

4 EM&A ON DECOMMISSIONING OF THE REMAINING PARTS (EX-GFS BUILDING AND RADAR STATION) OF THE FORMER KAI TAK AIRPORT

4.1 Introduction

4.1.1 This section details the specific EM&A requirements for Schedule 2 DP3a: Decommissioning of the Remaining Parts (Ex-GFS Building and Radar Station) of the Former Kai Tak Airport. The requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of this DP are presented. The project organisation, site environmental audit and reporting requirements are stipulated in Chapters 1, 14 & 15 of this Manual respectively.

4.2 Air Quality Impact

4.2.1 The findings of the EIA indicated that with the implementation of dust suppression measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* during construction, no adverse residual air quality impact would be expected. Dust monitoring is not required. However, regular site audit (see Section 14 of this Manual) is required to ensure compliance of the *Air Pollution Control (Construction Dust) Regulation*.

Mitigation Measures

4.2.2 As described in the EIA Report, no adverse air quality impacts at the ASRs are expected during the construction phase of this DP.

4.2.3 Mitigation measures for dust are recommended in the EIA Report. The Contractor shall be responsible for the design and implementation of these measures.

4.2.4 In order to ensure compliance with the acceptable criteria at the ASRs at all time, requirements of the *Air Pollution Control (Construction Dust) Regulation* shall be adhered to during the construction period. Misting for any stockpile of materials and provision of windbreaks on three sides are proposed to prevent wind erosion. In addition, the following good site practices are recommended to minimise dust and other air pollutants impacts during excavation, transportation, and loading and unloading of dusty material:

- The excavation area should be limited to as small in size as possible and backfilled with clean and/or treated soil shortly after excavation work.
- The exposed excavated area should be covered by the tarpaulin during night time.
- The top layer soils should be sprayed with fine misting of water immediately before the excavation.
- Stockpiling site(s) should be lined with impermeable sheeting and banded. Stockpiles should be fully covered by impermeable sheeting to reduce dust and other air pollutants emission.
- Misting for the dusty material should be carried out before being loaded into the vehicle.
- Any vehicle with an open load carrying area should have properly fitted side and tail boards.
- Material having the potential to create dust should not be loaded from a level higher than the side and tail boards and should be dampened and covered by a clean tarpaulin.
- The tarpaulin should be properly secured and should extend at least 300 mm over the edges of the sides and tailboards. The material should also be dampened if necessary before transportation.
- The vehicles should be restricted to maximum speed of 10 km per hour and confined haulage and delivery vehicle to designated roadways insides the site. On-site unpaved roads should be compacted and kept free of loose materials.
- Vehicle washing facilities should be provided at every vehicle exit point.

- The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcore.
- Every main haul road should be sealed with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet.
- Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed in an area sheltered on the top and the three sides.
- Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites.

4.2.5 The mitigation measures shall be implemented during the process of solidification and biopiling are described as follows.

Solidification

- The solidification pit/area should be provided with dust suppression measures.
- Handling and mixing of cement shall follow *Air Pollution Control (Construction Dust) Regulation* to limit cement emission.
- The bin should be covered during residence period after mixing process.

Biopiling

- During the course of biopile formation, the stockpiled soils at the biopiles should be covered by tarpaulin or low permeable sheet to avoid fugitive emissions of dust or any air pollutants from the biopiles affecting the surrounding environment and to minimise runoff from the stockpiled soils. Biopile(s) should be covered by impermeable sheeting (such that no longer than 5m of a biopile should be exposed to open air) to avoid fugitive emissions of dust or any pollutants from the biopile(s).
- Upon formation of a biopile, the biopile should be covered by low permeable geotextiles to prevent dust emission and runoff.
- During the operation of biopile, the biopiles should be fully covered to control the extraction of VOCs.
- The vented air from the biopile(s) should be connected to blower and carbon adsorption system with 99% control efficiency for treatment before release to the atmosphere. Exhaust air from the blower and carbon adsorption system should be monitored for TVOC bi-weekly to check the performance of the carbon filter. The frequency of monitoring might be adjusted subject to review on site. The location of the exhaust of the carbon filter should be sited as far away as possible from the nearby ASRs.
- Spent activated carbon of the carbon adsorption system should be replaced at appropriate intervals such that the TVOC emission concentration from the system is acceptable (i.e. the measured TVOC concentration is below 20ppm).

