6 Waste Management Implications

6.1 Introduction

This Section provides an evaluation of the potential waste management implications associated with the construction and operation of the Project. Mitigation measures have been proposed if considered necessary.

6.2 Relevant Legislation, Standards and Guidelines

The criteria and guidelines for evaluating potential waste management implications are laid out in Annexes 7 and 15 of the revised Technical Memorandum on EIA Process (EIAO-TM) effective since 30 June 2023 under Section 16 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499). The following legislation covers, or has some bearing upon the handling, treatment and disposal of the wastes generated from the construction and operation of the Project.

- Waste Disposal Ordinance (Cap.354).
- Waste Disposal (Chemical Waste) (General) Regulation (Cap 354C).
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N).
- Land (Miscellaneous Provisions) Ordinance (Cap.28).
- Public Health and Municipal Services Ordinance (Cap.132) – Public Cleansing and Prevention of Nuisances Regulation.

Waste Disposal Ordinance (Cap.354) and Construction Waste Disposal Charging Scheme

The Waste Disposal Ordinance (WDO) prohibits unauthorised disposal of wastes. The Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap.354N) and the Waste Disposal (Designated Waste Disposal Facility) Regulation (Cap.354L), which set out details of the construction waste disposal charging scheme, were enacted in January 2005. Construction waste is defined under Cap. 354N of the WDO as any substance, matter or thing that is generated and abandoned from construction works regardless if it has been processed or stockpiled before being abandoned, excluding sludge, screenings or any matter removed or generated from desludging, desilting or dredging works. Under the construction waste disposal charging scheme, construction waste producers are required to open a billing account with the Environmental Protection Department (EPD) before using designated waste disposal facilities and pay the appropriate charges for disposal of their construction waste. Under Cap. 354L of the WDO, construction waste delivered to a landfill for disposal must not contain more

than 50% by weight of inert construction waste. Construction waste delivered to a sorting facility for disposal must contain more than 50% by weight of inert construction waste, and construction waste delivered to a Public Fill Reception Facility (PFRF) for beneficial reuse in other projects must consist entirely of inert construction waste.

Waste Disposal (Chemical Waste) (General) Regulation (Cap.354C)

Issued under the WDO, the Waste Disposal (Chemical Waste) (General) Regulation administers the possession, storage, collection, transport and disposal of chemical wastes. EPD has also issued three guidelines detailing how the Contractor should comply with the regulations on chemical wastes, namely A Guide to the Chemical Waste Control Scheme (updated in 2023), A Guide to the Registration of Chemical Waste Producers (2024) and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (updated in 2023).

Land (Miscellaneous Provisions) Ordinance (Cap.28)

The inert Construction and Demolition (C&D) materials (also called public fill) may be taken to PFRFs. PFRFs usually form part of land reclamation schemes and are operated by the Civil Engineering and Development Department (CEDD) and others. The Land (Miscellaneous Provisions) Ordinance requires that individuals or companies who deliver inert C&D materials to the PFRFs to obtain Dumping Licenses. The licenses are issued by CEDD under delegated authority from the Director of Lands.

Public Health and Municipal Services Ordinance (Cap.132) – Public Cleansing and Prevention of Nuisances Regulation

This Regulation provides a further control on the illegal dumping of wastes on unauthorised (unlicensed) sites.

Other Relevant Guidelines

Other guideline documents which detail how the Contractor will comply with the WDO and its associated regulations include:

- Works Branch Technical Circular (WBTC) No. 2/93, Public Dumps.
- WBTC No. 2/93B, Public Filling Facilities.
- WBTC No. 16/96, Wet Soil in Public Dumps.
- WBTC Nos. 4/98 and 4/98A, Use of Public Fill in Reclamation and Earth Filling Projects.
- WBTC No. 12/2000, Fill Management.
- WBTC No. 19/2001, Metallic Site Hoardings and Signboards.
- WBTC No. 12/2002, Specification Facilitating the Use of Recycled Aggregates.
- Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TC(W)) No. 19/2005 Environmental Management on Construction Site.

- Development Bureau (DEVB) TC(W) No. 6/2010, Trip Ticket for Disposal of Construction and Demolition Materials.
- DEVB TC(W) No. 8/2010, Enhanced Specification for Site Cleanliness and Tidiness.
- DEVB TC(W) No.2/2011, Encouraging the Use of Recycled and Other Green Materials in Public Works Projects.
- DEVB TC(W) No. 9/2011, Enhanced Control Measures for Management of Public Fill.
- Project Administration Handbook (PAH) for Civil Engineering Works (2022 Edition) – Section 4.1.3 of Chapter 4 - Construction and Demolition Materials.
- Monitoring of Solid Waste in Hong Kong 2022

6.3 Assessment Methodology

The potential environmental impacts associated with the handling and disposal of waste arising from the construction and operation of the Project were assessed in accordance with the criteria presented in Annexes 7 and 15 of the revised EIAO-TM and summarized as follows.

- Estimation of the types and quantities of the wastes to be generated.
- Evaluation of opportunities for waste reduction, reuse, and recycling.
- Identification of disposal options for each type of waste.
- Assessment of impacts caused by handling (including labelling, packaging, and storage), collection, transportation, and re-use /disposal of wastes.
- Assessment of impacts on the capacity of waste collection, transfer and disposal facilities.
- Recommendation of best management practices to facilitate reuse and recycling on site or on other projects and to minimize potential environmental impacts arising from the waste management.

6.4 Identification of Potential Waste Sources

6.4.1 Construction Phase

The key construction activities to be carried out for the Project include site clearance, excavation, foundation piling, installation of Electrical and Mechanical (E&M) plants and equipment, construction of civil structures and access road, removal of existing seawall and seawall modification / construction of new berthing facilities. The types of wastes arising from the construction of the Project would include:

- Construction and demolition (C&D) materials.
- Chemical waste.

- General refuse.
- Floating Refuse.

6.4.2 Operational Phase

Under the current operation of WENT Landfill, most of the MSW is delivered to the WENT Landfill via marine route. This marine route passes through the seafront of the I·PARK2 site. During the operational phase of I·PARK2, MSW will be delivered to I·PARK2 using the same marine route. Maintenance dredging of the existing marine route to facilitate navigation of waste delivery vessels to and from the proposed berthing facility may be required on an as-needed basis subject to the seabed level, which would be similar to the current operation associated with the WENT Landfill. Since the maintenance dredging work is an existing operation, additional maintenance dredging during the I·PARK2 operation would not be anticipated.

The Project involves thermal incineration of MSW and energy recovery for electricity generation. In February 2021, the Government promulgated the "Waste Blueprint for Hong Kong 2035" which sets out the vision to move away from the reliance on landfills for direct disposal of MSW by around 2035. The Government's strategy has two main directions. The first is to mobilise the entire community to practise waste reduction and waste separation for recycling in the upstream to reduce the overall waste disposal amount. The second is to proactively drive the development of downstream waste-to-energy (WtE) facilities for sustainable disposal of the remaining MSW. . Considering the above, as well as the cost effectiveness and limitation of the Project site area for setting up an on-site sorting and recycling plant with mechanical treatment technology, no mechanical treatment processes, other than shredder to cut large-size MSW into smaller pieces prior to incineration as necessary, are proposed under the Project. The major types of wastes arising from the operation of the Project would include:

- Incineration by-products.
- Dewatered sludge.
- Chemical waste.
- General refuse.
- Floating Refuse.

