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7 WASTE MANAGEMENT IMPLICATIONS

7.1 Introduction

7.1.1 This section presents the assessment on the potential waste management implications associated with the construction and operation of the Project. The waste management implications have been assessed in accordance with the requirement in Annexes 7 and 15 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and the requirements in Section 3.4.7 and Appendix F of the Environmental Impact Assessment (EIA) Study Brief (ESB-363/2023).

7.2 Environmental Legislation, Standards and Assessment Criteria

7.2.1 The criteria for evaluating waste management implications and the guidelines for assessment of waste management implications are laid down in Annexes 7 and 15 of the EIAO-TM.

7.2.2 Legislation used in assessing potential waste management implications include:

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

Waste Disposal Ordinance (Cap. 354)

7.2.3 The *Waste Disposal Ordinance* (WDO) prohibits any unauthorised disposal of wastes. Construction waste, defined under Cap. 354N of the WDO, refers to any substance, matter or thing that is generated from construction work. It includes all abandoned materials, whether processed or stockpiled or not, before being abandoned, but does not include any sludge, screenings or matter removed in or generated from any desludging, desilting or dredging works. Under the WDO, waste can be disposed of only at designated waste disposal facilities licensed by Environmental Protection Department (EPD).

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

7.2.4 Issued under the WDO, the *Chemical Waste (General) Regulation* administers the possession, storage, collection, transport and disposal of chemical waste. EPD has also issued three statutory guidelines:

- A Guide to the Chemical Waste Control Scheme (2016) to introduce and explain the legislative controls over the management of chemical waste in Hong Kong;
- A Guide to the Registration of Chemical Waste Producers (2024) to introduce the registration provisions of the Waste Disposal (Chemical Waste) (General) Regulation (the Regulation) and the procedure for identifying chemical waste generation; and
- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992) to detail how the Contractor should comply with the regulations on chemical waste.

Waste Disposal (Clinical Waste) (General) Regulation (Cap. 354O)

7.2.5 The WDO defines clinical waste as waste substance generated in clinics, hospitals, laboratories and other medical sources in connection with:

- a dental, medical, nursing or veterinary practice;
- any other practice, or establishment (howsoever described), that provides medical care and services for the sick, injured, infirm or those who require medical treatment;
- dental, medical, nursing, veterinary, pathological or pharmaceutical research; or
- a dental, medical, veterinary or pathological laboratory practice.

7.2.6 Code of Practice for the Management of Clinical Waste - Major Clinical Waste Producers published under Section 35 of WDO provides the guidelines and requirements for proper handling, transporting, storing and disposing of clinical waste. and delivery of clinical waste including the licenses required for its collection and disposal.

Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)

7.2.7 Construction waste as defined under the *Waste Disposal (Charges for Disposal of Construction Waste) Regulation* includes any substance, matter or thing 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, screenings or matter removed in or generated from any desludging, desilting or dredging works. This Regulation stipulated that construction waste delivered to a landfill for disposal must not contain more than 50% by weight of inert material; construction waste delivered to a sorting facility for disposal must contain more than 50% by weight of inert material; whereas construction waste delivered to a Public Fill Reception Facility (PFRF) for disposal must consist entirely of inert material.

Land (Miscellaneous Provisions) Ordinance (Cap. 28)

7.2.8 The inert portion of Construction and Demolition (C&D) materials (including rocks, soil, broken concrete, building debris etc.) may be taken to PFRFs. PFRFs usually form part of land reclamation schemes and are operated by Civil Engineering and Development Department (CEDD) and others. The *Land (Miscellaneous Provisions) Ordinance* requires that individuals or companies who deliver public fill to the PFRFs are required to obtain Dumping Licences. The licences are issued by CEDD under delegated authority from the Director of Lands.

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

7.2.9 The *Public Cleansing and Prevention of Nuisances Regulation* provides control on illegal dumping of wastes on unauthorised / unlicensed sites. The illegal dumping of wastes can lead to a fine and/or imprisonment.

Other Relevant Documents and Guidelines

7.2.10 Other relevant documents and guidelines related to waste management and disposal include:

- Project Administration Handbook for Civil Engineering Works;
- Waste Blueprint for Hong Kong 2035, Environment Bureau (2021);
- Waste Disposal Plan for Hong Kong (1989);

- Hong Kong Planning Standards and Guidelines (HKPSG), Chapter 9 – Environment;
- Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste;
- Code of Practice for the Management of Clinical Waste - Major Clinical Waste Producers and Waste Collectors (June 2010)
- Professional Persons Environmental Consultative Committee Practice Note (ProPECCPN) 2/97 Handling of Asbestos Containing Materials in Buildings;
- New Disposal Arrangement for Construction Waste (1992), Environmental Protection Department & Civil Engineering and Development Department;
- Works Branch Technical Circular (WBTC) No. 02/1993, Public Dumps;
- WBTC No. 02/1993B, Public Filling Facilities;
- WBTC No. 16/1996, Wet Soil in Public Dumps;
- WBTC No. 19/2001, Metallic Site Hoardings and Signboards;
- WBTC No. 12/2000, Fill Management;
- WBTC Nos. 25/99, 25/99A and 25/99C, Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers;
- WBTC No. 12/2002, Specifications Facilitating the Use of Recycled Aggregates;
- Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TC(W)) No. 19/2005, Environmental Management on Construction Sites;
- DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials;
- DEVB TC(W) No. 02/2011, Encouraging the Use of Recycled and other Green Materials in Public Works Projects;
- DEVB TC(W) No. 08/2010, Enhanced Specification for Site Cleanliness and Tidiness;
- DEVB TC(W) No. 09/2011, Enhanced Control Measures for Management of Public Fill;
- DEVB TC(W) No. 4/2020 “Tree Preservation”;
- Relevant guidelines on handling of yard waste on EPD’s website (https://www.epd.gov.hk/epd/english/environmentinhk/waste/manage_facility/ypark.html) and Y·Park’s website (https://www.ypark.hk/zh-hant/); and
- The Greening, Landscape and Tree Management Section of the Development Bureau “Guidelines on Yard Waste Reduction and Treatment”.

