6. WASTE MANAGEMENT IMPLICATIONS

6.1 Introduction

This *Section* identifies the potential wastes arising from the decommissioning/ demolition, construction and operation of the Project and the potential environmental impacts associated with the storage, handling, transportation and disposal of the wastes.

6.2 Legislative Requirements and Evaluation Criteria

The criteria for evaluating waste management implications are stated in *Annex 7* of the *EIAO-TM*. *Annex 15* of the *EIAO-TM* prescribes the general approach and methodology for assessing the waste management implications caused by a project or proposal.

The following legislation covers the handling, treatment and disposal of wastes in Hong Kong which are relevant to the types of waste to be generated from the Project, and has been considered in the assessment.

- *Waste Disposal Ordinance (WDO) (Cap 354);*
- *Waste Disposal (Chemical Waste) (General) Regulation (Cap 354C);*
- *Buildings Ordinance (Cap 123);*
- *Land (Miscellaneous Provisions) Ordinance (Cap 28);* and
- *Public Health and Municipal Services Ordinance (Cap 132) - Public Cleansing and Prevention of Nuisances Regulation*.

6.2.1 Waste Disposal Ordinance (WDO) (Cap 354)

The *WDO* prohibits the unauthorised disposal of wastes, with waste defined as any substance or article which is abandoned. Under the *WDO*, wastes can only be disposed of at licensed waste disposal sites. A breach of these regulations can lead to the imposition of a fine and/or a prison sentence. The *WDO* also provides for the issuing of licences for the collection and transport of wastes. Licences for the collection and transport of construction waste or trade waste, however, are not issued currently.

The *Waste Disposal (Charges for Disposal of Construction Waste) Regulation* defined construction waste as any substance, matters or things that is generated from construction work and abandoned, whether or not it has been processed or stockpiled before being abandoned, but does not include any sludge, screening, or matter removed in or generated from any desludging, desilting or dredging works.

The *Construction Waste Disposal Charging Scheme* came into operation on 1 December 2005. Processing of account applications by the EPD started on the same day. A contractor who undertakes construction work with value of HK$1 million or above is required to open a billing account solely for the contract. Charging for the disposal of construction waste started on 20 January 2006.

Depending on the percentage of inert materials in the material, construction waste can be disposed of at public fill reception facilities, construction waste sorting facilities, landfills and outlying islands transfer facilities, where differing disposal costs would be applied. This scheme encourages waste reduction and hence minimise the costs of the Contractor or Project Proponent.

Table 6.1 summarises the Government waste disposal facilities for construction waste and various charge levels.

Table 6.1 Government Waste Disposal Facilities for Construction Waste

Government Waste Disposal Facilities	Type of Construction Waste Accepted	Charge per Tonne [a]
Public fill reception facilities	Consisting entirely of inert construction waste [b]	HK$71
Sorting facilities	Containing more than 50% by weight of inert construction waste [b]	HK$175
Landfills [c]	Containing not more than 50% by weight of inert construction waste [b]	HK$200
Outlying Islands Transfer Facilities [c]	Containing any percentage of inert construction waste [b]	HK$200

Notes:
(a) Except for the Outlying Islands Transfer Facilities, the minimum charge load is 1 tonne, i.e. if a load of waste weighs 1 tonne or less, it will be charged as 1 tonne. A load of waste weighing more than 1 tonne will be charged at 0.1 tonne increment. For Outlying Islands Transfer Facilities, the charge is $20 per 0.1 tonne and the minimum charge load is 0.1 tonne.
(b) Inert construction waste means rock, rubble, boulder, earth, soil, sand, concrete, asphalt, brick, tile, masonry or used bentonite.
(c) If a load of waste contains construction waste and other wastes, that load will be regarded as consisting entirely of construction waste for the purpose of calculating the applicable charge.

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

Chemical waste as defined under *the Waste Disposal (Chemical Waste) (General) Regulation* includes any substance being scrap material, or unwanted substances specified under *Schedule 1* of the *Regulation*, if such a substance or chemical occurs in such a form, quantity or concentration so as to cause pollution or constitute a danger to health or risk of pollution to the environment.