The wastes arising from the operation of the Project would be generated from 2030 onwards.

6.5 Impact Assessment and Evaluation

6.5.1 Construction Phase

During the planning and design of the Project, alternative design, general layout, construction method and construction programme have been considered to minimize the generation of C&D material. Underground facilities of the Project have been minimized, and pilling has been

proposed for construction of the foundation of key facilities of the Project to minimize PFA / soli excavation and thus generation of C&D material. The desalination technology requiring smaller footprint (i.e. seawater reverse osmosis) would be adopted that can reduce the generation of C&D materials. Non-dredged ground treatment method, i.e. Deep Cement Mixing (DCM), will be adopted for construction of the foundation for the proposed seawall modification/berthing facility. The marine deposits underlying the modified seawall/berthing facility will be left *in-situ* and disposal of excavated marine sediment would be avoided. Furthermore, the construction works and programme have been designed to allow temporary stockpile of excavated materials generated on-site for backfilling.

6.5.1.1 C&D Materials

The Project site is located at the Middle Ash Lagoon and West Ash Lagoon areas of the Tsang Tsui Ash Lagoons (TTAL), which were constructed in 1980s and was leased to a power company for storage of Pulverised Fuel Ash (PFA). The Middle Ash Lagoon was surrendered to the Government in 2015. The Middle Ash Lagoon within the Project site currently is unpaved wasteland covered with vegetations and would be decommissioned under separate project, namely "Decommissioning of Remaining Portion of Middle Ash Lagoon in Tsang Tsui (Decommissioning Project)". The Decommissioning Project mainly involves site clearance (including vegetation removal), levelling of Pulverized Fuel Ash (PFA) surface, covering of general fill above the levelled PFA, and installation of temporary surface drainage system. The Middle Ash Lagoon would be covered with general fill of at least 1m thick prior to commencement of the Project construction.

Construction and Demolition (C&D) materials would be generated from foundation works for buildings and facilities, seawall modification, construction of the civil structures and berthing facilities, construction of seawater outfall and associated pipe laying works. The C&D materials may consist of inert materials such as soil, rock, concrete, excavated general fill and PFA as well as non-inert materials such as vegetation, metal, timber, paper and plastic.

Based on the preliminary design, the quantity of C&D materials arising from major construction activities including site formation, excavation, construction of superstructures and installation of equipment and filling works of seawall construction has been estimated. The estimated volume of C&D materials generated from the Project during construction phase would be about 581,240 m^3 during 2026 to 2030. According to the latest design, no imported fill is required for the Project and it would be subject to change during the detailed design. All C&D materials generated shall be sorted on site into two separate portions (i.e. inert C&D materials and the non-inert C&D materials). The reusable and/or recyclable C&D materials shall be recovered before delivery / disposal of the non-reusable and/or non-recyclable portion off-site as a last resort. An estimation of quantity of C&D materials generated during construction phase is summarized in **Table 6-1**.

Table 6-1 Estimated Quantities of C&D Materials during Construction Phase

Type of C&D Material		Material Generated (m^3)	Inert C&D Material to be Reused On site (m^3)	Inert C&D Material to be Delivered off Site (m^3)	Non-inert C&D Material to be Collected for Recycling (m^3)	Non-inert C&D Material to be Disposed of off Site (m^3)
Inert Material	PFA	148,850	148,850 (100%)	0 (0%)	Not Applicable	Not Applicable
	Excavated General Fill	257,790	205,960 (80%)	51,830 (20%)	Not Applicable	Not Applicable
	Rock & Artificial Hard Material	58,540	58,540 (100%)	0 (0%)	Not Applicable	Not Applicable
	Rock Armor	36,650	0 (0%)	36,650 (100%)	Not Applicable	Not Applicable
Non-inert Material		79,410	Not Applicable	Not Applicable	15,880 (20%)	63,530 (80%)
Total		**581,240**	**413,350**	**88,480**	**15,880**	**63,530**

Approximately 501,830 m^3 of inert C&D materials would be generated. It is estimated that 413,350 m^3 of inert C&D materials, which comprises 148,850 m^3 of PFA, 205,960 m^3 of excavated general fill and 58,540 m^3 of Rock & Artificial Hard Material, would be reused on-site for filling work to avoid off-site disposal. Approximately 88,480 m^3 surplus inert C&D materials would be delivered to designated PFRF (i.e. Tuen Mun Area 38 Fill Bank) for off-site beneficial reuse. Assuming a capacity of 7 m^3 per truck, bulk factor of 1.7[1], construction period of 54 months and 25 working days a month, it is estimated that an average of about 16 truck trips per day would be required for the delivery of inert C&D materials off-site. The delivery destination of inert C&D materials is subject to the designation by the Public Fill Committee (PFC) of CEDD according to DEVB TC(W) No. 6/2010. According to the Project Administrative Handbook for Civil Engineering Works, the project office is required to draw up a Construction and Demolition Material Management Plan (C&DMMP) at the feasibility study or preliminary design stage of each project, which generates more than 50,000 m^3 of C&D materials. For a project with more than 300,000 m^3 of surplus inert C&D materials, a C&DMMP should be prepared and submitted to the PFC for in-principle approval prior to the commencement of the detailed design. A C&DMMP will therefore be prepared and submitted to PFC for approval in accordance with Project Administration Handbook for Civil Engineering Works for this Project. The control measures proposed in **Section 6.6.1.4** shall be followed for the management of inert C&D materials.

Approximately 79,410 m^3 of non-inert C&D materials would be generated. Such materials will be sorted for reuse and recycling where practicable before disposal to landfill. It is estimated

[1] The bulk factors of 1.7 for inert C&D materials and 1 for non-inert C&D materials are made reference to the bulk factors adopted in the approved EIA Report for "Relocation of Diamond Hill Fresh Water and Salt Water Service Reservoirs to Caverns" [AEIAR-232/2021].

that 15,880 m^3 of the non-inert C&D materials would be recycled, resulting in disposal of about 63,530 m^3. The non-recyclable non-inert C&D materials would be disposed of at West New Territories (WENT) Landfill or Extensions of WENT Landfill (WENTX). Assuming a capacity of 7 m^3 per truck, bulk factor of 1[1], construction period of 54 months and 25 working days a month, it is estimated that an average of about 7 truck trip per day would be required for disposed of non-inert C&D materials off-site. The designated disposal site of non-inert C&D materials shall be confirmed with the EPD. The separated recyclable non-inert C&D materials shall be collected by recycling companies for off-site reuse or recycling. The control measures proposed in **Section 6.6.1.4** shall be followed for the management of non-inert C&D materials.