7.3 Assessment Methodology

7.3.1 The assessment of waste management implications during the construction and operational phases of the Project has been carried out in accordance with the criteria outlined in Annexes 7 and 15 of the EIAO-TM as well as the requirements set out under Section 3.4.7 and Appendix F of the EIA Study Brief (No. ESB-363/2023), including the following tasks:

- Identification of the construction and operational activities of the Project which could give rise to waste arising;
- Estimation of types and quantities of waste generated;
- Examination of opportunities for waste reduction and reuse (both on-site and off-site) and the required disposal options for each type of waste; and

- Evaluation of potential impacts caused by handling, collection, transportation and reuse / disposal of wastes with respect to potential hazards, air and odour emissions, noise, wastewater discharges, ecology and public transport.

7.3.2 Prior to considering the disposal options for various types of waste, opportunities for reducing waste generation, on-site or off-site reuse and recycling have been evaluated. Measures which can be taken in the planning and design phases (e.g. by modifying the design approach) and in the construction phase for maximising waste reduction have been separately considered.

7.3.3 After considering all the opportunities for reducing waste generation and maximising reuse, the types and quantities of the waste required to be disposed of have been estimated and the disposal options for each type of waste have been described. The disposal method recommended for each type of waste has taken into account the result of the assessment. The impacts caused by handling (including stockpiling, labelling, packaging and storage), collection, transportation and reuse / disposal of waste have been addressed and appropriate mitigation measures have been proposed.

7.4 Identification and Evaluation of Waste Management Implications

Construction Phase

7.4.1 The following activities have been included in the waste management implication assessment for the construction phase:

- Construction and operation of new district distributor road (Road D1) and associated road works at San Tin Highway (DP1);
- Revitalisation of Ngau Tam Mei Drainage Channel (NTMDC) and river diversion works located less than 300 m from the nearest boundary of an existing conservation area (DP2);
- Revitalisation of NTMDC and river diversion works located outside 300 m from the nearest boundary of an existing conservation area;
- Construction of “Residential” (“R” & “RSc”) development, “Government, Institution or Community” (“G/IC”), “Education” (“E”), Open Space (“O”), “Amenity” (“A”), and other specified uses; and
- Miscellaneous construction works for other Project elements, e.g. buildings, roads, cycle tracks, utilities and facilities including electricity substations, sewage pumping station and associated rising mains, etc.

7.4.2 Typical waste types arising from the proposed construction works are identified in this section, together with an evaluation of the potential waste management impacts associated with the handling and disposal of waste. **Table 7.1** lists out the sources and examples of the identified waste types.

Table 7.1 Identification of Waste Types during the Construction Phase

Waste Type	Sources of Waste Generation	Examples of Waste
C&D Materials	• Materials generated from site clearance and site formation works • Materials generated from construction of new buildings and infrastructures	Non-inert C&D materials • Topsoil, vegetation and wood waste, etc. • Bamboo, timber, paper and plastic, etc. Inert C&D materials • Soft materials including but not limited to excavated soil and fill • Artificial hard materials including but not limited to broken concrete, asphalt, bitumen and granular materials
Chemical Waste	• Building demolition • Plant operation and maintenance • Maintenance of mechanical equipment	• Asbestos containing materials • Oil and grease, scrap batteries, used paint, fuel, etc. • Cleansing fluids and solvents from construction plant and equipment
General Refuse	• Refuse generated from construction works and site-based staff and workers	• Food waste, containers, cans and waste paper, etc.
Excavated Sediment	• Excavated sediment generated from the pond excavation works	• Pond sediment
Desilted Materials	• Desilting works during revitalisation of NTMDC	• Silt from existing bottom of the NTMDC
Floating Refuse	• Construction activities along river channels or water bodies	• Litter and debris

Construction and Demolition Materials

7.4.3 The construction phase of the Project will be implemented in three phases through a number of construction activities. The anticipated timing for major construction activities in each development phase is summarised in **Table 7.2**. C&D materials will be generated from site clearance and site formation works, as well as construction of new buildings and infrastructures. These C&D materials will comprise both non-inert and inert components.

Table 7.2 Anticipated Timing for Major Construction Activities

Construction Activities	Phase	Anticipated Timing
Site Clearance and Site Formation	Phase 1	2027 - 2029
	Phase 2	2028 - 2034
	Phase 3	2030 - 2036
Construction of New Buildings and Infrastructures	Phase 1	2028 - 2033
	Phase 2	2030 - 2035
	Phase 3	2032 - 2036

Site Clearance and Site Formation Works

7.4.4 Site clearance waste will mainly be generated from the demolition of existing structures, tree felling, and preparation of the existing ground surface and will comprise topsoil, vegetation, broken concrete and asphalt. Site formation waste will mainly come from the excavation works and will comprise excavated soil and artificial hard materials. Designated stockpile areas will be provided to allow temporary storage of surplus C&D materials, enabling inert materials generated from site clearance and formation to be reused as backfilling materials in later stages within the Project area. This construction planning and arrangement could minimise the disposal of public fill/inert C&D materials at PFRFs. Additionally, as discussed in **Section 2.7.4**, alternative construction method options for site formation have been taken into consideration to minimise the generation of public fill/inert C&D materials. These options were compared in terms of their potential to reduce inert C&D materials. The estimated volumes of C&D materials generated from site clearance and site formation works are illustrated in **Table 7.3**.