Chemical waste producers shall register with the EPD. Any person who contravenes this requirement commits an offence and is liable to a fine and imprisonment. Producers of chemical wastes must treat their wastes, utilising on-site plants licensed by the EPD or have a licensed collector take the wastes to a licensed facility. For each consignment of wastes, the waste producer, collector and disposer of the wastes must sign all relevant parts of a computerised trip ticket. The system is designed to allow the transfer of wastes to be traced from cradle-to-grave.

The *Regulation* prescribes the storage facilities to be provided on site including labelling and warning signs. To minimise the risks of pollution and danger to human health or life, the waste producer is required to prepare and make available written procedures to be observed in the case of emergencies due to spillage, leakage or accidents arising from the storage of chemical wastes. He/she must also provide employees with training in such procedures.

6.2.3 Buildings Ordinance (Cap 123)

Regulation of private projects, as opposed to government public works projects, is subject to the *Buildings Ordinance* (BO) and relevant *Practice Notes for Authorised Persons, Registered Structural Engineers and Registered Geotechnical Engineers* (PNAPs). Measures have been introduced under *PNAP ADV-19 Construction and Demolition Waste*, to enhance the management of construction and demolition (C&D) materials, and to minimise its generation at source. The enhancement measures include:

- Identifying opportunities to prevent waste during both the project planning and design stage as well as construction stage; and

- Requiring the contractor to prepare a Waste Management Plan (WMP) including areas described in *PNAP ADV-19* and submit to the project proponent for agreement.

6.2.4 Land (Miscellaneous Provisions) Ordinance (Cap 28)

The inert portion of construction waste (1) (also called public fill) may be taken to public fill reception facilities. Public fill reception facilities are operated by the Civil Engineering and Development Department (CEDD). The *Land (Miscellaneous Provisions) Ordinance* requires that individuals or companies who deliver public fill to the public fill reception facilities to obtain Dumping Licences. The licences are issued by the CEDD under delegated authority from the Director of Lands.

Under the licence conditions, public fill reception facilities will only accept inert earth, soil, sand, rock, boulder, rubble, brick, tile, concrete, asphalt, masonry or used bentonite. In addition, in accordance with paragraph 11 of *Development Bureau (DevB) Technical Circular (Works) (DevB TC(W)) No. 6/2010)*, the Public Fill Committee will advise on the acceptance criteria (eg no mixing of construction waste, nominal size of the materials less than 250mm, etc.). The material should, however, be free from marine mud, household refuse, plastic, metal, industrial and chemical wastes, animal and vegetable matter and any other materials considered unsuitable by the public fill reception facility.

6.2.5 Public Cleansing and Prevention of Nuisances Regulation (Cap 132)

This *Regulation* provides further control on the illegal dumping of wastes on unauthorised (unlicensed) sites. The illegal dumping of wastes can lead to a fine and/or imprisonment.

6.2.6 Other Relevant Guidelines and Documents

Other relevant guidance and planning documents, which detail how the Project Proponent or Contractor should comply with the local regulations, are as follows:

- *Waste Disposal Plan for Hong Kong* (December 1989), Planning, Environment and Lands Branch Government Secretariat, Hong Kong SAR Government;
- *A Guide to the Chemical Waste Control Scheme*;
- *A Guide to the Registration of Chemical Waste Producers*;
- *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* (1992), EPD, Hong Kong SAR Government;
- *Hong Kong Planning Standards and Guidelines Planning* (2014), Planning Department, Hong Kong SAR Government;
- *WBTC No. 2/93 - Public Dumps*, Works Branch, Hong Kong SAR Government;
- *WBTC No. 2/93B - Public Filling Facilities*, Works Branch, Hong Kong SAR Government;
- *WBTC No. 16/96 - Wet Soil in Public Dumps*, Works Branch, Hong Kong SAR Government;
- *Waste Reduction Framework Plan, 1998 to 2007*, Planning, Environment and Lands Bureau, Government Secretariat, 5 November 1998;
- *WBTC No. 4/98 and 4/98A - Use of Public Fill in Reclamation and Earth Filling Projects*, Works Bureau, Hong Kong SAR Government;

(1) "Construction waste" refers to materials arising from any land excavation or formation, civil/building construction, road works, building renovation or demolition activities. It includes various types of reusable materials, building debris, rubble, earth, concrete, timber and mixed site clearance materials. When sorted properly, materials suitable for land reclamation and site formation (known as public fill) should be reused at public fill reception facilities. The rock and concrete can be crushed and processed to produce aggregates for various civil and building engineering applications. The remaining construction waste (comprising timber, paper, plastics, and general refuse) are to be disposed of at landfills.

