

8 Land Contamination

8.1 Introduction

The potential environmental issues associated with land contamination within the Project Study Area have been assessed and are presented in this section. Potential impacts from contaminated sites during construction and operation phases and the need for mitigation measures have been qualitatively assessed in accordance with section 3.1 of Annex 19 of the Technical Memorandum on EIA Process issued under the EIA Ordinance (EIAO-TM) as specified in Clause 3.4.7 of the EIA Study Brief (ESB-276/2014).

8.2 Environmental Legislation, Standards and Guidelines

In 2007, Environmental Protection Department (EPD) issued two guidelines for utilising Risk-based Remediation Goals (RBRGs) developed for Hong Kong, namely, "Guidance Note for Contaminated Land Assessment and Remediation" (Guidance Note) and "Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management" (Guidance Manual). The land contamination assessment was carried out in accordance with the Guidance Manual and Guidance Note. In addition, reference was also made to the "Practice Guide for Investigation and Remediation of Contaminated Land" (Practice Guide).

8.3 Assessment Methodology

In order to identify and evaluate the potential contamination impacts associated with the Project, the following tasks have been undertaken:

- Desktop appraisal to review the current and historical land uses;
- Acquisition of information related to potential land contamination from EPD and Fire Services Department (FSD); and
- Site reconnaissance to identify the current land uses.

In addition, the following related information have been collated and reviewed:

- Historical aerial photographs of the Project;
- Records of active (current) and inactive (past) registered chemical waste producers within the Project area;
- Records of current and past dangerous goods (DG) licences within the Study Area;
- Records of accidents that involved spillage / leakage of chemical waste or DG from EPD and FSD;
- Records and photographs from site visit.

Site reconnaissance survey was also undertaken to identify current land uses of the Project and to verify the findings of the desktop appraisal.

8.4 Identification of Potential Environmental Impacts

8.4.1 Desktop Appraisal

8.4.1.1 Historical Information

Relevant historical aerial photographs taken between 1975 and 2013, where available, were collected and reviewed. The aim of this review is to evaluate potential contamination implications associated with any land use changes within the Project Study Area. The development history of the Project Study Area is summarised below and a list of aerial photographs reviewed has been provided in the **Table 8.1**. Representative aerial photographs reviewed are presented in **Appendix 8.1**.

The Study Area is a former borrow site partly located within the old Frontier Closed Area, which has since been opened up. In 1980 and early 1990, the original topography of low conical hills and ridges was substantially modified by earthworks associated with the construction of Kong Nga Po Road and the site platforms at the proposed development area. Kong Nga Po Road was constructed and completed by 1986, while earthworks at the site continued until 1993. Since then, the Study Area has been mostly rural comprising ponds, open areas and scattered buildings / graves. According to the aerial photographs, mainly vegetated land and woodland were found within the Study Area. The Study Area has not experienced significant changes over this period. Vegetated area can be found at most of the Study Area since the 2013. No land uses causing potential contamination was identified within the Study Area from the available historical aerial photographs.

Table 8.1: Review of Aerial Photographs

Year	Height (Feet)	Photograph Reference Number
1975	12,500	11872
1986	10,000	A07939R
1994	4,000	CN8659
2004	4,000	CW63040
2004	4,000	CW63038
2008	6,000	CS17898
2008	6,000	CS17899
2013	6,000	CS43990

Source: Survey and Mapping Office, Lands Department

8.4.1.2 Review of Relevant Information from Government Departments

EPD and FSD have been contacted for the following information:

- Records of any active (present) and inactive (past) registered chemical waste producer(s) and any reported accidents of chemical waste spillage / leakage within the Study Area; and
- Records of any licensed dangerous goods (DG) store(s) and any reported accidents of spillage / leakage of DG within the Study Area.

A list of the chemical waste producers (CWPs) records had been provided by EPD. No registered CWP was identified in the Study Area after reviewing the CWPs records.

A letter reply had been provided by EPD which confirms that there is no record of chemical spillage / leakage within the Study Area. The reply from EPD is shown in **Appendix 8.2**.

According to the reply from FSD, there is no record of DG or incidents of spillage / leakage of DG within the Study Area. The reply from FSD is shown in **Appendix 8.2**.