Table 7.3 Estimated Volumes of C&D Materials Generated from Site Clearance and Site Formation Works

Year	Volume of Non-Inert C&D Materials (m^3)	Volume of Inert C&D Materials (m^3)	
		Soft Material	Artificial Hard Material
2027	441	92,263	11,026
2028	896	233,742	22,394
2029	945	300,957	23,616
2030	1,019	306,486	25,463
2031	749	170,912	18,718
2032	501	84,302	12,534
2033	592	86,661	14,794
2034	215	9,924	5,373
2035	45	647	1,129
2036	34	433	848
Total	**5,437**	**1,286,327**	**135,895**

7.4.5 It is estimated that around 5,437 m^3 of non-inert C&D materials, and inert C&D materials including 1,286,327 m^3 of soft materials and 135,895 m^3 of artificial hard materials would be generated from site clearance and site formation works. All inert C&D materials generated from the Project are assumed to be suitable for reuse on-site as backfilling materials. The non-inert C&D materials should also be reused on-site wherever possible before disposing of at the North East New Territories (NENT) Landfill, subject to agreement with EPD. For felled trees, one of the non-inert C&D materials, recycling and reuse on-site and sorting for delivery to Y·Park should always be the priority. Disposal of felled trees directly at landfills should only be regarded as the last resort, when no alternatives are available.

7.4.6 It is estimated that around 31,262 m^3 of fill materials will need to be imported during the site clearance and site formation works of the Project. The fill materials required will be sourced from other concurrent projects. The reusable portion of the inert C&D materials generated from the site clearance and site formation works will be reused on-site as backfilling materials. The Contractor should review the programme during early construction stage to maximise the quantity of on-site reuse of surplus fill materials. The estimated cut and fill volumes for the Project by year are shown in **Table 7.4.** The remaining stockpiled volumes, 11,646 m^3 in 2036, will be delivered to the PFRFs, subject to agreement with EPD and designation by the PFC (Public Fill Committee).

Table 7.4 Estimated Cut and Fill Volumes for the Site Clearance and Site Formation Works by Year

Year	Cut Volume (m^3)	Fill Volume (m^3)	Surplus C&D Materials (m^3)	Required Import Volume of Fill Materials (m^3)	Cumulative Stockpiling Volume (m^3)
	(A)	(B)	(A) - (B)[1]		
2027	103,289	134,551	(31,262)	31,262	0
2028	256,136	213,888	42,248	-	42,248
2029	324,573	194,599	129,974	-	172,222
2030	331,949	226,270	105,679	-	277,901
2031	189,630	198,810	(9,180)	-	268,721
2032	96,836	169,960	(73,124)	-	195,597
2033	101,455	215,018	(113,563)	-	82,034
2034	15,297	74,079	(58,782)	-	23,252
2035	1,776	8,788	(7,012)	-	16,240
2036	1,281	5,875	(4,594)	-	11,646
Total	**1,422,222**	**1,441,838**	**(19,616)**	**31,262**	**11,646**

Note:
(1) Negative numbers in brackets.

Construction of New Buildings and Infrastructures

Both inert and non-inert C&D materials will also be generated from the construction of new buildings and infrastructures including the construction of district and local distributor roads, sewage pumping station and associated rising mains, electricity substations, and other miscellaneous infrastructure and landscape works. The estimated volumes of C&D materials generated from the construction of new buildings and infrastructures are shown in **Table 7.5**. About 356,649 m^3 of inert C&D materials generated from the construction of new buildings and infrastructures will be delivered to the PFRFs, subject to agreement with EPD and designation by the PFC, as a last resort.

Table 7.5 Estimated Volumes of C&D Materials Generated from Construction of New Buildings and Infrastructures

Year	Gross Floor Area (m^2)	Total C&D Materials Generated (m^3)	Volume of Non-Inert C&D Materials (m^3)	Volume of Inert C&D Materials (m^3)
2028	16,164.8	1,616.5	162	1,455
2029	190,327.7	19,032.8	1,903	17,130
2030	529,392.7	52,939.3	5,294	47,645
2031	529,392.7	52,939.3	5,294	47,645
2032	591,851.1	59,185.1	5,919	53,266
2033	634,708.0	63,470.8	6,347	57,124
2034	461,009.0	46,100.9	4,610	41,491
2035	704,730.1	70,473.0	7,047	63,426
2036	305,193.8	30,519.4	3,052	27,467

Year	Gross Floor Area (m^2)	Total C&D Materials Generated (m^3)	Volume of Non-Inert C&D Materials (m^3)	Volume of Inert C&D Materials (m^3)
Total	**3,962,770(1)**	**396,277(1)**	**39,628**	**356,649**

Note:
(1) Total rounded to the nearest integer.

7.4.7 In accordance with the Reduction of Construction Waste Final Report published by the Hong Kong Polytechnic University in March 1993, a C&D materials generation rate of 0.1 m^3 per 1 m^2 of gross floor area (GFA) was adopted. The total estimated GFA of the proposed development in the assessment area is around 3,962,770 m^2. Therefore, it is estimated that around 396,277 m^3 of C&D materials would be generated from the construction of the new buildings and infrastructures for the proposed development.

7.4.8 In addition, based on Monitoring of Solid Waste in Hong Kong (2023) published by EPD, approximately 90% of the C&D materials would be inert C&D materials. The inert C&D materials were assumed to be all artificial hard materials in the estimation. It is estimated that around 39,628 m^3 of non-inert C&D materials and 356,649 m^3 of inert C&D materials would be generated from the construction of new buildings and infrastructures. The non-inert and inert C&D materials generated from the construction of new buildings and infrastructures will be reused and recycled within the sites wherever possible before disposal of at the NENT Landfill, or delivery to the PFRFs, subject to agreement with EPD and designation by the PFC, respectively. In addition, during detailed design stage, architects and engineers could optimise building design and specifications, such as adoption of modular and standardised components for reducing cut-offs and offcuts during installation, as well as innovative techniques (e.g. efficient material cutting and offsite prefabrication), to minimise material usage and waste generation.