- *Project Administration Handbook for Civil Engineering Works, Section 3.3(i) of Chapter 2 and Section 4.13 of Chapter 4 - Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers*, Hong Kong SAR Government;
- *WBTC No. 12/2000 - Fill Management,* Works Bureau, Hong Kong SAR Government;
- *WBTC No. 19/2001 - Metallic Site Hoardings and Signboards,* Works Bureau, Hong Kong SAR Government;
- *Project Administration Handbook for Civil Engineering Works, Section 21.25 of Chapter 7 and Section 9.12 of Chapter 5 - Control of Site Crushers*, Hong Kong SAR Government;
- *WBTC No. 12/2002 - Specifications Facilitating the Use of Recycled Aggregates*, Works Bureau, Hong Kong SAR Government;
- *Project Administration Handbook for Civil Engineering Works, Section 4.1.3 of Chapter 4 - Management of Construction and Demolition Material Including Rock*, Hong Kong SAR Government;
- *ETWB TC(W) No. 19/2005 - Environmental Management on Construction Sites*, Environment, Transport and Works Bureau, Hong Kong SAR Government; and
- *DevB TC(W) No. 6/2010 - Trip Ticket System for Disposal of Construction & Demolition Materials*, Development Bureau, Hong Kong SAR Government;
- *DEVB TC(W) No. 08/2010 - 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*;
- *Hong Kong Blueprint for Sustainable Use of Resources 2013* – 2022, Environment Bureau, Hong Kong SAR Government; and
- *Waste Blueprint for Hong Kong 2035*, Environment Bureau, Hong Kong SAR Government.

6.3 Expected Waste Arisings during the Decommissioning/ Demolition and Construction Phases

During the decommissioning/ demolition and construction phases, the main activities that will potentially result in generation of waste include demolition of the existing GTs (i.e. GT2 to GT7), BSGT and other auxiliary equipment, construction of new OCGTs and associated civil works, cable trenches construction and cable laying, construction of the new staircase and lift, as well as reconstruction inside GTAB. The typical waste types associated with these activities include:

- C&D materials from demolition and removal of existing units and associated equipment / parts;
- Excavated materials (soil and rock) from the construction of new cables trenches and new staircase and lift as well as reconstruction works inside GTAB;
- C&D materials from minor civil works;
- Chemical waste from decommissioning of existing units, maintenance of construction plant and equipment, and commissioning of new units; and
- General refuse from construction workforce.

6.3.1 C&D Materials from Demolition

The existing GTs and their auxiliaries (e.g. transformers, generator coolers) will be demolished to make space for the construction of the new units. The main lube oil tank adjacent to GT5, the BSGT, the miscellaneous storage shed next to the BSGT, as well as existing equipment and Turbo Block structure inside the GTAB will also be demolished and removed as part of the Project.

Approximately 600m^3 of broken concrete is estimated to be generated from the demolition of the Turbo Block structure within the GTAB and, assuming a bulking factor of 1.2, the bulk volume of broken concrete waste is about 720m^3. The existing foundation and reinforced concrete structures of the existing units will be reused for the new units as far as practicable and thus broken concrete arising from the demolition of existing units would be minimal.

C&D materials arising from the demolition of the existing GT2 to GT7 will be primarily scrap metals from the demolition of the aboveground steel structures siting on top of the existing reinforced concrete structures. With an estimation of approximately 700 tonnes of scrap metals to be generated from the demolition of each of GT2, GT3, GT4 and GT6, and approximately 850 tonnes of scrap metals from the demolition of each of GT5 and GT7, a total of about 4,500 tonnes of scrap metals are expected to be generated from the demolition of all existing units (i.e. GT2 to GT7). The scrap metal produced will be sent to recycler for recycling as far as practicable. Other C&D materials generated from the demolition works (e.g. plastics, timber, cardboard) would be minimal, with an estimated quantity of about 100m^3 of non-inert C&D materials (excluding scrap metals) to be generated from the demolition works.

