based on the desktop review findings of selected aerial photos, the information collected during site survey, from the operator of the current Golf Driving Range as well as EPD and Fire Services Department (FSD), the storage/ workshop area is identified as the only potential contaminated site within the boundary of the Project and the works of the Project. Nevertheless, the land contamination potential at the storage/ workshop area is low.

3.7.2.3 Project Proponent (PP) is recommended to conduct further land contamination assessment at the storage/ workshop area at later stage of the Project after the area within the boundary of the Project and the works of the Project is handed over to the PP. Further land contamination assessment should include site re-appraisal, submission of Land Contamination Review (LCR) or Contamination Assessment Plan (CAP), Site Investigation (SI) and submission of Contamination Assessment Report (CAR), if necessary. If land contamination is confirmed, a Remediation Action Plan (RAP) should be submitted to formulate viable remedial measures. Possible remediation methods include air sparging, biopile, stabilisation / solidification, thermal desorption, etc. The contaminated land should then be remediated according to the approved RAP, and a Remediation Report (RR) should be submitted to demonstrate the land has been remediated adequately.

3.7.3 Operational Phase

3.7.3.1 Potential future sources of contamination include application of turfgrass chemicals (pesticides and herbicides) for maintaining the golf course as well as accidental spillage of chemicals to be used. Recommendations have been made to ensure proper management of agrochemicals and measures to be taken in case of accidental chemical spillage. With proper implementation of the recommended mitigation measures, land contamination issues during the operational phase are not anticipated.

3.8 Landfill Gas Hazard

3.8.1.1 Potential Landfill gas hazard impacts associated with the Project have been assessed in accordance with Clause 3.4.10 of the Study Brief and Appendix H and the guidelines as stipulated in Annexes 7 and 19 of the TM-EIAO.

3.8.2 Construction Phase

3.8.2.1 The qualitative landfill gas hazard assessment has been conducted in the EIA study. The results indicate the risk level from the Project during the construction phase is medium. With the implementation of appropriate protective and precautionary measures according to Landfill Gas Hazard Assessment Guidance Note, adverse impacts on the targets are mitigated to acceptable level.

3.8.2.2 In addition, major construction activities of the Project include tree felling, site formation (include excavation and filling), relocation, modification, reprovision and demolition of existing landfill restoration facilities, road works and utilities installation, civil, electrical and mechanical works for buildings and ancillary facilities and provision of temporary site offices. Potential impacts from these construction activities on existing landfill restoration facilities have been assessed. With proper mitigation measures adopted, adverse impacts on the landfill restoration facilities are not anticipated.

3.8.3 Operational Phase

3.8.3.1 The results of this qualitative risk assessment for landfill gas hazards indicate the risk level from the Project during the operational phase is from low to high. For the high risk targets such as indoor areas with free public access, a combination of active control system, passive control system, gas detection system and good site management should be provided. For the medium risk targets such as indoor areas with limited public access, semi-active control measures, together with passive control systems, gas detection system and good site management, should be provided. Maintenance staff working in the confined spaces should implement entry safety procedures as stipulated in the Factories and Industrial Undertakings (Confined Spaces) Regulation. By the provision of protective and precautionary measures, the risks of the targets have been reduced to acceptable levels.

3.8.3.2 In addition, the operational impacts on the landfill restoration facilities have been reviewed. The major human activities atop the Project Site would be golfing and routine lawn mowing. Adverse impacts on these facilities are not anticipated when appropriate maintenance, precautionary and protective measures are in place.

3.9 Ecology

3.9.1.1 Potential ecological impacts associated with the Project have been assessed in accordance with Clause 3.4.11 and Appendix I of the Study Brief, and Annexes 8 and 16 of the TM-EIAO.

3.9.1.2 Due consideration on impact avoidance and impact minimisation have been taken in the present Project. No marine works is proposed.

3.9.1.3 The Project Site is located in a restored landfill covered with man-made habitats of low ecological value including turfgrass in driving range and restoration plantation, and away from recognised sites of conservation importance and other important habitats. Surveys however revealed that Collared Crow and Black Kite would utilise some of the plantation trees as night roosts.