Temporary Stockpiling Areas

7.4.9 As presented in **Section 7.4.4**, the inert C&D materials generated from site clearance and site formation works will be reused on-site as backfilling materials where practicable. Since the Project will be implemented in phases, with provision of temporary stockpiling areas in Site G.11 and Site G.12, this proper site arrangement could facilitate the on-site reuse of surplus C&D materials under the Project, thereby minimising the disposal of public fill/inert C&D materials at PFRFs. The locations of Site G.11 and Site G.12 are presented in **Figure 2.1**.

7.4.10 The temporary stockpiling areas are proposed at Site G.11 and Site G.12, with the sizes of approximately 14.9 ha and 28.7 ha respectively. Assuming a stockpiling area of 25% of the total site area of G.11 and G.12 and a height of 3 meters, the total holding capacities would be 327,000 m^3, which would be sufficient for storing the peak estimated stockpiling volume (i.e. about 277,901 m^3 in Year 2030 (**Table 7.4** refers)).

7.4.11 Mitigation and control requirements for C&D materials are detailed in **Section 7.5.9** to **Section 7.5.15**.

Chemical Waste

7.4.12 Asbestos containing materials (ACM) can be found in buildings built before the mid-1980s. If the buildings or structures containing ACM need to be demolished, the ACM should be removed in accordance with the requirements of *Air Pollution Control Ordinance* and disposed of in accordance with the requirements of WDO. A Registered Asbestos Consultant and Registered Asbestos Laboratory shall be engaged to conduct investigation for the presence of ACM. An Asbestos Investigation Report, an Asbestos

Abatement Plan (if required) and a notification of commencement of asbestos abatement works (if required) shall be submitted to EPD at least 28 days before the asbestos abatement works commence. Also, the removal of ACM should be carried out by a Registered Asbestos Contractor according to the approved Asbestos Abatement Plan under the supervision of a Registered Asbestos Consultant. The asbestos waste generated should be disposed of at the NENT Landfill by a licensed chemical waste collector in compliance with the WDO.

7.4.13 The maintenance and servicing of plant, equipment and vehicles will also generate chemical waste during the construction phase of the Project. The possible chemical waste includes:

- Scrap batteries from vehicle maintenance;
- Spent hydraulic fluids and waste fuel from plant operation;
- Spent lubrication oils and cleaning fluids from plant maintenance; and
- Spent paint and solvents from equipment maintenance.

7.4.14 Chemical waste arising during the construction phase may pose environmental, health and safety hazards if not stored and disposed of in an appropriate manner as stipulated in the *Waste Disposal (Chemical Waste) (General) Regulation*. The potential hazards include:

- Toxic effects on the workforce;
- Adverse impacts on water quality and aquatic biota from spills; and
- Fire hazards.

7.4.15 It is difficult to quantify the amount of chemical waste that would arise from the construction activities as it would be highly dependent on the contractor's on-site maintenance activities and the quantity of plant and equipment utilised. It is anticipated that the quantity of chemical waste, such as lubrication oil and solvent produced from plant maintenance, would be a few cubic metres per month.

7.4.16 Handling, storage, transportation 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 the EPD. Recycling at licensed facilities should be prioritised before disposal of chemical waste at the CWTC as the last resort. Mitigation and control requirements for chemical waste are detailed in **Section 7.5.16** to **Section 7.5.21**.

General Refuse

7.4.17 During the construction phase of the Project, the workforce will generate general refuse comprising food waste, waste paper, empty containers, etc.. Storage of general refuse may give rise to adverse environmental impacts, such as windblown litter, odour, water and visual impacts, if not properly managed. The site may also attract vermin and pests if the waste containers are not cleaned or maintained properly and frequently. In addition, disposal of waste at sites other than the approved waste disposal facilities may lead to similar adverse environmental impacts at those sites.

7.4.18 The number of construction workers is not available at this stage, but it is anticipated that there would be not more than 870 staff to be presented on-site at any one time during each year of the construction phase of the Project. Based on a generation rate of 0.65 kg per worker per day, around 566 kg of general refuse would be generated daily during the construction phase of the Project.

7.4.19 In order to minimise the final disposal quantities of general refuse, provision of sufficient number of recycling bins for the collection of different types of recyclable waste and sufficient number of general refuse bins for the collection of non-recyclable waste are recommended. A reputable waste collector should be employed to collect the general refuse on a daily basis for disposal of general refuse at the NENT Landfill. Mitigation and control requirements for general refuse are detailed in **Sections 7.5.22** and **7.5.23.**

Excavated Sediment

7.4.20 Existing ponds will be removed due to the new developments recommended for the Project. Construction works at the existing ponds within the Project Site may result in pond sediment (i.e. excavated sediment).

7.4.21 Information on the quantity and quality of excavated sediment is not currently available. However, it is preliminarily estimated that there would be approximately 91,200 m^3 of excavated sediment, assuming the excavation area is equivalent to the affected ponds area (i.e. 6.08 ha) at a depth of 1.5 m. The estimation however should be further reviewed and updated when sufficient geotechnical information is available. Metal-based algaecides including copper-based algaecides are not commonly used for freshwater fish farming in Hong Kong due to the high cost and toxicity to fish. Calcium oxide, which is cheaper, non-toxic to fish and a more readily available chemical, is more commonly used to control algae and suspended solids in fishponds. It is therefore considered unlikely that the excavated sediment will be contaminated. The excavated sediment, however, is expected to have high water content and high organic content. The excavated sediment is proposed to be stabilised / solidified by mixing with cement so that the mixture is suitable for reuse on-site. It is estimated that the process should take less than 1.5 months inclusive of testing, subject to further liaison with relevant parties. In view of short processing period, the sediment is proposed to be reused directly at its original location, and all excavated sediment is anticipated to be suitable for reuse. Transportation arrangement for the excavated sediment is therefore not required.