6.5.1.2 Chemical Waste

Chemical waste is defined in the Waste Disposal (Chemical Waste) (General) Regulation. Where the construction processes produce chemical waste, the Contractor must register with EPD as a chemical waste producer. In general, chemical waste would mainly arise from maintenance of construction equipment. These may include the following items:

- Scrap batteries or spent acid/alkali from maintenance activities.
- Used engine oils, hydraulic fluids, and waste fuel.
- Spent mineral oils/cleaning fluids from mechanical machinery.
- Spent solvents/solutions from equipment cleaning activities.

Accidental spillages of chemicals in the works area may contaminate the soil and groundwater on exposed ground/earth. The contaminated soil particles may be washed away by construction site runoff causes water pollution.

Chemical wastes pose environmental, health and safety hazards if not stored and disposed of in an appropriate manner as outlined in the Waste Disposal (Chemical Waste) (General) Regulation. These hazards include:

- Toxic effects to workers.
- Adverse effects on water quality from spills.
- Fire hazards.

The amount of chemical waste cannot be accurately predicted at this stage since it largely depends on the Contractor's housekeeping measure. The amount is anticipated to be small (about 50 litres per month) and it is recommended that good housekeeping measures should be implemented to reduce the amount of chemical waste generated. The chemical wastes will be collected by licensed chemical waste collector for the disposal of at licensed treatment facilities (i.e. Chemical Waste Treatment Centre (CWTC) at Tsing Yi) in accordance with relevant regulation and guideline.

With the incorporation of suitable arrangements for the storage, handling, transportation and disposal of chemical wastes under the requirements stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste, no adverse environmental impacts and hazards will result from the handling, transportation and disposal of chemical waste arising from the Project. The control measures proposed in **Section 6.6.1.5** shall be followed for the management of chemical waste.

6.5.1.3 General Refuse

General refuse will be generated by the site staff and construction workers during the construction period. This includes food scraps, aluminium cans, waste papers, plastic containers, food packaging, etc. The amount of general refuse that may be produced is dependent on size of workforce at site.

Based on a peak construction workforce of 1,000 persons and assuming a general refuse generation rate of 0.65 kg per worker per day, the amount of general refuse to be generated on site will be about 650 kg per day. General refuse generated during the construction workforce will be sorted to recover recyclable materials such as food scraps, paper, aluminium cans etc. where practicable. Different recyclables will be stored and contained separately and will be collected by recycling companies for off-site reuse or recycling. The remaining non-recyclable general refuse generated will be collected by a waste collector and disposed of at landfill daily.

The storage of general refuse has the potential to give rise to a variety of adverse environmental impacts. These include odour if waste is not collected frequently, water quality impacts if waste enters water bodies and visual impact from windblown litters. The refuse may attract pests and vermin if the storage areas are not well maintained and cleaned regularly. In addition, disposal of waste at sites other than approved waste transfer or disposal facilities can also lead to environmental impacts.

Handling and disposal of general refuse should cope with the presence of peak workforce during the construction period. Provided that the refuse is stored and transported in accordance with proper practices and disposed at approved disposal facilities, potential environmental impact is not expected. The control measures proposed in **Section 6.6.1.6** shall be followed for the management of general refuse.

6.5.1.4 Floating Refuse

Floating refuse may wash up onto the Project site through the effect of currents and wind and may be trapped or accumulated in the existing seawall or the newly constructed seawall during the construction phase. Considering no sharp turns or abrupt indentation for shoreline along the new vertical seawall, entrapment or accumulation of floating refuse on the proposed seawall would be considered as minimal. Any floating refuse trapped within the Project area will be collected and disposed of as general refuse.

The construction workforce may also generate floating refuse (e.g. waste paper and empty containers) while working along the shoreline. With proper waste management and training to workers, floating refuse arising from the construction activities is not anticipated.

The proposed disposal outlets and tentative transportation routings for the disposal of various types of waste during construction phase are shown in **Table 6-2**.

Table 6-2 Proposed Disposal Outlet and Tentative Transportation Routings for Waste Disposal during Construction Phase

Types of Waste	Estimated Generation Amount (Timing of Generation)	Handling	Proposed Delivery Destination / Disposal Outlet	Estimated Frequency of Truck	Tentative Transportation Routing
Inert C&D materials	501,830 m^3 (2026 to 2030)	The inert C&D materials generated would be sorted and reused on-site where practicable. About 413,350 m^3 of inert C&D material would be reused on-site.	88,480 m^3 of inert C&D material to be delivered to Tuen Mun Area 38 Fill Bank* for other beneficial uses	16 truck trips per day	via Nim Wan Road, Lung Kwu Tan Road, Lung Mun Road
Non-inert C&D materials	79,410 m^3 (2026 to 2030)	Recyclable materials (e.g., metal) will be segregated from the non-inert C&D materials for recycling where practicable. About 15,880 m^3 of non-inert C&D material would be recycled off-site.	63,530 m^3 of non-inert C&D material or if rejected by recycling companies to be disposed at WENT Landfill or WENTX^ as the last resort	7 truck trips per day	via Nim Wan Road
Chemical waste	50 litres per month (2026 to 2030)	On-site chemical waste collection points will be provided for collection by licensed chemical waste collector	CWTC	As required	via Nim Wan Road, Lung Kwu Tan Road, Lung Mun Road, Lung Fu Road, Tuen Mun Road, Tsing Long Highway, Tsing Sha Highway, Tsing Yi Road
General refuse	650 kg per day (2026 to 2030)	On-site refuse collection points and recycling bins will be provided. Recyclable materials will be segregated from the non-recyclable materials for off-site reuse / recycling where practicable	Non-recyclables to be disposed of at WENT Landfill or WENTX	Not more than 1 truck trip per day	via Nim Wan Road
Floating Refuse	Note #	Collected and disposed of as general refuse	WENT Landfill or WENTX	N/A	via Nim Wan Road

Note:
* The delivery destination of inert C&D materials is subject to the designation by the Public Fill Committee according to DEVB TC(W) No.6/2010.

^ The disposal of non-inert C&D materials at designated landfill shall be subject to agreement with the relevant section of the EPD.

With proper waste management and education, floating refuse arising from the construction activities is not anticipated. For floating refuse not generated from the Project (i.e. floating refuse washing up onto the Project site through the effect of currents and wind), the quantity is not estimated under this EIA. However, any floating refuse trapped within the Project area will be collected and disposed of as general refuse.

6.5.2 Operational Phase

During the operation phase of the Project, the major sources of MSW will be transported to the I·PARK2 via marine access. The MSW containing vessel will be equipped with GPS Trackers to provide real time vessel location, which serves as an effective surveillance measure to avoid waste dumping at sea. Some of the waste collection vehicles originally travelling to the WENT Landfill or its extension will be diverted to the I·PARK2 for treatment, and the vehicles will be weighted at weighbridge on arrival and departure of I·PARK2. With reference to the prevailing practice of MSW transportation to landfills, the MSW will be fully enclosed in sealed containers or covered entirely to ensure that the MSW do not leak from vessels or vehicles during transportation. Regarding MSW handling in I·PARK2, when unloading MSW into the storage bunker and transferring it using overhead crane grabs into the combustion chamber, the storage bunker will be kept at negative pressure to ensure no leakage of fugitive emission out of the storage bunker. The potential air quality and health impacts associated with MSW handling during Project operation is expected to be minimal.