3.9.2 Construction Phase

3.9.2.1 The impacts of loss of man-made habitats caused by the Project are thus of limited severity. The future golf course will have a high greening proportion including newly planted tree groups and landscape areas with more native plant species and better ecological functions, besides the turfgrass on golf playing areas.

3.9.2.2 The area size of plantation trees available as the roosting sites for Collared Crow and Black Kite will be temporarily reduced during construction but the golf course layout design has maximised the tree groups to be preserved, including those more frequently used as night roosts, given the small size of the Project Site and other site constraints. Fencing will be erected surrounding the preserved tree groups as protection. Construction works will be implemented in phases to shorten the duration of impacts, to reduce the potential disturbance impacts and to facilitate early tree planting and landscape planting. Heavy standard trees will be incorporated into the soft landscape works to speed up the establishment of the trees to re-provide roost sites. Works hours of construction plants in certain locations will be restricted to halt at least one hour before sunset, to avoid disturbance to the roosting birds. Construction site runoff will be retained using the water storage tanks to avoid indirect impact on marine ecology.

3.9.3 Operational Phase

3.9.3.1 During the operational phase, the drainage system and water storage tanks with a total volume of 30,000m³ would ensure the collection and retention of runoff containing residual agrochemicals, and the reuse in irrigation. Only after prolonged raining, when residual agrochemicals

have been carried by the first flush into the water storage tanks and the tanks are full, further runoff might bypass the tanks and enter Tolo Harbour. A proper location of outfall sited away from the ecologically related WSRs is designed to further minimize the water quality impact. The sewage from the proposed development would be conveyed to TPSTW for treatment and emergency bypass is prevented by the design of the SPS. Residual adverse ecological impacts are not anticipated.

3.10 Fisheries

3.10.1.1 Potential fisheries impacts associated with the Project have been assessed in accordance with Clause 3.4.12 and Appendix J of the Study Brief and the criteria and guidelines stipulated in Annexes 9 and 17 of TM-EIAO.

3.10.1.2 The importance of fisheries resources within the assessment area are addressed based on the baseline information. Fishing areas within Tolo Harbour and Tolo Channel are generally of moderate fisheries production when compared with other waters in Hong Kong. However, the fishing grounds just outside the Project Site are of low fisheries production. The Tolo Channel from Whitehead to outer Tolo Channel was identified as an important nursery ground of commercial fisheries resources but it is over 4 km from the Project Site. Yim Tin Tsai FCZ is the nearest FCZ to the Project Site and it is about 700m distant.

3.10.2 Construction Phase

3.10.2.1 Because there will be no marine works or marine traffic for the Project, no permanent or temporary loss of fishing ground, fisheries habitats or aquaculture sites are expected during construction phase. Construction site runoff will be retained using the water storage tanks to avoid indirect impact on marine water quality and in turn on fisheries resources including fish culture zones.

3.10.3 Operational Phase

3.10.3.1 With the approaches for avoidance and minimization of impacts, and the proper design of drainage system, water storage tanks, and outfall location to address the potential impacts from residual agrochemicals, no unacceptable fisheries impacts on fishing grounds, spawning and nursery grounds, and fisheries and mariculture activities due to operations of the Project are anticipated.

3.11 Landscape and Visual

3.11.1.1 Potential landscape and visual impacts as a result of the Project have been assessed in accordance with Clause 3.4.13 and Appendix K of the Study Brief, EIAO Guidance Note No. 8/2010, and Annexes 10 and 18 of the TM-EIAO.