8.4.2 Site Reconnaissance Survey

Site reconnaissance was conducted in 28 July 2015 to identify current land uses within the Study Area and to verify the findings of the desktop appraisal. The Study Area mainly consists of vegetated areas and concrete-paved ground. No potential land contamination issues were observed in the Study Area. No potential polluting activities were found during site reconnaissance in this area. Therefore, no sign of land contamination was observed.

The photographic records taken during site reconnaissance are shown in **Appendix 8.3** and site photo locations are shown in **Figure 8.1**.

8.5 Prediction and Evaluation of Environmental Impacts

8.5.1 Construction Phase

Based on the reviewed historical aerial photographs, the current land uses, site reconnaissance survey and the information collected from the relevant government departments, some general refuse was found within the development area (refer to Photo 6 of **Appendix 8.3**), but no potentially contaminated area within the Project was identified. The findings from the desktop appraisal and the site reconnaissance of the Project have been summarised in **Table 8.2**.

Table 8.2: Summary of Potential Land Contamination Impact

Location	Current Land Use	Historical Land Use	Potential Land Contamination Impact	Necessity for Further Site Investigation	Photo Ref. (in Appendix 8.3)
Kong Nga Po Road	Vehicular road	Vegetated area, slopes and road	No contaminative land uses were identified	No	1,2,3,4,5,11

Location	Current Land Use	Historical Land Use	Potential Land Contamination Impact	Necessity for Further Site Investigation	Photo Ref. (in Appendix 8.3)
Kong Nga Po development area	Vegetated area and vehicular road	Vegetated area, slopes and road	No contaminative land uses were identified	No	6, 7, 8, 9, 10

8.5.2 Operation Phase

The planned land uses within the Project will mainly include firing training, weapons training, driving and traffic training for the Hong Kong Police Force (HKPF). All cartridge casing and bullet heads will be collected from the firing range after each target practice and stored in the storeroom for disposal. Therefore, no contaminated land issue is anticipated during training activities.

A petrol/ diesel filling station will be provided in the Police Driving and Traffic Training Facilities (PD&TTF). Underground storage tanks will be used for oil storage. Refuelling will be carried out for the police vehicle fleet. Spills and leaks from storage tanks and pipework may pose potential land contamination issues. To prevent seepage of fuel into the ground, it is essential that any leaks should be promptly identified and cleaned up. With the precautionary measures to prevent fuel oil leakage and spillage discussed in **Section 8.6.2**, no adverse impacts on land contamination are anticipated.

Mobile oil refuelling truck for refuelling of helicopters will be required under some specific operational need upon request by Government Flying Services (GFS). The truck will temporarily park near the helipad and wait for the helicopter to arrive. The refuelling operation will be carried out at the helipad. Given that the refuelling activities will only be required on an as-needed basis, the chance of leakage of fuel will be minimal. All refuelling activities will be carried out under concrete-paved areas. With consideration of the infrequent refuelling activities and the minimal amount of fuel handled each time, as well as proper handling of refuelling truck and precautions on refuelling activities, no adverse impacts on land contamination are anticipated.

8.6 Recommendation of Mitigation Measures

8.6.1 Construction Phase

As no potential land contamination issues have been identified for the Project, specific mitigation measures are virtually not necessary. Nevertheless, in any case where contaminated soil is identified after the commencement of works, a Contamination Assessment Plan (CAP) is required to be prepared for EPD's endorsement prior to the site investigation. The Contamination Assessment Report (CAR) and/ or Remediation Action Plan (RAP) should be prepared for EPD's approval after the site investigation. If land contamination is confirmed, remediation works should be carried out according to the approved RAP. A Remediation Report (RR) should also be prepared for EPD's endorsement to demonstrate that the clean-up of the contaminated land is completed. No construction work or development of the site should be carried out before the approval of the RR.