6.5.2.1 Incineration By-products

The main waste type to be generated during the operation of the incineration plant would be incineration by-products including bottom ash, fly ash and air pollution control (APC) residues. According to the latest design, the estimated quantity of bottom ash would be 660 to 1,200 tonnes per day (tpd) and that of fly ash and APC residues would be 200 to 440 tpd. According to the latest design of I·PARK1, additional 265 tpd of bottom ash would be imported from I·PARK1 for treatment and off-site recycle / beneficial uses. An estimation of quantity incineration by-products generated during operational phase is summarized in **Table 6-3**.

Table 6-3 Estimated Quantities of Incineration By-products during Operational Phase

Types of Waste	Generated from I·Park2 and / or Imported from I·Park1 (tpd)
Bottom Ash	925 to 1,465
Fly Ash & APC Residues	200 to 440 (320 to 700 after cement solidification / chemical stabilization)

Provided the proper design and operation of the combustion systems in the incinerator, the bottom ash would be considered as inert. The bottom ash generated from I·PARK2 and imported from I·PARK1, which are of 925 to 1,465 tpd in total, would be treated by various treatment processes including screening, crushing, sieving and metal removal, etc. for metal

recovery and off-site beneficial uses after meeting the relevant requirements[2]. The metal removed will be recycled while the treated bottom ash will be delivered for off-site beneficial uses (e.g. construction material production) by marine vessels, subject to detailed design (it is estimated that about 1 trip marine vessel per day will be required, subject to site condition). The vessels will be equipped with GPS Trackers to provide real time vessel location, which serves as an effective surveillance measure to avoid dumping at sea. Disposal of bottom ash at landfill would be the last resort if all possible options of beneficial uses/outlet of the treated bottom ash are exhausted.

The fly ash and APC residues from the flue gas stream are likely with higher pollution load and more readily leachable than that in bottom ash. As the existing technology for recovering fly ash is immature with a high cost, the fly ash and APC residues will be treated by cement solidification or chemical stabilization to ensure the compliance of the proposed Incineration Residue Pollution Control Limits (IRPCL) presented in **Table 6-4** and leachability criteria before disposal. Approximately 320 to 700 tpd of stabilized fly ash / APC residues would be disposed of at the landfill site (i.e. WENT Landfill or WENTX). Assuming a capacity of 12 m^3 per truck, it is estimated that about 27 to 59 truck trips per day would be required to transport the stabilized fly ash / APC residues to WENT Landfill or WENTX via Nim Wan Road for disposal, and the trucks would be weighted at weighbridge before leaving I·PARK2 and upon arrival at WENT Landfill or WENTX. Beneficial use of stabilized fly ash and APC residues will be explored where practicable. The Government will keep in view the development of fly ash treatment technology and consider recovering fly ash for beneficial use when the technology becomes mature and cost-effective.

The storage and treatment of both bottom ash and fly ash / APC residues will be carried out in an enclosed environment with air withdrawn through the bunkers into the combustion chamber of the incinerator or dust exhaust with fabric filter and misting system will be installed as fugitive emission control. The potential air quality and health impacts associated with storage and handling of ash arising from the operation of the Project is expected to be minimal.

Table 6-4 Incineration Residue Pollution Control Limits

Pollutant Parameter	Pollution Control Limit
Residue Itself: Bottom Ash, Fly Ash and APC residues	
Total organic carbons [(a)]	3% by weight or loss on ignition is less than 5% of the dry weight [(b)]
Dioxins/Furans	1 ppb (or 1 µg/kg) [(c)]
Leachate Derived from the Residue:	
pH	>8 [(d)]
Heavy Metals [(e)]	
Cadmium (Cd)	10 mg/L
Chromium (Cr)	50 mg/L
Copper (Cu)	250 mg/L

[2] The treatment requirements will be subject to the possible options of beneficial uses/outlet of the treated bottom ash. Taking MSW incineration bottom ash treated for use as aggregate in Mainland China as an example, the relevant requirements in GB/T 25032-2010 should be met. More stringent treatment requirements might be required for other options of beneficial uses/outlet of the treated bottom ash.

Pollutant Parameter	Pollution Control Limit
Nickel (Ni)	250 mg/L
Lead (Pb)	50 mg/L
Zinc (Zn)	250 mg/L
Mercury (Hg)	1 mg/L
Tin (Sn)	250 mg/L
Silver (Ag)	50 mg/L
Antimony (Sb)	150 mg/L
Arsenic (As)	50 mg/L
Beryllium (Be)	10 mg/L
Thallium (Tl)	50 mg/L
Vanadium (V)	250 mg/L
Selenium (Se)	1 mg/L
Barium (Ba)	1,000 mg/L

Notes:
(a) Checking of carbon burnout of the ash is necessary to ensure adequate sterility
(b) European Union – Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
(c) EPA's preliminary remediation goal for dioxin in soil is 1 ppb according to "Update to the ATSDR Policy Guideline for Dioxins and Dioxin-Like Compounds in Residential Soil"
(d) Approved EIA Report of Integrated Waste Management Facilities (AEIAR-163/2012)
(e) Toxicity Characteristic Leaching Procedure (TCLP) limits for landfill disposal

All bottom ash and stabilized fly ash / APC residues to be disposed of at landfill shall be tested in accordance with the requirements of the proposed IRPCL presented in **Table 6-4**. Provided that the treated incineration by-products and its Toxicity Characteristic Leaching Procedure (TCLP) results comply with the IRPCL, it would not be considered as chemical wastes under the Waste Disposal (Chemical Waste) (General) Regulation and could be disposal of at landfill.

6.5.2.2 Dewatered Sludge from on-site Wastewater Treatment Plants

Sludge generated from the wastewater treatment processes would be dewatered to dry solid content of 30%. Approximately 50 m^3 per day of dewatered sludge would be generated and treated in the incineration plant within I·PARK2.

6.5.2.3 Chemical Waste

Small quantities of chemical wastes including spent lubricants, spent cleaning solvent and used batteries would be generated from routine operation and regular maintenance activities during the operational phase. The chemical wastes generated may pose environmental and health and safety hazards if not stored and disposed properly as outlined in the Waste Disposal (Chemical Waste) (General) Regulation. The operator shall register with EPD as a chemical waste producer if any chemical waste would be generated from the operation. The chemical wastes generated during operation of the Project will be collected by licensed chemical waste collector for the disposal of at licensed treatment facilities (i.e. CWTC at Tsing Yi).

6.5.2.4 General Refuse

General refuse, such as paper, food waste, plastic, aluminium cans, packaging and office wastes etc., would be generated by staff, visitors, and office activities during operation of the Project. It is expected 220 staff would work on site during the operational phase. Assuming a general

refuse generation rate of 0.65 kg per person per day, the amount of general refuse to be generated from the Project will be about 140 kg per day. General refuse generated during the Project operation should be sorted to recover recyclable materials such as paper, food waste, aluminium cans etc. where practicable These recyclables will be collected by recycling companies for off-site reuse or recycling. The remaining non-recyclable general refuse generated will be sent to the incineration plant within I·PARK2 for treatment.