4.2.6 The implementation schedule for the recommended air quality impact mitigation measures is presented in **Appendix A3**.

4.3 Noise Impact

4.3.1 The findings of the EIA study indicated that no adverse construction noise impacts would be expected on the noise sensitive receivers (NSRs) in the vicinity of the work areas of this DP in view of the large separation distance between the potential construction noise sources and the nearby NSRs. Construction noise monitoring is therefore not considered necessary. However, regular site audit (see Section 14 of this Manual) is required to ensure proper implementation of the proposed good site practices.

Mitigation Measures

4.3.2 In order to ameliorate the construction noise impacts, good site practices listed below should be adopted by all the Contractors:

- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program;
- Mobile plant, if any, should be sited as far away from NSRs as possible;
- Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs;
- Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

4.3.3 The implementation schedule for the recommended mitigation measures is presented in **Appendix A3**.

4.4 Water Quality Impact

Introduction

4.4.1 No off-site marine water quality impact would be expected from this DP and given that there would not be any marine-based works for the proposed works, water quality monitoring is not considered necessary. However, it is recommended that regular site audits (at least once per week) be undertaken to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are properly implemented. Proposed mitigation measures for containing and minimizing water quality impacts are listed in the implementation schedule given in **Appendix A3**.

Site Audits

4.4.2 Implementation of regular site audits (at least once per week) is to ensure that the recommended mitigation measures are to be properly undertaken. It can also provide an effective control of any malpractices and therefore achieve continual improvement of environmental performance on site.

4.4.3 Site audits shall include site inspections and monitoring audits.

Site Inspections

4.4.4 Site inspections shall be carried out by the ET and shall be based on the mitigation measures for water pollution control recommended in the implementation schedule as attached in **Appendix A3**. In the event that the recommended mitigation measures are not fully or properly implemented, deficiency shall be recorded and reported to the site management. Suitable actions are to be carried out to:

- Investigate the problems and the causes;
- Issue action notes to the Contractor which is responsible for the works;
- Implement remedial and corrective actions immediately;
- Re-inspect the site conditions upon completion of the remedial and corrective actions; and
- Record the event and discuss with the Contractor for preventive actions.

Monitoring Audits

4.4.5 Monitoring audits are to be undertaken to ensure that a valid discharge license has been issued by EPD prior to the discharge of effluent from the construction site. Parameters included in the WPCO licence, will also be included in the monitoring programme. The chemical testing of water samples collected in the monitoring programme should be undertaken by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory. The audit results reflect whether the effluent quality is in compliance with the discharge license requirements and that the recommended water quality mitigation measures are properly implemented. In case of non-compliance, suitable actions should be undertaken to:

- Notify the site management for the non-compliance;
- Identify the sources of pollution;
- Check the implementation status of the recommended mitigation measures;
- Investigate the operating conditions of the on-site treatment systems;
- Implement corrective and remedial actions to improve the effluent quality;
- Increase monitoring frequency until the effluent quality is in compliance with the discharge licence requirements; and
- Record the non-compliance and propose preventive measures.

4.5 Waste Management Implications

Introduction

4.5.1 Waste management will be the Contractor's responsibility to ensure that all wastes produced during the decommissioning works of the Project are handled, stored and disposed of in accordance with good waste management practices and EPD's regulations and requirements.

4.5.2 Waste materials generated during the decommissioning works, such as construction and demolition (C&D) material, general refuse and chemical wastes, are recommended to be audited at regular intervals (at least once per week) to ensure that proper storage, transportation and disposal practices are being implemented. This monitoring of waste management practices will ensure that these solid and liquid wastes are not disposed into the nearby harbour waters. The Contractor will be responsible for the implementation of any mitigation measures to minimise waste or redress problems arising from the waste materials.