The following mitigation measures are proposed for contaminated material excavation and transportation of contaminated materials (if any), in order to minimise the potentially adverse effects in the health and safety of construction workers and impacts arising from the disposal of potentially contaminated materials:

- To minimise the chance for construction workers to come into contact with any contaminated materials, bulk earth-moving excavation equipment should be employed;
- Contact with contaminated materials can be minimised by wearing appropriate clothing and personal protective equipment such as gloves and masks (especially when working directly with contaminated material), provision of washing facilities and prohibition of smoking and eating on site;
- Stockpiling of contaminated excavated materials on site should be avoided as far as possible;
- The use of any contaminated soil for landscaping purpose should be avoided unless pre-treatment was carried out;
- Vehicles containing any excavated materials should be suitably covered to reduce dust emissions and / or release of contaminated wastewater;
- Truck bodies and tailgates should be sealed to stop any discharge;
- Only licensed waste haulers should be used to collect and transport contaminated material to treatment/disposal site and should be equipped with tracking system to avoid fly tipping;
- Speed control for trucks carrying contaminated materials should be exercised;
- Observe all relevant regulations in relation to waste handling, such as Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354C) and obtain all necessary permits where required; and
- Maintain records of waste generation, disposal quantities and disposal arrangements.

8.6.2 Operation Phase

The implementation of appropriate mitigation measures for the underground storage tank and pipework, and refuelling activities is required to ensure that risk of land contamination as a result of fuel oil spills or leaks is kept to a practical minimum. Such measures should include the following:

- Adherence to relevant design standards for storage tank and pipework;
- Regular inspections and maintenance;
- Underground fuel storage tank should be placed within a concrete pit;
- Refuelling service area should be concrete-paved;
- Provision of spill control materials and equipment on site (e.g. absorbent materials, goggles, protective masks, nitrile gloves, disposal bags etc.);
- If the fuel leakage or spillage occurs during refuelling activities, the activities should be immediately stopped; and
- Fuel leakage or spillage should be contained and cleaned up immediately. Waste fuel oil should be collected and stored for recycling or disposal in accordance with the Waste Disposal Ordinance.

8.7 Evaluation of Residual Environmental Impacts

Based on the desktop appraisal and the site reconnaissance survey results for land contamination assessment of the Project, no contaminated land issue has been revealed. Hence, no land remediation action is proposed. As such, no residual impact in relation to land remediation is anticipated.

With the recommended mitigation measures in place to prevent, contain and clean-up spills and leaks of fuel oil stored or conveyed to and from the site, no land contamination would be expected to arise and no residual impacts are predicted.

8.8 Environmental Monitoring and Audit Requirements

No potential land contamination issues have been identified for the construction and operation phases of Project. Therefore, no adverse impacts are anticipated and no specific monitoring is required.

Nevertheless, in any case where contaminated soil is identified after the commencement of works, the requisite land contamination assessment process under EIAO should be conducted and if contamination is confirmed, remediation works should be carried out. In such an event, bulk excavation of soil for decontamination works would take place and environmental monitoring of decontamination works should be considered, with such monitoring to include regular site inspections.

8.9 Conclusion

8.9.1 Construction Phase

The land contamination assessment has been conducted by reviewing the historical and current land uses, desktop appraisal and site reconnaissance survey with respect to the potential land contamination at the Study Area. Other relevant information collected from the related government departments has been reviewed.

Based on the findings of the desktop appraisal of the historical and current land uses and the site survey in the Study Area, land contamination impacts associated with construction of the Project is not anticipated.

In case contaminated materials are discovered after the commencement of works, mitigation measures for handling of contaminated materials and regular site audits are recommended to minimise the potential adverse impacts on workers' health and safety and remediation/ disposal of potentially contaminated materials.

8.9.2 Operation Phase

The planned land uses within the Project will mainly include firing training, weapons training, driving and traffic training. All cartridge casing and bullet heads will be collected from the firing range after each target

practice and stored in the storeroom for disposal. Therefore, no contaminated land issue is anticipated during training activities.

A petrol/ diesel filling station will be provided in the PD&TTF. Spills and leaks from underground storage tanks and pipework may pose potential land contamination issues. With the recommended mitigation measures in place, no land contamination would be expected to arise and no adverse impacts are anticipated.

Mobile oil refuelling truck for refuelling of helicopters will be required under some specific operational need. The refuelling activities will be carried out at the helipad. With the recommended mitigation measures in place, no land contamination would be expected to arise and no adverse impacts are anticipated.