6.5.2.5 Floating Refuse

Floating refuse may wash up onto the Project site through the effect of currents and wind and may be trapped or accumulated in the proposed seawall during the operation phase. Considering no sharp turns or abrupt indentation for shoreline along the new vertical seawall, entrapment or accumulation of floating refuse on the proposed seawall would be considered as minimal. Any floating refuse trapped within the Project Area will be collected and disposed of as general refuse. With the proper implementation of management control practices in **Section 6.6**, no associated adverse environmental impact would be anticipated.

6.6 Mitigation Measures

6.6.1 Construction Phase

6.6.1.1 General

The management of C&D materials follows the same hierarchy as for other wastes i.e. in descending order of desirability: avoidance, minimization, reuse/recycling, treatment and safe disposal of waste.

Training of construction staff should be undertaken by the Contractor about the concept of site cleanliness and appropriate waste management procedures. The Contractor should develop and provide toolbox talk for on-site sorting of C&D materials to enhance workers' awareness in handling, sorting, reuse and recycling of C&D materials. Requirements for staff training should be included in the Contractor's Environmental Management Plan (EMP). The EMP shall be submitted to the Engineer for approval before construction works in accordance with ETWB TC(W) No. 19/2005.

Good planning and site management practice should be employed to eliminate over ordering or mixing of construction materials to reduce wastage. Proper storage and site practices will minimize the damage or contamination of construction materials.

Where waste generation is unavoidable, the potential for recycling or reuse should be explored. If waste cannot be recycled, disposal routes described in the EMP shall be followed. A recording system for the amount of wastes generated, recycled, delivered and disposed (including the delivery destinations / disposal sites) should be implemented. In order to monitor the delivery / disposal of C&D material and solid wastes at public fill reception facilities and landfills and to control fly-tipping, a trip-ticket system should be included. DEVB TC(W) No. 6/2010 shall be referenced for details. Dump trucks shall be equipped with real-time tracking and monitoring devices as a means to prevent illegal dumping.

6.6.1.2 Best Management Practice

The proposed mitigation measures are as below:

- An on-site environmental coordinator should be identified at the outset of the works. The EMP incorporating waste management shall be prepared in accordance with the requirements set out in the ETWB TC(W) No. 19/2005. The EMP shall include monthly and yearly Waste Flow Tables (WFT) that indicate the amounts of waste generated, recycled, delivered and disposed of (including final delivery destination / disposal site), and which shall be regularly updated.
- The reuse/recycling of all materials on site shall be investigated prior to treatment/ delivered/ disposal off-site.
- Good site practices shall be adopted from the commencement of works to avoid the generation of waste, reduce cross contamination of waste and to promote waste minimization.
- All waste materials shall be sorted on-site into inert and non-inert C&D materials, and where the materials can be recycled or reused, they shall be further segregated. Inert C&D materials will comprise stone, rock, masonry, brick, concrete, and soil which is suitable for land reclamation and site formation whilst non-inert C&D materials include all other wastes generated from the construction process such as plastic packaging and vegetation (from site clearance).
- The Contractor shall be responsible for identifying what materials can be recycled/ reused, whether on-site or off-site. In the event of the latter, the Contractor shall make arrangements for the collection of the recyclable materials. The remaining non-inert C&D materials shall be collected and disposed of to the landfills whilst inert C&D materials shall be re-used on site where practicable. Alternatively, if inert C&D materials cannot be reused on-site, the materials would be delivered to PFRFs for beneficial reuse.
- With reference to DEVB TC(W) No.6/2010, a trip ticket system should be established at the outset of the construction to monitor the delivery / disposal of C&D materials and solid wastes from the site to public fill reception facilities and landfills. Dump trucks shall be equipped with real-time tracking and monitoring devices for monitoring of the transportation of construction waste.
- Under the Waste Disposal (Chemical Waste) (General) Regulation, the Contractor shall register as a Chemical Waste Producer if chemical wastes such as spent lubricants and paints are generated on site. Only licensed chemical waste collectors shall be employed to collect any chemical waste generated at site. The handling, storage, transportation, and disposal of chemical wastes shall be conducted in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes and A Guide to the Chemical Waste Control Scheme both published by EPD.
- A sufficient number of covered bins shall be provided on site for the containment of general refuse to prevent visual impacts and nuisance to the sensitive surroundings. These bins shall be cleared daily and the collected waste disposed of at

landfill as designated by EPD after recyclable materials (e.g. food scraps, paper, metals, aluminium cans, etc.) have been sorted out. Further to the issue of DEVB TC(W) No. 8/2010, the Contractor is required to maintain a clean and hygienic site throughout the Project works.

- The Contractor shall prepare and submit the C&DMMP in accordance with the Project Administrative Handbook for Civil Engineering Works for approval.
- The contractor should prepare a Waste Management Plan (WMP) as part of EMP in accordance with ETWB TC(W) No. 19/2005. The WMP should be submitted to the Engineer for approval. Mitigation measures proposed in the EIA Report and the EM&A Manual should be adopted.
- The Contractor shall comply with all relevant statutory requirements and guidelines and their updated versions that may be issued during the course of Project construction.

6.6.1.3 On-site Sorting, Reuse and Recycling

All waste materials should be segregated into categories covering:

- Inert C&D materials suitable for reuse on-site.
- Inert C&D materials suitable for PFRFs.
- Recyclable non-inert C&D materials for recycling.
- Remaining non-inert C&D materials for landfill.
- Chemical waste.
- Recyclable general refuse for recycling
- Remaining general refuse for landfill.

Proper segregation and disposal of construction waste and general refuse should be implemented. Separate containers should be provided for inert and non-inert C&D materials. Separate recycling bins should be provided to facilitate recovery of recyclable materials from general refuse generated from construction workforce.

Sorting is important to recover materials for reuse and recycling. Specific area should be allocated for on-site sorting of C&D materials and to provide a temporary storage area for those sorted materials. If area is limited, all C&D materials should at least be sorted on-site into inert and non-inert components. Yard waste portion of non-inert C&D materials such as bamboo, timber, vegetation, should be collected and delivered to Yard Waste Recycling Centre (Y·PARK) for recycling where practicable. Other non-inert C&D materials such as packaging waste and other organic materials should be reused and recycled where practicable and disposed to the designated landfill only as a last resort. Inert C&D materials such as concrete, stone, clay, brick, soil, asphalt and the like should be separated and reused in this or other projects (subject to approval by the relevant parties in accordance with the DEVB TC(W) No. 6/2010) before delivered to a public filling facility operated by CEDD. Steel and other metals should be recovered from demolition waste stream and recycled. Recyclables (e.g. wastepaper

from office, aluminium cans) should be recovered from the general refuse for proper collection by waste recyclers for off-site recycling or reuse.

6.6.1.4 Construction and Demolition Material

Inert C&D materials should be temporarily stored on-site for use as backfill where practicable. It should be properly covered with tarpaulin or similar impervious sheeting to prevent dust nuisance and site runoff. Surplus inert C&D materials should be delivered to PFRFs.