The C&D materials will be segregated at source and temporarily stored on site. The C&D materials will be transported to the existing LPS jetty and delivered off-site for recycling or disposal at landfills and public fill reception facilities. According to the tentative implementation programme, GT57 will be demolished between 2022 and 2023, while the remaining GT2, GT3, GT4 and GT6 will all be demolished in 2025. It is estimated that the generation of the C&D materials arising from the demolition works during the peak year of 2025 will require about 1 barge trip per two weeks on average for off-site disposal or recycling. In view of the limited number of barge trips required, adverse marine traffic impact as well as environmental impact (including dust, noise, water quality) arising from the demolition of the Project is not expected with implementation of good construction site practices.

6.3.2 Excavated Materials

Excavated materials will be generated from the construction of the new cable trenches across the GT compound and the new staircase and lift at the immediate east of the GTAB. Minor excavation will also be required at the existing Turbo Block structure to be demolished within the GTAB as part of its conversion to the new 132kV Switching Station. Given that the new cable trenches will be about 1.8m in depth, 1.5m in width and 1,240m in length within the GT Compound, it is estimated that about 3,348m^3 of excavated materials will be generated from the construction of the new cable trenches. Applying a bulking factor of 1.2, the bulk volume of the excavated material is about 4,018 m^3. The construction of the new staircase and lift will require excavation down to 5m below ground and, given its construction footprint of about 10m x 5m, will generate approximately 250m^3 of excavated materials. Applying a bulking factor of 1.2, the bulk volume of the excavated material is about 300 m^3. Furthermore, considering the need to excavate down to 2.6m below ground over an area of about 200m^2 within the GTAB, it is estimated that an addition of approximately 520m^3 will be generated, with a bulk volume of 624m^3 when applying a bulking factor of 1.2. Therefore, the total quantity of excavated materials generated is expected to be about 5,000 m^3. The excavated materials, which mainly comprise top soil and artificial hard materials (i.e. broken concrete and asphalt), will be reused for backfilling on site as far as practicable before being disposed of off-site at the public fill reception facilities.

The construction of the new cable trenches and the new staircase and lift, as well as reconstruction works in GTAB will tentatively commence in 2023 and these are expected to last for about 18 months. Therefore, about 5 barge trips in total (2) over a period of 18 months (i.e. about 1 barge trip per 3-4 months on average) will be required for off-site disposal of the excavated materials, assuming a worst case of no excavated materials can be reused on site. In view of the limited number of barge trips required, adverse marine traffic impact as well as environmental impact (including dust, noise, water quality) due to off-site disposal of the excavated materials is not anticipated with implementation of good construction site practices.

6.3.3 C&D Materials from Minor Civil Works

C&D materials (consisting of waste concrete, wood, packing materials, plastics, etc.) will be generated from the construction of the new units and the new staircase and lift at the immediate east of the GTAB. As most of the major equipment and piping associated with the new units will be fully assembled off-site and then installed on site, civil works and the associated C&D material generation from the construction of the new units on site are expected to be minimal (about 100m^3) (3). There is no construction of new buildings under the Project except for the new staircase and lift. Based on the limited footprint of the new staircase and lift (i.e. 10m x 5m), the C&D materials to be generated are also expected to be minimal (4). The C&D materials produced on-site will be sorted on-site into an inert portion (i.e. public fill) and non-inert portion (i.e. construction waste). Recyclables, such as plastics and cardboard, will be segregated for recycling as far as practicable.

Public fill and construction waste will be delivered to the public fill reception facilities and landfills, respectively, while the recyclables will be sent to recyclers for recycling. As the quantity of C&D materials to be generated from civil works under the Project are expected to be minimal, the handling, transportation and disposal of the associated C&D materials would not cause unacceptable marine traffic impact or other environmental impact (including dust, noise, water quality) with the implementation of good construction site practices.

6.3.4 Chemical Waste

Chemical waste, as defined under the *Waste Disposal (Chemical Waste) (General) Regulation*, includes any unwanted substances specified under *Schedule 1* of the *Regulation*. Substances likely to be generated from the decommissioning/ demolition and construction of the Project will include:

- Leftover diesel, petroleum products or chemicals within the existing units and equipment to be demolished;
- Used paint, engine oils, hydraulic fluids and waste fuel;
- Spent mineral oils/cleaning fluids from mechanical machinery; and
- Spent solvents/ solutions from equipment cleaning activities.

Chemical wastes may 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* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. These hazards may include:

- Toxic effects to workers;

(2) Assuming a capacity of 1,000m^3 per barge.