7.4.22 All excavated sediment generated from the pond excavation works should be collected and handled in compliance with the WDO. Mitigation and control requirements for excavated sediment are detailed in **Section 7.5.24**.

Desilted Materials

7.4.23 Desilting works will be involved during revitalisation of NTMDC. The existing bottom of the NTMDC is of concrete lined (i.e. less deposition) and no significant desilted material deposits were observed during the site inspection. The estimated desilting volume would be up to 100 m^3 during the entire construction phase if desilted materials are present. Should excessive desilted material accumulation occur, it will be removed through the desilting works. The desilted materials will be handled using standard good practices, including stockpiling the desilted materials as far away from the sensitive receivers as possible, and covering with tarpaulin sheets to minimise the release of potential odour, before transporting to NENT Landfill for disposal. Mitigation and control requirements for desilted materials are detailed in **Section 7.5.25**.

Floating Refuse

7.4.24 Floating refuse in the Project Site would be generated from the construction workforce (e.g. waste paper and empty containers) while working along the river channels or water bodies if there is no proper site management in place. With implementation of proper waste management measures and worker training to prevent the occurrence of wind-blown light materials, the quantity is expected to be insignificant. Measures should be

taken to recycle materials before disposal at NENT Landfill. Mitigation and control requirements for floating refuse are detailed in **Section 7.5.26**.

Transportation Arrangement for Waste Disposal during Construction Phase

7.4.25 Land transport should be used to deliver and dispose of the waste generated from the Project Site to the designated disposal outlets. The tentative transportation routings for the disposal of various types of wastes generated during the construction phase of the Project are shown in **Table 7.6**. No barging points or conveyor systems will be established in the Project Site. The transportation routings may be subject to change according to the actual traffic conditions of the roads. Nevertheless, with the implementation of appropriate mitigation measures (e.g. using water-tight containers and covered trucks), no adverse environmental impacts are expected due to the transportation of waste.

Table 7.6 Tentative Transportation Routings and Frequency for Waste Handling / Disposal during Construction Phase

Type of Waste	Disposal Outlet	Tentative Transportation Routing and Frequency
Non-inert C&D Materials	NENT Landfill/ Y·Park	NENT Landfill: Via New Territories Circular Road/San Tin Highway, Fanling Highway, Heung Yuen Wai Highway, Wo Keng Shan Road Y·Park (for felled trees): Via San Tin Highway, Yuen Long Highway, Tuen Mun Road, Wong Chu Road, Lung Fu Road and Lung Mun Road (4 truck trips to NENT Landfill / Y·Park per day)(1)(3)
Inert C&D Materials	PFRFs subject to the designation from the PFC	Via San Tin Highway, Yuen Long Highway, Tuen Mun Road, Wong Chu Road, Lung Fu Road and Lung Mun Road (Tuen Mun Area 38 Fill Bank) (39 truck trips per day)(1)
General Refuse and Floating Refuse (if any)	NENT Landfill	Via New Territories Circular Road/San Tin Highway, Fanling Highway, Heung Yuen Wai Highway, Wo Keng Shan Road (1 truck trip per day) (2)
ACM	NENT Landfill	Via New Territories Circular Road/San Tin Highway, Fanling Highway, Heung Yuen Wai Highway, Wo Keng Shan Road (Number of trips to NENT Landfill is subject to the volume of ACM which will be verified prior to construction stage)
Chemical Waste other than ACM	Chemical Waste Treatment Centre (CWTC)	Via San Tin Highway, Tsing Long Highway, Tsing Sha Highway and Tsing Yi Road (1 truck trip per month) (2)
Desilted Materials	NENT Landfill	Via New Territories Circular Road/San Tin Highway, Fanling Highway, Heung Yuen Wai Highway, Wo Keng Shan Road (14 truck trips during the entire construction phase)(2)

Notes:

(1) The number of trips is the maximum estimate based on the expected peak annual C&D materials volume during construction (i.e. 7,092 m^3 for non-inert C&D materials in 2035 (i.e. the total sum of 45 m^3 (Table 7.3 refers) and 7,047 m^3 (Table 7.5 refers), and 82,454 m^3 (63,426 m^3 in 2035 (Table 7.5 refers) with a bulking factor of 1.3 applied) for inert

C&D materials). Inert C&D materials from site clearance and site formation will be reused and stockpiled on-site, and only the surplus inert C&D would be delivered to PFRFs in 2036). A capacity of 7.5 m^3 / 7.5 tonnes per truck which operates 6 days a week and 48 weeks a year is assumed.

(2) It is assumed that each truck has a capacity of 7.5 m^3 / 7.5 tonnes and operates 6 days a week and 48 weeks a year.

(3) As only trunks in appropriate health condition could be delivered and accepted by Y·Park, the delivered volume and number of trips to Y·Park cannot be determined at this stage. The total number of trips for transporting all non-inert C&D materials to either NENT Landfill or Y·Park has been provided instead.

Construction Phase Waste Summary

7.4.26 **Table 7.7** provides a summary of the waste types likely to be generated during the construction phase of the Project, together with the recommended handling and disposal methods.