Control measures for temporary stockpiles on-site should be taken in order to minimize the noise, generation of dust, pollution of water and visual impact. These measures include:

- Stockpiling areas should be enclosed where space is available.
- Stockpiled soil in open space should be properly covered with tarpaulin especially when heavy rainstorms are predicted.
- Surface of any uncovered stockpiled soil should be regularly wetted with water especially during dry season.
- Disturbance of stockpiled soil should be minimized.
- Stockpiling location should be away from the water bodies.
- An independent surface water drainage system equipped with silt traps should be installed at the stockpiling area.

Disposal of non-inert C&D materials to landfill shall only be a last resort. Proper segregation of inert and non-inert C&D materials shall be carried out in the construction sites.

The Public Fill Committee of CEDD should be consulted for delivery of inert C&D materials to PFRFs while EPD should be consulted for disposal of non-inert C&D materials to landfill. Disposal of C&D materials to landfill must not have more than 50% (by weight) inert material. The C&D materials delivered for landfill disposal should contain no free water and the liquid content should not exceed 70% by weight.

In order to avoid dust impacts, any vehicle leaving a works area carrying inert or non-inert C&D materials should have their load covered up before leaving the construction site.

C&D materials should be delivered to / disposed of at designated PFRFs or landfills. Delivery / disposal of these materials for the use at other construction projects is subject to the approval of the relevant project proponents and Public Fill Committee of CEDD. Furthermore, unauthorized disposal of C&D materials in particular on private agricultural land is prohibited and may be subject to relevant enforcement and regulating actions. The delivery / disposal of C&D materials will be controlled through trip-ticket system in accordance with DEVB TC(W) No. 6/2010.

6.6.1.5 Chemical Waste

Should any chemical waste be generated, the Contractor must register with EPD as a chemical waste producer. Chemical waste is defined in the Waste Disposal (Chemical Waste) (General)

Regulation. EPD requires information on the particulars of the waste generation processes including the types of waste produced, their location, quantities and generation rates. An updated list of licensed chemical waste collector can be obtained from EPD.

Storage, handling, transport and disposal of chemical waste should be arranged in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published by EPD, and should be collected by a licensed chemical waste collector.

Suitable containers should be used for specific types of chemical wastes. The containers should be properly labelled (in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations), resistance to corrosion, stored safely and closely secured. Stored volume should not be kept more than 450 litres unless the specification has been approved by the EPD. Storage area should be enclosed by three sides by a wall, partition of fence that is at least 2 m height or height of tallest container with adequate ventilation and space.

Hard standing, impermeable surfaces draining via oil interceptors should be provided in works area compounds. Interceptors should be regularly emptied to prevent release of oils and grease into the surface water drainage system after accidental spillages. The interceptor should have a bypass to prevent flushing during periods of heavy rain. Oil and fuel bunkers should be bunded and/or enclosed on three sides to prevent discharge due to accidental spillages or breaches of tanks. Bunding should be of sufficient capacity to accommodate 110% of the volume of the largest container or 20% of the total volume of waste, whichever is larger. Waste collected from oil interceptors should be collected and disposed of by a licensed chemical waste collector.

Lubricants, waste oils and other chemical wastes are likely to be generated during the maintenance of vehicles and mechanical equipment. Used lubricants should be collected and stored in individual containers which are fully labelled in English and Chinese and stored in a designated secure place. The chemical waste shall be collected by licensed chemical waste collectors.

The registered chemical waste producer (i.e. the Contractor) has to arrange for the chemical waste to be collected by licensed chemical waste collector. The licensed chemical waste collector should regularly take chemical waste to a licensed chemical waste treatment facility (such as the CWTC in Tsing Yi). A trip ticket system operates to control the movement of chemical wastes.

No lubricants, oils, solvents or paint products should be allowed to discharge into water courses, either by direct discharge, or as contaminants carried in surface water runoff from the construction site.

6.6.1.6 General Refuse

General refuse should be disposed of at landfill as designated by EPD only after recyclable materials (e.g. food scraps, paper, metals, aluminium cans, etc.) have been sorted out.

The Contractor should nominate approved site personnel 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 about site cleanliness, proper waste management and chemical handling procedures should be provided. Recyclable materials such as papers and aluminium cans should be segregated and collected by waste recycler. An adequate number of waste containers should be provided to avoid spillage of waste.

General refuse generated on-site should be stored in enclosed bins or skips and collected separately from other construction and chemical wastes and disposed of at designated landfill by reputable waste collector. The removal of waste from the site should be arranged on a daily basis by the Contractor to minimize any potential odour impacts, minimize the presence of pests, vermin and other scavengers and prevent unsightly accumulation of waste.

6.6.1.7 Floating Refuse

The Contractor should regularly check and clean any refuse trapped or accumulated along the seawall. Collected floating refuse shall be disposed of as general refuse.

6.6.2 Operational Phase

The following measures are recommended for the MSW handling:

- The MSW containing vessel will be equipped with GPS Trackers to provide real time vessel location, which serves as an effective surveillance measure to avoid waste dumping at sea.
- The MSW shall be fully enclosed in sealed containers or covered entirely to prevent accidental leakage from vessels or vehicles during transportation. The containers shall be in good condition and free from damage or any other defects.
- The unloading and transferring of MSW shall be carried out under negative pressure to ensure no leakage of fugitive emission.

6.6.2.1 Incineration By-products

The following measures are recommended for the storage, handling and collection of incineration by-products:

- Ash should be stored in intact storage pits / silos.
- Ash should be handled and conveyed in an enclosed environment with negative pressure to prevent leakage to the surrounding environment prior to treatment if needed.
- Ash should be wetted with water to control fugitive dust, where necessary.
- The bottom ash will be treated for off-site beneficial uses. Disposal of bottom ash at landfill would be the last resort if all possible options of beneficial uses/outlet are exhausted. All bottom ash to be disposed of at landfill should be tested to ensure the compliance with the proposed IRPCL and leachability criteria prior to disposal.
- The stabilized fly ash / APC residues would be disposed of at the landfill site. Beneficial use of stabilized fly ash and APC residues will be explored where practicable. All

stabilized fly ash / APC residues to be disposed of at landfill should be tested for compliance with the proposed IRPCL and leachability criteria prior to disposal.

- The bottom ash and stabilized fly ash / APC residues to be disposed of at landfill should be stored in enclosed container during transportation.

The Contractor should provide EPD with chemical analysis results of bottom ash and stabilized fly ash / APC residues to confirm the compliance with the proposed IRPCL before disposal of at landfill.

6.6.2.2 Dewatered Sludge

The dewatered sludge would be treated at I·PARK2 regularly. The dewatered sludge shall be stored in sealed containers to minimize associated odour impact.

6.6.2.3 Chemical Waste, General Refuse and Floating Refuse

The chemical waste, general refuse and floating refuse generated / collected during the operational phase would follow the same handling procedures and disposal method presented in **Sections 6.6.1.5, 6.6.1.6** and **6.6.1.7** except that the non-recyclable general refuse shall be sent to the incineration plant of I·PARK2 for treatment (instead of to the designated landfill site).