Waste Control and Mitigation Measures

4.5.3 Mitigation measures for waste management are summarised below. With the appropriate handling, storage and removal of waste arisings during the decommissioning works as defined below, the potential to cause adverse environmental impacts will be minimised.

Good Site Practices

4.5.4 Adverse impacts related to waste management are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the decommissioning works include:

- Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site;
- Training of site personnel in proper waste management and chemical waste handling procedures;
- Provision of sufficient waste disposal points and regular collection for disposal;

- Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;
- A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites).

Waste Reduction Measures

4.5.5 Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:

- Sorting C&D waste from demolition of the remaining structures to recover recyclable portions such as metals;
- Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Encouraging collection of aluminium cans, PET bottles and paper by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the work force;
- Recycling any unused chemicals or those with remaining functional capacity;
- Proper storage and site practices to minimise the potential for damage or contamination of construction materials;
- Planning and stocking construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.

4.5.6 In addition to the above measures, specific mitigation measures are recommended below for the identified waste arisings to minimise environmental impacts during handling, transportation and disposal of these wastes.

Construction and Demolition Material

4.5.7 The C&D material should be sorted on-site into inert C&D material (that is, public fill) and C&D waste. The inert C&D material would require disposal to the designated public fill reception facility. C&D waste, such as steel and other metals should be re-used or recycled and, as a last resort, disposed of to landfill. It is recommended that a suitable area be designated to facilitate the sorting process and a temporary stockpiling area will be required for the separated materials.

4.5.8 In order to monitor the disposal of public fill and C&D waste at public filling facilities and landfills, respectively, and to control fly tipping, a trip-ticket system should be included as one of the contractual requirements and implemented by the ET. The IEC should be responsible for auditing the results of the system.

General Refuse

4.5.9 General refuse should be stored in enclosed bins or compaction units separate from C&D material. A licensed waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D material. Effective collection and storage methods (including enclosed and covered area) of site wastes would be required to prevent waste materials from being blown around by wind, wastewater discharge by flushing or leaching into the marine environment, or creating odour nuisance or pest and vermin problem.

Chemical Wastes

- 4.5.10 After use, chemical wastes (for example, cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. Spent chemicals should be collected by a licensed collector for disposal at the CWTF or other licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.
- 4.5.11 **Table 4.1** provides a summary of the various waste types likely to be generated during the decommissioning works, together with the recommended handling and disposal methods.

Table 4.1 Summary of Waste Handling Procedures and Disposal Routes

Waste Type	Generated From Works Item	Total Quantity Generated	Quantity to be disposed off-site / re-used	Handling	Disposal
C&D Material	Decommissioning of the remaining parts of the former Kai Tak Airport and decontamination of the south apron area	- 9,500 m ³ for demolition of ex-GFS Building - 5,000 m ³ for demolition of ASDE radar tower - 28,750 m ³ for decommissioning and decontamination of the south apron	Landfill / public fill	Dust and water Dust quality mitigation measures	Sort on-site into Inert C&D material to be disposed off-site to the designated public fill reception facility, C&D material should be reused as far as practicable
Chemical Wastes	Lubrication oil, fuel etc. from operation, maintenance, and servicing of construction and decontamination treatment plant and equipment, and from decontamination works	Few cubic metres per month (preliminary estimate)	Few cubic metres per month (preliminary estimate)	Recycle on-site or by licensed companies Stored on-site within suitably designed containers	Chemical Waste Treatment Facility or other licensed facility
General Refuse	Waste paper, discarded containers etc. generated from workforce	Few cubic metres per month (preliminary estimate)	Few cubic metres per month (preliminary estimate)	Provide on-site refuse collection points	Refuse station for compaction and containerisation and then to landfill

- 4.5.12 The implementation schedule of the recommended mitigation measures is presented in **Appendix A3**.