3.11.2 Landscape and Visual Baseline

3.11.2.1 Within the assessment area, there are a total of 25 Landscape Resources (LRs) including ex-landfill site plantation, mixed woodland, managed grassland, watercourse, agricultural field, seashore, waterbody, park and amenity area, roadside amenity planting and developed area. There are 4 Landscape Character Areas (LCAs) showing different and diverse residential, restored landfill site, waterfront park and industrial landscape characters within the assessment area. These LR and LCAs are considered to be relatively tolerable to the changes as a result of the Project and majority of them have a low to medium sensitivity to accommodate changes. Two LR including woodland and waterfront park have a high sensitivity to change. A total of 21 Visually Sensitive Receivers (VSRs) and 2 Planned Visually Sensitive Receiver (PVSR) are identified with the visual envelope, majority of VSRs in their living place have medium sensitivity to change as a result of the Project.

3.11.3 Review of the Planning Development Control Framework

3.11.3.1 The introduction of an 18-hole golf course is in similar nature and character of the existing 145-bay driving range currently exists on site. The provision and scale for both the staff quarters and overnight accommodation would be subject to the final lease conditions and any statutory town planning ordinance where applicable. In case if there is any conflict with the statutory town plan(s) and any published land use plan(s) which need for any further statutory submission, it will be separately submitted to comply with the respective authorities where applicable. The Project, either implemented with or without accommodations, is found integrated with the future outlook of the urban and coastal fringe landscape context along Ting Kok Road.

3.11.4 Landscape Impact Summary

Tree Impact

3.11.4.1 Impact on existing trees will be compensated by new tree planting. The Project would be able to accommodate 11,198 trees/whips including the retention of 1,874 existing trees in-situ or through transplanting of 326 trees in combination of the establishment of 4,180 newly planted trees and 4,818 whips will reinstate and enhance amenity within the Project Site and benefit to the neighbourhood landscape context. The species selection will predominantly utilise native or locally adopted species, with supplement of a range of ornamental and amenity tree species. Opportunities of tree replanting within the golf course have been maximised considering enough space reserved for tree preservation and tree transplanting and reserved enough for healthy tree establishment. A mix of tree stock selection for tree replanting, whip, standard to heavy standard size in general and mature size at strategic location, is subject to detailed design of the golf course and planting area profile and condition at later stage.

3.11.4.2 Four important trees are proposed to be retained within the Project Site. These important trees including *Ficus elastica* and *Ficus microcarpa*, and 2 nos. of *Aquilaria sinensis* will be retained in their current location.

Construction Phase Impact on LRs and LCAs

3.11.4.3 Substantial impact on plantation of ex-landfill site and moderate impact on managed grassland and the existing Golf Park Golf Driving Range within Project Site will be alleviated to moderate adverse to insubstantial mitigated impact.

3.11.4.4 Moderate adverse impact will be mitigated to slight adverse impact on restored landfill site LCA during construction phase.

Operational Phase Impact and Residual Impact on LRs and LCAs

3.11.4.5 With the adoption of responsive design of the Project layout and associated ancillary facilities, utilities and access road, tree preservation, full establishment of planting proposals within the Project Site, creation of continuous landscape buffer/tree planting at the periphery of the Project Site, restoration of the disturbed areas, introduction of landscape pond/lake, and minimisation of disturbance to existing topography and coastline, the substantial unmitigated impacts will be alleviated to moderate to slight level of mitigated impact (Yr 1). Upon full establishment of tree and planting proposals,

the residual impacts on the Plantation of Ex-landfill Site (within Project Site) (LR1.1) will be alleviated to slight adverse impact (Yr10), the Project will be slight to moderate beneficial to the remaining LRs including Managed Grassland on Ex-landfill Site and along Seashore within Project Site (LR3.1 and LR 3.2), and the Existing Golf Park Golf Driving Range (within Project Site) (LR10.1).

3.11.4.6 In addition to tree planting proposal mentioned above, the impact on restored landfill site landscape character area (LCA2) will be alleviate from moderate adverse unmitigated impact to slight adverse impact (Yr1) to insubstantial (Yr 10) during operational phase through the implementation of extensive turf area and shrub planting and introduction of landscape pond/lake to enhance the landscape and amenity value of the Project Site and making itself a better integration with the waterfront of Tolo Harbour and Tai Po urban landscape character adjoining to the Project Site. The minimisation of the change of coastline and existing topography also reduce the change of amenity and character of the Project Site. Given the above responsive design approach, the Project will fit into the existing urban and waterfront landscape context.