6.7 Land Contamination Prevention Measures

6.7.1 General

The Project site is located at the Middle Ash Lagoon area of the TTAL constructed in 1980s and was used for storage of PFA. The Middle Ash Lagoon was surrendered to the Government in 2015. The Middle Ash Lagoon within the Project site currently is unpaved wasteland covered with vegetations and would be decommissioned under the Decommissioning Project. No other contaminating activities including storage and use of chemicals or fuels were practised on site. Potential land contamination impact associated with the previous uses of the Project site would not be anticipated.

6.7.2 Potential Sources of Contamination

A variety of chemicals, such as cleaning solvent, sulphuric acid, hydrochloric acid, sodium hydroxide, sodium hypochlorite, etc., would be used during the operation of I·PARK2. Chemical wastes and incineration by-products (including bottom ash, fly ash and APC residues) would also be generated during the operation. Potential land contamination may arise from potential uncontrolled spillages, or improper handling and disposal of chemicals and incineration by-products.

6.7.3 Approach to Prevent Land Contamination

6.7.3.1 Fuel Oil Spillage Prevention

Precautionary measures to prevent fuel oil spillage include:

a) Fuel Oil Tank Construction and Test

- The fuel tank to be installed should be of specified durability.
- Double skin tanks are preferred.
- Underground fuel storage tank should be placed within a concrete pit.
- The concrete pit shall be accessible to allow regular tank integrity tests to be carried out at regular intervals.
- Tank integrity tests should be conducted by an independent qualified surveyor or structural engineer.
- Any potential problems identified in the test should be rectified as soon as possible.

b) Fuel Oil Pipeline Construction and Test

- Installation of aboveground fuel oil pipelines is preferable; if underground pipelines are unavoidable, concrete lined trenches should be constructed to contain the pipelines.
- Double skin pipelines are preferred.
- Distance between the fuel oil refuelling points and the fuel oil storage tank shall be minimized.
- Integrity tests for the pipelines should be conducted by an independent qualified surveyor or structural engineer at regular intervals.
- Any potential problems identified in the test should be rectified as soon as possible.

c) Fuel Oil Leakage Detection

- Installation of leak detection device at storage tank and pipelines.
- Installation and use of pressure gauges (e.g. at the two ends of a filling line) in fuel filling, which allows unexpected pressure drop or difference and sign of leakage to be detected.

d) Fuel Oil Storage Tank Refuelling

- Storage tank refuelling (from road tanker) should only be conducted by authorized staff of the oil company using the company's standard procedures.

e) Fuel Oil Spillage Response

- An Oil Spill Response Plan should be prepared by the operator to document the appropriate response procedures for oil spillage incidents in detail. General procedures to be taken in case of fuel oil spillage are presented below:

<u>Training</u>

Training on oil spill response actions should be given to relevant staff. The training shall cover the followings:

- Tools & resources to combat oil spillage and fire, e.g. locations of oil spill handling equipment and fire fighting equipment;
- General methods to deal with oil spillage and fire incidents;
- Procedures for emergency drills in the event of oil spills and fire; and
- Regular drills shall be carried out.

Communication

Establish communication channel with the Fire Services Department (FSD) and EPD to report any oil spillage incident so that necessary assistance from relevant department can be quickly sought.

Response Procedures

Any fuel oil spillage within the Project site should be immediately reported to the Plant Manager with necessary details including location, source, possible cause and extent of the spillage.

Plant Manager should immediately attend to the spillage and initiate any appropriate action to confine and clean up the spillage. The response procedures shall include the following:

- Identify and isolate the source of spillage as soon as possible.
- Contain the oil spillage and avoid infiltration into soil/ groundwater and discharge to storm water channels.
- Remove the oil spillage.
- Clean up the contaminated area.
- If the oil spillage occurs during storage tank refuelling, the refuelling operation should immediately be stopped.
- Recovered contaminated fuel oil and the associated material to remove the spilled oil should be considered as chemical waste. The handling and disposal procedures for chemical wastes are discussed in the following paragraphs.

6.7.3.2 Chemicals and Chemical Wastes Handling & Spillage Prevention

The precautionary measures to prevent improper handling/ use of chemicals and chemical waste spillage include:

a) Chemicals and Chemical Wastes Handling & Storage

- Chemicals and chemical wastes should only be stored in suitable containers in purpose-built areas.
- The storage of chemical wastes should comply with the requirements of the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.
- The storage areas for chemicals and chemical wastes shall have an impermeable floor or surface. The impermeable floor/ surface shall possess the following properties:
  - Not liable to chemically react with the materials and their containers to be stored.
  - Able to withstand normal loading and physical damage caused by container handling
  - The integrity and condition of the impermeable floor or surface should be inspected at regular intervals to ensure that it is satisfactorily maintained
- For liquid chemicals and chemical wastes storage, the storage area should be bunded to contain at least 110% of the storage capacity of the largest containers or 20% of the total quantity of the chemicals/chemical wastes stored, whichever is the greater.
- Storage containers shall be checked at regular intervals for their structural integrity and to ensure that the caps or fill points are tightly closed.
- Chemical handling shall be conducted by trained workers under supervision.

b) Chemicals and Chemical Wastes Spillage Response

- A Chemicals and/ or Chemical Wastes Spillage Response Plan shall be prepared by the operator to document in detail the appropriate response procedures for chemicals or chemical wastes spillage incidents. General procedures to be undertaken in case of chemicals/ chemical waste spillages are presented below:

<u>Training</u>

Training on spill response actions should be given to relevant staff. The training shall cover the followings:

- Tools & resources to handle spillage, e.g. locations of spill handling equipment;
- General methods to deal with spillage; and
- Procedures for emergency drills in the event of spills.

<u>Communication</u>

Establish communication channel with FSD and EPD to report the spillage incident so that necessary assistance from relevant department can be quickly sought.

<u>Response Procedures</u>

Any spillage within the Project site should be reported to the Plant Manager.

Plant Manager shall attend to the spillage and initiate any appropriate actions needed to confine and clean up the spillage. The response procedures shall include the followings:

- Identify and isolate the source of spillage as soon as possible;
- Contain the spillage and avoid infiltration into soil/ groundwater and discharge to storm water channels (in case the spillage occurs at locations out of the designated storage areas);
- Remove the spillage; the removal method/ procedures documented in the Material Safety Data Sheet (MSDS) of the chemicals spilled should be observed;
- Clean up the contaminated area (in case the spillage occurs at locations out of the designated storage areas); and
- The waste arising from the cleanup operation should be considered as chemical wastes.

6.7.3.3 Preventive Measures for Incineration By-products Handling

The recommended measures listed below can minimize the potential contamination to the surrounding environment due to the incineration by-products:

- Ash should be stored in intact storage pits / silos.
- Ash should be handled and conveyed in an enclosed environment with negative pressure to prevent leakage to the surrounding environment prior to treatment if needed.
- Ash should be wetted with water to control fugitive dust, where necessary.
- The bottom ash will be treated for off-site beneficial uses. Disposal of bottom ash at landfill would be the last resort if all possible options of beneficial uses/outlet are exhausted. All bottom ash to be disposed of at landfill should be tested to ensure the compliance with the proposed IRPCL and leachability criteria prior to disposal.
- The stabilized fly ash / APC residues would be disposed of at the landfill site. Beneficial use of stabilized fly ash and APC residues will be explored where practicable. All stabilized fly ash / APC residues to be disposed of at landfill should be tested for compliance with the proposed IRPCL and leachability criteria prior to disposal.
- The bottom ash and stabilized fly ash / APC residues to be disposed of at landfill should be stored in enclosed container during transportation.