4.6 Land Contamination Impact

Introduction

- 4.6.1 The EIA study has evaluated the potential land contamination issues for the remaining facilities, structures and buildings within the former Kai Tak Airport that were not covered under the previous EIAs on decommissioning of former Kai Tak Airport registered under the EIAO (namely EIA on Decommissioning of the Former Kai Tak Airport other than the North Apron and EIA on Kai Tak Airport North Apron Decommissioning).
- 4.6.2 For land contamination identified within the ex-GFS building, the EIA study has recommended excavating the contaminated soil from the proposed excavation zone within the ex-GFS building area for carrying out soil treatment at the proposed decontamination works area located at the northern part of the South Apron of the former Kai Tak Airport as shown in **Figure 2.4**.
- 4.6.3 The confirmation sampling / testing shall be carried out by the Environmental Team (ET) for (i) soil excavation (to ensure complete excavation of contaminated soil); (ii) biopiling (to ensure attainment of cleanup targets); and (iii) solidification / stabilization (to ensure attainment of cleanup targets). In addition, independent environmental checker (IEC) shall carry out independent checking on the above confirmation sampling / testing for not less than 10% of total numbers of samples and the scope shall cover sampling works and laboratory analysis by an independent Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory.
- 4.6.4 All contamination identified at the ex-GFS building shall be remediated before commencement of any demolition / construction works at the concerned sites to avoid disturbance on the ground. The duration of remediation shall be taken into account by the Project Proponent and the Contractor as part of the decommissioning programme.
- 4.6.5 In all cases, contaminated soil remediation and treatment must be managed in an environmentally sound manner, including compliance with all relevant legislation and Government requirements.

Confirmation Sampling / Testing for Soil Excavation

Sampling and Testing Requirements

- 4.6.6 After excavation, confirmation samples shall be undertaken at limits of excavation to confirm that all contaminated soils have been excavated. The confirmation samples shall be analysed by a HOKLAS accredited laboratory and if the analytical results are below the relevant Dutch B levels. If the analytical samples exceed the relevant action levels, more soil shall be excavated (either with 0.5m increment in vertical or 1m in horizontal direction depending on whether the exceeding confirmation sample is collected from a sidewall or excavation base), and additional confirmation samples shall be collected and analysed until all confirmation samples are below the relevant action levels.
- 4.6.7 One confirmation sample shall be collected from the excavation pit bottom and one from each sidewall of the excavation pit. The depth of sampling shall be based on the depth of the original sample collected during the site investigation (SI) sample result that triggered excavation in that area. If there are any visible indications of impact, samples shall be collected from the apparent impact zone(s).

Compliance Assessment and Event / Action Plan

4.6.8 If the analytical results of the confirmation samples are below the concerned action levels for soil remediation, removal of the contaminated soil shall be considered complete. If the analytical results exceed the relevant action levels, more soil shall be excavated (either with 0.5m increment in vertical or 1m horizontal direction depending on whether the exceeding confirmation sample is collected from a sidewall or excavation base). Additional confirmation samples shall be collected and analysed until all confirmation samples are below the relevant Action Levels. The Event and Action Plan for confirmation sampling / testing for soil excavation is provided in **Table 4.2**.

Table 4.2 Event and Action Plan for Confirmation Sampling / Testing for Soil Excavation

Event	Action	Action Party
The concentration of the contaminant(s) for the SI sample that triggered the excavation exceed the relevant Action Levels for soil remediation (as tabulated in Table 4.3 below	(i) Collect one confirmation sample from the excavation pit bottom and one from each sidewall of the excavation pit and analyse	Contractor
The concentration(s) of the contaminant(s) for the confirmation sample exceed the relevant Action Levels for soil remediation (as tabulated in Table 4.3 below).	(i) More soil shall be excavated either laterally or vertically depending on whether the exceeding confirmation sample is from a sidewall or excavation base; (ii) Additional confirmation samples shall be collected and analysed until all confirmation samples are below the relevant Action Levels.	Contractor

Table 4.3 Concerned Action Levels for Soil Excavation

Contaminants	Action Level (mg/kg)*
TPH	1000
Phenanthrene	10
Benzo(a)pyrene	1
Fluoranthene	10
Pyrene	10
Copper	100
Lead	150
Zinc	500
Cadmium	5
Nickel	100
Cobalt	50

Remarks:

*The action level adopted is the Dutch B level provided in the Practice Note ProPECC PN3/94 "Contaminated Land Assessment and Remediation" issued by Environmental Protection Department.