(3) Assuming 80% inert and 20% non-inert C&D materials, there would be 80m^3 of inert C&D materials and 20m^3 of non-inert C&D materials.

(4) Assuming generation rate of 0.1m^3 per m^2 of GFA constructed with reference to Hong Kong Polytechnics (March 1993) Reduction of Construction Waste Final Report, the amount of C&D materials generated from the construction of the new staircase and lift is about 5m^3, of which 4m^3 is inert and 1m^3 is non-inert C&D materials.

- Adverse effects on air, water and land from spills; and
- Fire hazards.

It is difficult to quantify the exact amount of chemical waste that will arise from the construction activities since it will be highly dependent on contractor's on-site maintenance activities and the quantity and/or types of plant and equipment utilised. Varying quantity of chemical waste may also be generated from leftover diesel, petroleum products or chemicals from the existing units, tanks and equipment, as well as cleaning of the existing units, tanks and equipment to be demolished under the Project. With respect to the scale of the decommissioning/ demolition and construction activities, it is anticipated that the quantity of chemical waste to be generated is about a few hundred litres per month throughout the decommissioning/ demolition and construction of the Project. The chemical waste will be collected by licensed chemical waste collectors and delivered to the licensed chemical waste treatment facilities for disposal (i.e. Chemical Waste Treatment Centre (CWTC) in Tsing Yi).

In addition to the chemical waste that will be generated from the decommissioning/ demolition and construction activities, chemical waste will also be generated from the use of lube oil for flushing during the testing and commissioning of the new units. It is expected that approximately 54,000 litres of lube oil will be used for flushing for each new unit and will be disposed of at the CWTC via licenced chemical waste collectors.

With the incorporation of suitable arrangements for the storage, handling, transportation and disposal of chemical wastes under the requirements stated in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*, no adverse environmental impact (including air and odour, noise, water quality) or other hazards will result from the handling, transportation and disposal of chemical waste arising from the Project.

6.3.5 General Refuse

The presence of a construction site with workers and associated site office will result in the generation of general refuse (mainly consists of food waste, aluminium cans, plastic bottles, waste paper and glass bottles) which requires off-site disposal. The storage of general refuse has the potential to give rise to adverse environmental impacts, if not properly managed. These include odour if the waste is not collected frequently, windblown litter and visual impact.

It is conservatively estimated that a maximum of about 250 construction workers will be working on site at any one time during the demolition and construction phases of the Project. With a general refuse generation rate of 0.65 kg per worker per day, the maximum amount of general refuse to be generated by the construction workforce will be about 162.5 kg per day.

To reduce the quantity of general refuse to be disposed of at landfill, recyclable materials (i.e. paper, plastic bottles, aluminium cans and glass bottles) will be segregated on-site for off-site recycling, as far as practicable. Adequate number of enclosed waste containers and recycling bins will be provided to avoid over-spillage of waste and/ or recyclable materials.

The non-recyclable refuse will be placed in bags and collected together with other general refuse generated from the LPS by existing waste management contractor at LPS, and subsequently disposed of at the landfills on a daily basis. Given that the quantity of general refuse to be disposed of at the landfills is small, no adverse impact on the operation of the landfills is anticipated.

With the implementation of the mitigation measures recommended in ***Section 6.5.1***, no adverse environmental impacts (including air and odour, noise, water quality) caused by storage, handling, transport and disposal of general refuse are expected.

6.4 Expected Waste Arisings during the Operation Phase

During the operation of the new units (i.e. the OCGTs and BSGT), the major waste types to be generated include:

- Chemical waste from maintenance of the plant and equipment; and
- General refuse from site operation.

6.4.1 Chemical Waste

The major types of chemical waste expected to be generated from the operation and maintenance of the new units include oil contaminated items, paint contaminated items, spent lubricant, solvent, etc., similar to those generated by the existing units. The quantity of chemical waste to be generated is also expected to be similar to those generated by the existing units and is estimated to be about a few hundred litres per month. All chemical waste will be collected by licenced chemical waste collectors and delivered to the CWTC for disposal. With the incorporation of suitable arrangements for storage, handling, transportation and disposal of chemical wastes in accordance with the requirements stated in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*, no adverse environmental impact (including air and odour, noise, water quality) or other hazards will result from the handling, transportation and disposal of chemical waste arising from the operation of the Project.