Table 7.7 Summary of Waste Arising, Waste Handling Procedures and Disposal Routes during the Construction Phase

Waste Type	Sources of Waste Generation	Materials to be Generated	Total Approx. Amount to be Generated	Handling Procedures	Handling/Disposal Routes
C&D Materials	• Materials generated from site clearance and site formation works	Non-inert C&D materials • Topsoil, vegetation and wood waste, etc. • Bamboo, timber, paper and plastic, etc.	• 5,437 m^3	• Reusable materials should be separated and recycled where practicable	• Reused on-site wherever possible. Materials that cannot be reused nor recycled will be disposed of at the NENT Landfill, subject to agreement with EPD. • Felled trees will be recycled and reused on-site wherever possible. The remainder will be delivered to Y·Park. Disposal at the NENT Landfill will be regarded as the last resort.
		Inert C&D materials • Soft materials • Artificial hard materials	• 1,422,222 m^3	• Reusable materials should be separated and recycled where practicable	• Sorted materials will be stored at the temporary stockpiling areas and reused wherever possible.
	• Materials generated from construction of new buildings and infrastructures	Non-inert C&D materials • Topsoil, vegetation and wood waste, etc. • Bamboo, timber, paper and plastic, etc.	• 39,628 m^3	• Reusable materials should be separated and recycled where practicable	• Reused on-site wherever possible. Materials that cannot be reused nor recycled will be disposed of at the NENT Landfill, subject to agreement with EPD.

Waste Type	Sources of Waste Generation	Materials to be Generated	Total Approx. Amount to be Generated	Handling Procedures	Handling/Disposal Routes
		Inert C&D materials • Soft materials • Artificial hard materials	• 356,649 m^3	• Reusable materials should be separated and recycled where practicable	• Sorted materials will be reused on-site wherever possible. The remainder will be delivered to PFRFs, subject to the designation by the PFC for beneficial use.
Chemical Waste	• Building demolition • Plant operation and maintenance • Maintenance of mechanical equipment	• ACM • Oil and grease, scrap batteries, used paint, fuel, etc. • Cleansing fluids and solvents from construction plant and equipment	• ACM: To be verified prior to construction stage • Other chemical waste: A few cubic metres per month	• Other chemical waste: Stored in compatible containers in designated area on-site • ACM and other chemical waste: Collected by licensed collectors	• ACM: Disposed of at the NENT Landfill • Other chemical waste: Recycling at licensed facilities should be prioritised before disposal at the CWTC as the last resort
General Refuse	• Construction works and site-based staff and workers	• Food waste, containers, cans and waste paper, etc.	• Around 566 kg per day	• Provide on-site collection points together with recycling bins • Collected by a reputable waste collector	• Recycling at recycling facilities should be prioritised before disposed of at the NENT Landfill as the last resort.
Excavated Sediment	• Pond excavation works	• Pond sediment	• Around 91,200 m^3	• All excavated sediment generated from pond excavation works should be collected and handled in compliance with the WDO	• All excavated sediment should be stabilised and solidified for reuse on-site

Waste Type	Sources of Waste Generation	Materials to be Generated	Total Approx. Amount to be Generated	Handling Procedures	Handling/Disposal Routes
Desilted Materials	• Desilting works during revitalisation of NTMDC	• Silt from existing bottom of the NTMDC	• Up to 100 m^3	• Stockpiled as far away from the sensitive receivers as possible and covering with tarpaulin sheets before transporting for disposal	• Disposed of at the NENT Landfill
Floating Refuse	• Construction activities along river channels or water bodies	• Litter and debris	• Insignificant	• Disposed of together with general refuse, after separating the recyclables for recycling • Collected by a reputable waste collector	• Recycling at recycling facilities should be prioritised before disposal at the NENT Landfill as the last resort.

Operational Phase

7.4.27 Major waste types generated during the operation of the Project include municipal solid waste (MSW), chemical waste, clinical waste and desilted materials. **Table 7.8** lists out the sources and examples of the identified waste types.

Table 7.8 Identification of Waste Types during the Operational Phase

Waste Type	Sources of Waste Generation	Examples of Waste
MSW	• Domestic waste generated from future residences of dedicated rehousing estate and private housing, staff quarters and student hostels. • Commercial and industrial (C&I) waste generated from retail, schools, post-secondary education institutions, offices and hospital.	• Food waste, containers, cans, waste paper, etc. • Scrap materials, e.g. metals, etc.
Chemical Waste	• Public facilities operation (e.g. hospital, education institutions, etc.) • Maintenance activities (e.g. buildings, infrastructure, roads, etc.) • Laboratory testing in the Integrated Hospital	• Paint, lubricants and used batteries, laboratory chemicals, etc.
Clinical Waste	• Clinical waste generated from hospital	As defined in WDO: • Group 1 – Used or contaminated sharps • Group 2 – Laboratory waste • Group 3 – Animal and Human tissues • Group 4 – Infectious materials • Group 5 – Dressings contaminated with blood • Group 6 – Other wastes
Desilted Materials	• Regular desilting works during maintenance of the revitalised NTMDC	• Silt from the bottom of revitalised NTMDC

Municipal Solid Waste

7.4.28 MSW comprises solid waste from households and C&I sources. With reference to the latest data from “Monitoring of Solid Waste in Hong Kong – Waste Statistics for 2023” by EPD, the MSW disposal rate was 1.44 kg/person/day in Year 2023, and the recovery rate for recycling was 33% of the MSW generation. By calculation, the MSW generation rate, disposal rate and recycled rate were 2.15 kg/person/day, 1.44 kg/person/day and 0.71 kg/person/day in 2023 respectively. According to the “Waste Blueprint for Hong Kong 2035” by Environment Bureau, a series of action agenda including waste reduction and pressure relief on landfills has been built upon

enhanced social mobilization and implementation of policies and legislation. Necessary waste infrastructures to handle different types of waste will also be provided. The Blueprint has also set up ambitious waste reduction targets which aim to gradually reduce Hong Kong's MSW disposal rate on a per capita basis by 40-45% and increase the recovery rate to about 55% in the medium term, and to move away from the reliance on landfills in the long run by developing adequate waste-to-energy facilities (e.g. O·Park2 and I·Park1). As such, the estimated quantities of MSW to be disposed of at the future development stage adopted for the purpose of EIA could serve as a conservative approach and would be reduced upon the achievement of the waste reduction targets as the programme progresses. The estimated MSW based on planned residential and/or employment populations are summarised in **Table 7.9**.