Confirmation Sampling / Testing for Biopiling

Sampling and Testing Requirements

- 4.6.9 The objective of the biopile closure assessment is to collect soil samples for testing in order to ensure that the soil contaminant levels in the biopiles are below the cleanup targets for TPH / SVOCs.
- 4.6.10 Confirmation samples shall be collected at a sampling frequency of one sample per 100m³ of soil treated. The samples shall be collected at representative locations distributed evenly throughout the biopile and at various depths within the biopile. Sample locations within the biopile shall be documented accurately so that the analytical results can be correlated with the sampling locations within the biopile.
- 4.6.11 Access to the sampling locations shall be through opening of heat bonded cover panels. These openings shall be closed after each access. Extracting of the soil samples shall be accomplished by using a hand auger or other methods approved by the ER.
- 4.6.12 All soil samples shall be analysed in an HOKLAS accredited laboratory for TPH and SVOCs.

Compliance Assessment and Event / Action Plan

- 4.6.13 If the analytical results of the confirmation samples are below the concerned cleanup targets for biopiling, cleanup of the contaminated soil shall be considered complete. Individual soil lot which has demonstrated meeting the cleanup target could be removed from the biopile provided the lot would not affect the operation of biopile or would not be affected by adjacent soil lots still under treatment. If the analytical results exceed the relevant cleanup targets, the concerned biopile treatment system shall have to be restarted to fully decontaminate the soil. The Event and Action Plan for confirmation sampling / testing for biopile closure assessment is given in **Table 4.4**.

Table 4.4 Event and Action Plan for Confirmation Sampling / Testing for Biopiling

Event	Action	Action Party
Exceedance of any cleanup targets for the contaminants (as tabulated in Table 4.5 below)	Concerned biopile treatment system shall be restarted to fully decontaminate the soil	Contractor

Table 4.5 Concerned Action Levels for Biopiling

Contaminants	Action Level (mg/kg)*
TPH	1000
Phenanthrene	10
Benzo(a)pyrene	1
Fluoranthene	10
Pyrene	10

Remarks:

*The action level adopted is the Dutch B level provided in the Practice Note ProPECC PN3/94 "Contaminated Land Assessment and Remediation" issued by Environmental Protection Department

Confirmation Sampling / Testing for Solidification / Stabilization

Sampling and Testing Requirements

- 4.6.14 Following solidification / stabilization treatment for metal-contaminated soil and curing of the solidified soil, confirmation sampling / testing shall be undertaken to ensure that the cleanup targets have been attained.
- 4.6.15 Confirmation samples shall be collected at a sampling frequency of one sample per 100m³ of treated material. Each sample shall be a composite sample collected at 5 locations throughout the treated soil pile and the same volume of sample shall be collected at each of the locations so that the composite sample is not biased.
- 4.6.16 Confirmation samples shall be analysed in an HOKLAS accredited laboratory for the concerned soluble metals using Toxicity Characteristics Leaching Procedure (TCLP) in accordance with USEPA Method 1311.
- 4.6.17 In order to ensure that the soil is fully solidified in the solidification process, all the soil treated with solidification / stabilization shall be tested for unconfined compressive strength. All the treated soil shall have an unconfined compressive strength of at least 150 pound-force per square inch (psi) (1MPa), with reference to USEPA guideline (USEPA 1986) for hazardous waste solidification / stabilization requirement.