6.4.2 General Refuse

General refuse will arise from the site staff and site operation. General refuse may consist of food waste, plastic, glass bottles, waste paper, scrap metals etc. Source separation with the provision of recycling bins will continue to be conducted under the operation of the new units following existing waste management practices at LPS. Recyclable materials (i.e. paper and metals) will be separated for recycling, in order to reduce the amount of general refuse to be disposed of at landfill. As there will be no change in the number of site staff and that site operation with the new units remains largely the same as the existing operation, the quantity of general refuse to be generated during the operation of the Project is expected to be similar to that generated during existing operation.

The non-recyclable waste will be delivered to the landfills on a daily basis following existing waste management arrangement at LPS. As the general refuse to be disposed of at the landfills under the operation of the Project is of similar and small quantity as in existing operation, no adverse impact on the operation of the landfills is anticipated. With the implementation of the mitigation measures recommended in ***Section 6.5.2***, no adverse environmental impacts (including air and odour, noise, water quality) caused by the storage, handling, transport and disposal of general refuse are expected.

6.5 Mitigation Measures

6.5.1 Decommissioning/ Demolition and Construction Phases

The assessment indicates that with the implementation of the proposed waste management practices at the work site, no adverse environmental impacts are envisaged for the handling, collection and disposal of waste arising during the decommissioning/ demolition and construction phases of the Project.

This *Section* further describes the good construction site practices to avoid or further reduce the potential environmental impacts associated with the handling, collection and disposal of C&D materials, chemical waste and general refuse arising from the decommissioning, demolition and construction works.

The contractor(s) must ensure that all the necessary waste disposal permits or licences are obtained prior to the commencement of the decommissioning/ demolition and construction works.

6.5.1.1 Management of Waste Disposal

The contractor(s) will open a billing account with the EPD in accordance with the *Waste Disposal (Charges for Disposal of Construction Waste) Regulation*. Every construction waste or public fill

load to be transferred to Government waste disposal facilities (e.g. public fill reception facilities, sorting facilities and landfills) will be provided with a valid "chit" which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system will also be established in accordance with *DevB TC(W) No. 6/2010* to monitor the disposal of construction waste at landfill and to control fly-tipping. The trip-ticket system will be included as one of the contractual requirements and implemented by the contractor(s).

Scrap metals generated from the demolition of aboveground steel structures and other recyclables (e.g. plastics, timber, cardboard) generated during the decommissioning/ demolition and construction phases will be segregated and sent to recycler for recycling as far as practicable.

A waste management plan (WMP) as stated in the *PNAP ADV-19* for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established and implemented during the decommissioning/ demolition and construction phases as part of the Environmental Management Plan (EMP). The Contractor will be required to prepare the EMP and submit it to the Architect/ Engineer under the Contract for approval prior to implementation.

6.5.1.2 Measures for Reduction of Excavated Materials and Construction Waste Generation

C&D materials will be segregated on-site into public fill and construction waste and stored in different containers or skips to facilitate reuse of the public fill and proper disposal of the construction waste. Specific areas of the Project site will be designated for such segregation and storage if immediate use is not practicable. Prefabrication will be adopted as far as practicable to reduce the construction waste arisings.

6.5.1.3 Measures for Management of Chemical Waste

The contractor(s) will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes* as listed below.

Containers used for storage of chemical wastes will:

- Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
- Have a capacity of less than 450 L unless the specifications have been approved by the EPD; and
- Display a label in English and Chinese in accordance with instructions prescribed in *Schedule 2* of the *Regulations*.

The storage area for chemical wastes will:

- Be clearly labelled and used solely for the storage of chemical waste;
- Be enclosed on at least 3 sides;
- Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;
- Have adequate ventilation;
- Be covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and
- Be arranged so that incompatible materials are appropriately separated.

Chemical waste will be disposed of:

- Via a licensed waste collector; and
- To a facility licensed to receive chemical waste, such as the CWTC which also offers a chemical waste collection service and can supply the necessary storage containers.

6.5.1.4 Measures for Management of General Refuse

General refuse will be stored in enclosed bins separately from C&D materials and chemical wastes. General refuse will be delivered separately from C&D materials and chemical wastes for offsite disposal on a daily basis to reduce odour, pest and litter impacts.

Recycling bins will be provided at strategic locations within the Project site to facilitate recovery of recyclable materials (including aluminium can, waste paper, glass bottles and plastic bottles) from the Project site. Materials recovered will be sold for recycling.