6.7.3.4 Incident Record

After any spillage, an incident report should be prepared by the Plant Manager. The incident report should contain details of the incident including the cause of the incident, the material

spilled and estimated spillage amount, and also the response actions undertaken. The incident record should be kept carefully and able to be retrieved when necessary.

The incident report should provide sufficient details for the evaluation of any environmental impacts due to the spillage and assessment of the effectiveness of measures taken.

In case any spillage or accidents results in significant land contamination, EPD should be informed immediately and the operator should be responsible for the cleanup of the affected area. The responses procedures described in Sections **6.7.3.1** and **6.7.3.2** above should be followed accordingly together with the land contamination assessment and remediation guidelines stipulated in the *Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management* and the *Guidance Note for Contaminated Land and Remediation*.

6.7.4 Evaluation of Residual Impacts

With proper management of the chemicals, chemical wastes and incineration by-products, and implementation of the land contamination preventive measures recommended in Sections **6.6.1.5, 6.6.2.1** and **6.7.3** to prevent the potential land contamination due to uncontrolled spillages, or improper handling and disposal of chemicals and incineration by-products, potential land contamination impact arising from the Project would not be anticipated.

6.8 Residual Impacts

With the implementation of proper waste management practices for storage, handling, transportation, delivery and disposal of waste arisings, no adverse residual impacts are expected during the construction and operational phases of the Project.

6.9 Monitoring and Audit Requirement

Weekly audit of waste management practice is recommended during the construction phase of the Project to determine if waste is being managed in accordance with prescribed waste management procedures and the EMP. The audits should examine all aspects of waste management including waste generation, storage, recycling, treatment, transportation, delivery and disposal.

During the operational phase, it is recommended that TCLP tests shall be carried out for the bottom ash and stabilized fly ash / APC residues to be disposed of at landfill in accordance with the requirements of the proposed IRPCL prior to disposal to landfill. The proposed sampling frequencies of the test for stabilized fly ash / APC residues to be disposed of at landfill are as follows:

Testing and commissioning (T&C)

- During T&C, the Contractor shall sample and test every 20 m^3 of stabilized fly ash / APC residues for conformance of the IRPCL and leachability criteria presented in **Table 6-4**.

First six months of operation

- During the first six months of operation, if all samples conform to the limits and criteria during T&C, the Contractor shall take two samples on daily basis for stabilized fly ash / APC residues; otherwise, the Contractor shall sample and test every 20 m^3 of stabilized fly ash / APC residues until all samples conform to the limits and criteria throughout a continuous six-month period during operation.

After the first six months of operation

- If all samples conform to the limits and criteria throughout the preceding continuous six-month period during operation, the Contractor shall take two samples on the same day on monthly basis for stabilized fly ash / APC residues; otherwise, the Contractor shall take two samples on daily basis until all samples conform to the limits and criteria throughout the preceding continuous six-month period during operation..

The bottom ash will be treated for off-site beneficial uses. Disposal of bottom ash at landfill would be the last resort if all possible options of beneficial uses/outlet of the treated bottom ash are exhausted. The proposed sampling frequencies of the test for the bottom ash to be disposed of at landfill are as follows:

Testing and commissioning (T&C)

- During T&C, the Contractor shall sample and test every 20 m^3 of the bottom ash for conformance of the IRPCL and leachability criteria presented in **Table 6-4**.

First six months of operation

- During the first six months of operation, if all samples conform to the limits and criteria during T&C, the Contractor shall take two samples on the same day on monthly basis for the bottom ash; otherwise, the Contractor shall sample and test every 20 m^3 of the bottom ash until all samples conform to the limits and criteria throughout a continuous six-month period during operation.

After the first six months of operation

- If all samples conform to the limits and criteria throughout the preceding continuous six-month period during operation, the Contractor shall take two samples on the same day every three months for the bottom ash; otherwise, the Contractor shall take two samples on the same day on monthly basis until all samples conform to the limits and criteria throughout the preceding continuous six-month period during operation.

The detailed sampling and testing plan of the bottom ash and stabilized fly ash / APC residues to be disposed of at landfill site shall be agreed by EPD before commencement of the

operation phase. The chemical analysis results of the sampling shall be submitted to EPD for approval before disposal of the bottom ash and stabilized fly ash / APC residues to the landfill.

The treated bottom ash for off-site beneficial use would be tested in accordance with the relevant requirements subject to the possible options of beneficial uses/outlet of the treated bottom ash.

6.10 Conclusion

C&D materials will inevitably be produced during the construction phase of the Project. Waste generated during construction works include inert C&D materials, non-inert C&D materials, chemical waste, general refuse and floating refuse. Approximately 501,830 m^3 of inert C&D materials would be generated of which 413,350 m^3 would be reused on-site and 88,480 m^3 would be delivered to designated PFRF. Approximately 79,410 m^3 of non-inert C&D materials would be generated of which 15,880 m^3 would be recycled and 63,530 m^3 would be disposed of at designated landfill. It is estimated that about 50 litres of chemical waste would be generated per month and collected by licensed chemical waste collector for disposal at licensed treatment facilities. About 650 kg of general refuse would be generated per day. Recyclable materials recovered from the general refuse would be collected by suitable waste recyclers and any non-recyclables of the general refuse would be disposed of at landfill. With proper waste management and education, floating refuse arising from the construction activities is not anticipated.

During operational phase, incineration by-products including bottom ash, fly ash and APC residues would be generated. It is estimated that approximately 660 to 1,200 tpd and 265 tpd of bottom ash would be generated from the Project operation and imported from I·PARK1, respectively. The bottom ash generated or imported will be treated by screening, crushing, sieving and metal removal. The bottom ash would be treated for off-site beneficial uses. Disposal of bottom ash at landfill would be the last resort if all possible options of the beneficial uses/outlet are exhausted. It is estimated that approximately 200 to 440 tpd of fly ash / APC residues would be generated from the Project operation and would be treated by cement solidification or chemical stabilization. The stabilized fly ash / APC residues shall be properly disposed of at designated landfill. The beneficial use of stabilized fly ash and APC residues would be explored where practicable.

With the implementation of the mitigation measures during the construction and operational phases of the Project, no adverse impact on waste management is anticipated. The implementation of the mitigation measures shall form part of the works contracts. Regular site inspections are recommended during construction phase to ensure the measures are implemented properly. During the operational phase, for the bottom ash and stabilized fly ash / APC residues to be disposed of at landfill, TCLP tests as detailed in **Section 6.9** are recommended to ensure the compliance with the proposed IRPCL. The treated bottom ash for

off-site beneficial use would be tested in accordance with the relevant requirements subject to the possible options of beneficial uses/outlet of the treated bottom ash.