Compliance Assessment and Event / Action Plan

- 4.6.18 The "Universal Treatment Standards" (UTS) shall be used for interpretation of the TCLP test results to assess if the cleanup targets have been attained.
- 4.6.19 If either the cleanup targets or the target unconfined compressive strength have not been achieved, the treated material shall be crushed and returned to the solidification / stabilization process. The Event and Action Plan for confirmation sampling / testing for solidification / stabilization treatment is given in **Table 4.6**.

Table 4.6 Event and Action Plan for Confirmation Sampling / Testing for Solidification/ Stabilization

Event	Action	Action Party
Respective cleanup targets (as tabulated in Table 4.7) of any confirmation samples have not been attained	The treated material shall be crushed and returned to the solidification / stabilization until the respective cleanup targets have been achieved.	Contractor
Unconfined compressive strength of 150 pound force per square inch (psi) (1MPa) has not been attained		

Table 4.7 Concerned Action Levels for Solidification/ Stabilization

Contaminants	Action Level (mg/kg)*
Lead	0.75 mg/L as TCLP
Copper	7.8** mg/L as TCLP
Zinc	4.3 mg/L as TCLP
Cadmium	0.11 mg/L as TCLP
Nickel	11 mg/L as TCLP
Cobalt	Not Available**

Remarks:

* Reference to Universal Treatment Standards (UTS) of U.S. Resource Conservation and Recovery Act (RCRA) in Title 40 of the Code of Federal Regulations (CFR) Parts 268.

**It should be noted that the UTS standard for copper and cobalt are unavailable. To determine the UTS for copper, a comparison has been made between Drinking Water Standards for the USEPA and the USEPA Federal Register. It was found that the 2 sets of standards differ by a factor of ~6 (for Chromium) to ~2950 (for Cyanide). Using a more conservative approach, the factor of 6 is taken. Therefore, the UTS for copper is taken to be the Drinking Water Standard value of 1.3mg/L times a factor of 6, giving a value of 7.8mg/L. For cobalt, it should be noted that there is no UTS or USEPA Drinking Water Standard for Cobalt. Therefore, a cleanup standard is not established for Cobalt. However, it is expected that the solidification process will likely isolate the Cobalt in the same manner as the other COC present.

Environmental Mitigation Measures and Safety Measures

- 4.6.20 To minimise the potentially adverse environmental impacts arising from the handling of potentially contaminated materials in the ex-GFS building, the following environmental mitigation measures are proposed during the course of the site remediation:

Excavation and Transportation

- Excavation profiles must be properly designed and executed.
- Stockpiling site(s) should be lined with impermeable sheeting and bunded. Stockpiles should be fully covered by impermeable sheeting to reduce dust emission. If this is not practicable due to frequent usage, regular watering should be applied. However, watering should be avoided on stockpiles of contaminated soil to minimise contaminated runoff.
- Stockpiles of contaminated soil should be properly covered by impermeable sheeting to minimize contaminated runoff from the stockpiles.
- Excavation and stockpiling should be carried out during dry season as far as possible to minimise contaminated runoff from contaminated soils.
- Supply of suitable clean backfill material is needed after excavation.
- Vehicles containing any excavated materials should be suitably covered to limit potential dust emissions or contaminated wastewater run-off, and truck bodies and tailgates should be sealed to prevent any discharge during transport or during wet conditions.
- Speed control for the trucks carrying contaminated materials should be enforced.
- Vehicle wheel and body washing facilities at the site's exist points should be established and used.