In addition, to avoid any odour and litter impact, portable toilets will be provided for workers on-site where appropriate.

6.5.1.5 Staff Training

At the commencement of the decommissioning/ demolition and construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.

6.5.2 Operation Phase

6.5.2.1 Measures for Management of Chemical Waste

The measures for management of chemical waste during operation phase are similar to those outlined in ***Section 6.5.1.3***.

6.5.2.2 Measures for Management of General Refuse

Management approach of general refuse arises from the on-site operators and visitors to the plant during operation phase will be similar to that in construction phase. General refuse and non-recyclables will be stored in enclosed bins and collected by existing waste management contractor at LPS for disposal at the landfills on a daily basis for avoidance of pest and odour nuisance. Recycling bins for recyclable materials (including aluminium can, waste paper, glass bottles and plastic bottles) will be placed at the site office and transported off-site for recycling on a regular basis.

6.6 Residual Impact

No residual environmental impact related to waste management is envisaged during the decommissioning/ demolition, construction and operation phases of the Project.

6.7 Environmental Monitoring and Audit

6.7.1 Decommissioning/ Demolition and Construction Phases

It is recommended that regular site inspections of the waste management practices would be carried out during the decommissioning/ demolition and construction phases to determine if wastes are being managed in accordance with the recommended good site practices and WMP. The site inspections will investigate all aspects of waste management including waste generation, storage, handling, recycling, transportation and disposal.

6.7.2 Operation Phase

As the operation of the new units and associated equipment will generate minimal quantity of waste and no adverse environmental impacts will arise with the implementation of standard waste management practices at LPS, waste monitoring and audit programme for the operation of the new units and associated equipment under the Project will not be required.

6.8 Conclusion

With the implementation of good site practices, adverse environmental impacts (including air and odour, noise and water quality) or other hazards arising from the management and disposal of waste during the decommissioning/ demolition, construction and operation phases are not anticipated.

The estimated waste arisings and recommend waste management arrangements during the decommissioning/ demolition, construction and operation phases of the Project are summarised in ***Table 6.2***.

Table 6.2 Summary of Estimated Waste Arisings and Recommended Waste Management Arrangements

Types of Waste	Approximate Quantity	Waste Management Arrangements
Decommissioning/ Demolition and Construction Phase		
C&D materials (demolition works)	Scrap metals: 4,500 tonnes	■ Off-site recycling ■ Disposed of at landfill sites directly or via Outlying Island Transfer Facilities
	Other non-inert C&D materials (e.g. plastics, timber, cardboard): 100m^3	■ On-site segregation and off-site recycling, or disposed of at landfill sites directly or via Outlying Island Transfer Facilities
	Inert C&D materials (e.g. broken concrete): 720m^3	■ Sent to public fill reception facilities directly or Outlying Island Transfer Facilities
C&D materials (civil works)	Inert C&D materials: 84m^3	■ Sent to public fill reception facilities directly or Outlying Island Transfer Facilities
	Non-inert C&D materials: 21m^3	■ On-site segregation and off-site recycling, or disposed of at landfill sites directly or via Outlying Island Transfer Facilities
Excavated materials	5,000m^3	■ On-site reuse for backfilling ■ Sent to public fill reception facilities directly or Outlying Island Transfer Facilities
Chemical waste	Few hundred litres per month [(b)]	■ Disposed of at CWTC or other licensed chemical waste treatment facilities
General refuse	162.5kg per day	■ Recyclable materials: on-site sorting and off-site recycling ■ Non-recyclable refuse: disposed of at landfill sites directly or via Outlying Island Transfer Facilities
Operation Phase		
Chemical waste	Few hundred litres per month	■ Disposed of at CWTC or other licensed chemical waste treatment facilities
General refuse	Insignificant quantity [(a)]	■ Recyclable materials: on-site sorting and off-site recycling

Types of Waste	Approximate Quantity	Waste Management Arrangements
		■ Non-recyclable refuse: disposed of at landfill sites directly or via Outlying Island Transfer Facilities

Note:
(a) Insignificant quantity of general refuse with respect to operation of the new units under the Project.
(b) An addition of about 54,000L of waste lube oil will be generated from testing and commissioning of each unit and will also be disposed of at CWTC or other licensed chemical waste treatment facilities.