Table 7.9 Estimated Quantities of MSW from Planned Residential and Employment Population during Operational Phase

Population Intake Year	Estimated MSW from Residential Population (tpd) (1)(3)				Estimated MSW from Employment Population (tpd) (1)(3)			
	Residential Population	Gen-erated (2)	Required Disposal (2)	Recycl-ed (2)	Employment Population	Gen-erated (2)	Required Disposal (2)	Recycl-ed (2)
2033	2,138	4.6	3.1	1.5	102	0.2	0.1	0.1
2034	7,265	15.6	10.5	5.1	13,484	29.0	19.4	9.6
2035	1,331	2.9	1.9	1.0	7,319	15.7	10.5	5.2
2036	27,766	59.7	40.0	19.7	5,095	11.0	7.4	3.6
Total	**38,500**	**82.8**	**55.5**	**27.3**	**26,000**	**55.9**	**37.4**	**18.5**

Notes:

(1) tpd: tonne per day. Residential and employment population are based on the development schedule of RODP of the Project.

(2) MSW disposal rate in 2023 was 1.44 kg/person/day and 67% of the MSW generation according to "Monitoring of Solid Waste in Hong Kong – Waste Statistics 2023" by EPD (MONITORING OF SOLID WASTE IN HONG KONG (wastereduction.gov.hk)). Based on this information, it is calculated that the MSW generation rate was 2.15 kg/person/day, MSW recycling rate was 0.71 kg/person/day and MSW recovery rate for recycling was 33% of the MSW generation.

(3) The MSW is estimated by population intake year with respect to commissioning year of the development and it is not accumulated.

7.4.29 As shown in **Table 7.9**, the estimated MSW generated from residential population is around 82.8 tonnes per day and the estimated MSW generated from the employment population is around 55.9 tonnes per day in the full commissioning of the development. As such, the total MSW generated from the Project would be around 138.7 tonnes per day.

7.4.30 An effective and efficient waste handling system is essential in order to minimise potential adverse environmental impacts during waste storage, collection and transport. Such impacts may include odour if waste is not collected frequently; water quality if waste enters storm water drains; aesthetics and vermin problems if the waste storage area is not well maintained and cleaned regularly. The waste handling system may also facilitate materials recovery and recycling.

7.4.31 In accordance with Chapter 9 of the HKPSG, a refuse collection point (RCP) is required to serve the needs of each population of 20,000 persons or areas within a distance of 500 metres. Site G.4 and Site G.7 have been allocated for provision of the proposed new RCPs. A Community Recycling Centre (CRC) is also proposed to co-

locate with the RCP in Site G.4 for environmental education purpose and convenient collection of recyclables from the local community and to create synergy to achieve better operational efficiency and environmental sustainability. The locations of the proposed RCPs and CRC are presented in **Figure 2.1**.

7.4.32 Provision of sufficient number of recycling bins / points at the Development Area for collection of recyclables is recommended to sort and recycle waste before disposal at the NENT Landfill as the last resort. The food waste generated within the Development Area would be source-separated wherever possible and subsequently be transported to STT for pre-treatment and for later co-digestion at Effluent Polishing Plant proposed under STT (i.e. San Tin EPP). The detailed arrangement is subject to further liaison with relevant parties. The new RCPs should contain compactors and/or related equipment to provide adequate waste handling services within the Development Area. At least daily collection should be arranged by the waste collectors. Mitigation and control requirements for MSW are detailed in **Sections 7.5.27** and **7.5.28**.

Chemical Waste

7.4.33 Chemical waste such as paints, lubricants, used batteries, laboratory chemicals, etc. would be generated during maintenance activities, operation of public facilities, and laboratory testing in the Integrated Hospital. This waste may pose environmental, health and safety hazards. Measures as stipulated in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Waste* should be strictly followed for the handling and disposal of chemical waste. The quantity of chemical waste to be generated during the operation is expected to be a few cubic metres per month.

7.4.34 Should any chemical waste be generated, the operator should register with EPD as a chemical waste producer. Recycling by licensed facility should be prioritised before disposal of chemical waste at the CWTC in Tsing Yi as the last resort. This chemical waste should be collected periodically in drum-type containers by licensed chemical waste collectors. Mitigation and control requirements for chemical waste are detailed in **Section 7.5.29**.

Clinical Waste

7.4.35 Clinical waste with an estimated amount of 1,000 kg/day would be generated during the operation of the proposed Integrated Hospital. The waste shall be segregated from other types of waste at the source, centrally collected, and stored in designated clinical waste storage rooms. The clinical waste shall be collected by licensed clinical waste collectors and be disposed of at a licensed disposal facility such as the CWTC. Different groups of clinical waste shall be handled and packaged according to their specific requirement. Mitigation and control requirements for clinical waste are detailed in **Section 7.5.30**.

Desilted Materials

7.4.36 Regular desilting works would be involved as part of the maintenance procedures of the revitalised NTMDC and carried out by the Drainage Services Department (DSD). Maintenance desilting works would tentatively be carried out on an annual basis during dry season (November to March) when the water flow is low, except during emergency situations where the accumulated silt would adversely affect the hydraulic capacity of the drainage or where flooding risk is imminent, or when complaints on

environmental nuisance associated with the accumulated silt are received. Small amount of silt, debris and screenings, which would be similar in nature to general refuse, would be generated from the revitalised NTMDC. Such waste will be removed by hand-held / light machinery and disposed of at NENT Landfill after the clearance works. About 100 m^3 of desilted materials, which are similar to general refuse, are anticipated to be generated from each desilting maintenance works. The desilted materials will be handled using standard good practices, including stockpiling the desilted materials as far away from the sensitive receivers as possible, and covering them with tarpaulin sheets to minimise the release of potential odour, before transporting to NENT Landfill for disposal. Mitigation and control requirements for desilted materials are detailed in **Section 7.5.31**.