3.11.5 Visual Impact Summary

Construction Phase Impact on VSRs

3.11.5.1 Mitigation measures implemented during construction phase including preservation of existing trees, responsive hoarding, tidy site management and careful planning of the construction program, responsive construction method, advance tree transplanting and replanting works program as earliest as possible after sectional completion of the Project, the predicted level of impacts on the majority of VSRs would be alleviated from substantial to slight adverse unmitigated impact to moderate adverse to insubstantial mitigated impact on majority of VSRs.

Operational Phase and Residual Impact

3.11.5.2 As has been described above, the Project is compatible to the character of the existing uses such as the 145-bay driving range and plantation, which implied that replacement with an 18-hole golf course and associated ancillary facilities will reinstate and enhance the greenery coverage and also creates an unique recreational landscape character for the Project Site. The visual change would be considered as substantial to moderate (unmitigated impacts) in views of VSRs in proximity to the Project Site but it is a good change on quality with introduction of new greenery and landscape features without too much

altering the existing topography. Through the implementation of visual mitigation measures including minor amendment of site level regarding of the Project Site and topography largely maintained, creation of landscape buffer, planting works for recreational landscape and introduction of landscape ponds/lakes, the impact mitigated to a moderate to slight adverse mitigated impact (Yr1). The residual impacts (Yr10) and visual change on the views of residents and planned residents of low-rises along Lo Fai Road (VSR 1.2 and PVSr 1.3), and Residents of Fortune Garden (VSR2.1) and The Beverly Hills (VSR2.2) would be alleviated to slight level upon full establishment of landscape and visual mitigation measures. For the remaining VSRs with their views being blocked by existing development / screened off by greenery when viewing towards the Project Site, or viewing from long distance to the Project Site, will experience insubstantial residual impacts.

3.11.5.3 Key mitigation measures for the Project including the adoption of innovative and responsive design for the buildings and associated engineering structures, responsive building disposition and height profile, alignment of access road, minor change of grading and maintaining existing topography, introduction of recreational and landscape features in the Project and tree preservation, transplanting and tree planting proposal and application of alternative green feature such as green roof/vertical greening will soften the development mass and edges and enhance the visual amenity. As such the level of visual change arising from the implementation of the Project will not be apparent in majority views of VSRs and visually integrated with the urban and waterfront context.

3.11.5.4 In accordance with Annex 10 of the TM-EIAO, the landscape and visual impacts as a result of the Project would be ‘acceptable with mitigation measures’ that is to say ‘there would be some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures’.

4 Environmental Monitoring and Audit

- 4.1.1.1** An Environmental Monitoring and Audit (EM&A) programme has been formulated for Project which is a DP listed under Schedule 2 of the EIAO, with details presented in the separate EM&A Manual.
- 4.1.1.2** The EM&A programme will provide management actions to check the effectiveness of the recommended mitigation measures and compliance with relevant statutory criteria, thereby ensuring the environmental acceptability of the construction and operation of the Project.

5 Conclusion

- 5.1.1.1** The Chief Executive in Council has agreed in principle to the government proposal to grant a piece of land in Tai Po to Sha Lo Tung Development Company Limited (the Project Proponent) in exchange for its private land in Sha Lo Tung which has high ecological values.
- 5.1.1.2** Under the non-in-situ land exchange proposal, the piece of land at the Shuen Wan Restored Landfill in Tai Po will be granted to the Project Proponent and the Sha Lo Tung site would be considered by government for active conservation management to avoid degradation and damage for long-term public enjoyment.
- 5.1.1.3** This EIA Study has demonstrated the overall environmental acceptability of Shuen Wan Golf Course, in accordance with the Study Brief (ESB-303/2017) and the TM-EIAO. The Project is expected to meet all relevant environmental standards with the implementation of suitable mitigation measures during both construction and operational stages.