Biopiling

- To avoid fugitive emissions of dust or any air pollutants from the biopile(s) and to minimise runoff from the stockpiled soils, the stockpiled soils at the biopiles should be covered by impermeable sheeting such that not longer than 5m of the biopile is exposed to open air.
- Upon formation of a biopile, the biopile should be fully covered by impermeable sheeting to prevent dust emission and runoff.
- Impermeable sheeting should be placed at the bottom of the biopiles and leachate collection sump should be constructed along the perimeter of the biopiles to prevent leachate from contaminating the underlying soil/groundwater. The collected leachate should be discharged following the requirements of Water Pollution Control Ordinance (WPCO).
- The vented air from the biopile(s) should be connected to blower and carbon adsorption system with 99% control efficiency for treatment before release to the atmosphere. Exhaust air from the blower and carbon adsorption system should be monitored for TVOC bi-weekly to check the performance of the carbon filter. The frequency of monitoring might be adjusted subject to review on site.
- The biopiles should be fully covered by impermeable sheeting to control the extraction of TVOC.
- Spent activated carbon of the carbon adsorption system should be replaced at appropriate intervals such that the TVOC emission concentration from the system is acceptable (i.e. the measured TVOC concentration is below 20ppm).
- Silencers should be installed at the biopile blowers to minimise noise impact.
- Contaminated runoff from biopile(s) should be prevented by constructing concrete bunds along the perimeter of the biopiles.

Solidification / Stabilization

- The loading, unloading, handling, transferring and storage of cement should be carried out in an enclosed system.
 - Mixing process and other associated material handling activities should be properly scheduled to minimise potential noise impact.
 - Mixing of contaminated soils with cement / water / other additive(s) should be undertaken at a solidification plant to minimise the potential for leaching.
 - Runoff from the solidification / stabilization area should be prevented by constructing concrete bunds along the perimeter.
- 4.6.21 In addition, the following basic health and safety measures shall be implemented as far as possible to minimise the potentially adverse effects on health and safety of construction workers during the course of site remediation:
- Set up a list of safety measures for site workers;
 - Provide written information and training on safety for site workers;
 - Keep a log-book and plan showing the contaminated zones and clean zones;
 - Maintain a hygienic working environment;
 - Avoid dust generation;
 - Provide face and respiratory protection gear to site workers;
 - Provide personal protective clothing (e.g. chemical resistant jackboot, liquid tight gloves) to site workers; and
 - Provide first aid training and materials to site workers.
- 4.6.22 Since some small parts of the ex-GFS building and Radar Station including the transformer room and the generator room etc. were still under operation during the previous land contamination site investigation (SI), SI at those areas was not possible due to site accessibility and safety issues. For these remaining areas with potential land contamination concerns, a supplementary land contamination SI was recommended to be carried out upon the cessation of the operations and prior to the redevelopment. A supplementary sampling plan providing the sampling and laboratory analysis information for supplementary SI in these areas has been included in the respective CAR and/ or RAP for ex-GFS building and Radar Station. The supplementary SI shall be carried out once the area is accessible, and a supplementary CAR and if necessary RAP shall be prepared. If contamination is identified in the supplementary SI, remediation shall be performed according to the supplementary CAR/RAP upon EPD's approval.
- 4.6.23 For any excavation works at Radar Station and ex-GFS building, as the risk due to dermal contact with groundwater by site workers is uncertain, it is recommended that personnel protective equipment (PPE) be used by site workers as a mitigation measure.
- 4.6.24 The implementation for the recommended land contamination mitigation measures is presented in **Appendix A3**. In the event of exceedances or complaints, the ET and / or the Contractor shall be responsible for reviewing the effectiveness of these measures and for proposing, designing and implementing alternative measures as appropriate.

4.7 Impact on Cultural Heritage

- 4.7.1 The EIA Study concluded that the sites of the proposed decommissioning sites of the ex-GFS Building and the Radar Station are not in close proximity to any of the existing built heritage resources and are not on any area of archaeological potential. No mitigation and monitoring and audit programme specific for cultural heritage would be required for the proposed decommissioning works.

4.8 Landscape and Visual Impact

- 4.8.1 The sensitive receivers are shown in **Figure 4.1, 4.2, 4.3**.
- 4.8.2 The EIA Study concluded that due to the small scale and temporary nature of DP3a, it will result in insubstantial landscape and visual impacts during the construction phase and there will be no impact during the operation phase. Therefore, no mitigation measure and monitoring and audit programme specific for landscape and visual impact would be required for the proposed decommissioning works.