Transportation Arrangement for Waste Disposal During Operational Phase

7.4.37 Land transport should be used to deliver and dispose of the waste generated from the Development Area to the designated disposal outlets. It is expected there would be around 14 vehicles per day for transporting non-food waste MSW during the operational phase of the Project. The transportation routings for the disposal of various types of waste generated during the operational phase of the Project are shown in **Table 7.10**. The transportation routings may change subject to the actual traffic conditions of the roads. Nevertheless, with the implementation of appropriate mitigation measures (e.g. using water-tight containers and covered trucks), no adverse environmental impacts are expected due to the transportation of waste.

Table 7.10 Tentative Transportation Routings and Frequency for Waste Handling / Disposal during Operational Phase

Type of Waste	Disposal Outlet	Tentative Transportation Routing and Frequency
MSW	NENT Landfill	Via New Territories Circular Road/San Tin Highway, Fanling Highway, Heung Yuen Wai Highway, Wo Keng Shan Road (13 truck trips per day)(1)(2)
Food Waste	San Tin EPP	Via proposed Road L3 and road connection to/from San Tin Technopole (6 truck trips per day)(1)(2)
Chemical Waste and Clinical Waste	CWTC	Via San Tin Highway, Tsing Long Highway, Tsing Sha Highway and Tsing Yi Road (1 truck trip per month for Chemical Waste(2) & 1 vehicle per day for clinical waste(2))
Desilted Materials	NENT Landfill	Via New Territories Circular Road/San Tin Highway, Fanling Highway, Heung Yuen Wai Highway, Wo Keng Shan Road (14 truck trips per each desilting works)(2)

Notes:

(1) 30% of the total MSW, i.e. 41.6 tonnes, is assumed to be food waste that would be delivered to San Tin EPP for co-digestion. The remaining 70% of MSW, i.e. 97.1 tonnes, would be transported to landfill daily.

(2) Each collection truck is assumed to have a loading capacity of 7.5 tonnes / 7.5 m^3.

Operational Phase Waste Summary

7.4.38 **Table 7.11** provides a summary of the waste types likely to be generated during the operational phase of the Project, together with the recommended handling and disposal methods.

Table 7.11 Summary of Waste Arising, Waste Handling Procedures and Disposal Routes during the Operational Phase

Waste Type	Sources of Waste Generation	Materials to be Generated	Total Approx. Amount to be Generated	Handling Procedures	Handling/Disposal Routes
MSW	• Domestic waste generated from future residences of public and private housing, staff quarters and student hostels. • C&I waste generated from retails, schools, post-secondary education institutions, offices and hospital.	• Food waste, containers, cans and waste paper, etc. • Scrap materials, e.g. metals, etc.	• Around 138.7 tonnes per day	• Provide on-site collection points together with recycling bins • Collected by a reputable waste collector	• Recycling at recycling facilities should be prioritised before disposal at the new RCPs and/or the NENT Landfill as the last resort • Source-separated food waste should be transported to San Tin EPP for pre-treatment and later co-digestion
Chemical Waste	• Public facilities operation (e.g. hospital, education institutions, etc.) • Maintenance activities (e.g. buildings, infrastructures, roads, etc.) • Laboratory testing in the Integrated Hospital	• Paint, lubricants, used batteries, laboratory chemicals, etc.	• A few cubic metres per month	• Stored in compatible containers in designated area on-site • Collected by licensed collectors	• Recycling by licensed facility should be prioritised before disposal at the CWTC as the last resort

Waste Type	Sources of Waste Generation	Materials to be Generated	Total Approx. Amount to be Generated	Handling Procedures	Handling/Disposal Routes
Clinical Waste	• Clinical waste generated from the proposed hospital	• Used or contaminated sharps • Human and animal tissues • Laboratory Waste • Infectious materials • Dressings • Other wastes	• 1,000 kg/day	• Packaged with appropriate container, colour code and sealing • Stored in lockable containers with warning sign • Collected by licensed collectors	• Disposed of at the CWTC
Desilted Materials	• Desilting works during maintenance of the revitalised NTMDC	• Silt from the bottom of revitalised NTMDC	• About 100 m^3 per time of desilting	• Stockpiled as far away from the sensitive receivers as possible and covering with tarpaulin sheets before transporting for disposal	• Disposed of at the NENT Landfill

7.5 Mitigation Measures

General

Waste Management Hierarchy

7.5.1 The waste management hierarchy has been applied in the assessment and development of mitigation measures for waste which aims at evaluating the desirability of waste management methods and includes the following in descending preference:

- Avoidance and minimisation of waste generation;
- Reuse of materials where practicable;
- Recovery and recycling of residual materials where possible; and
- Treatment and disposal of waste according to relevant laws, guidelines and good practices.

7.5.2 Recommendations of good site practices and waste reduction measures should be stated in order to achieve avoidance and minimisation of waste generation in the waste management hierarchy. A trip-ticket system is recommended for monitoring management of waste. Specific measures targeting the mitigation of impacts in works areas and the transportation of waste off-site should be provided to minimise the potential impacts to the surrounding environment.

Good Site Practices

7.5.3 Appropriate waste handling, transportation and disposal methods for all waste arising generated during the construction works for the Project should be implemented to ensure that construction wastes do not enter the nearby streams or drainage channel.

7.5.4 It is anticipated that adverse impacts would not arise on the construction site, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:

- Nomination of approved personnel, such as a site manager, to be responsible for good site practices, and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility.
- Training of site personnel in proper waste management and chemical waste handling procedures.
- Provision of sufficient waste reception/disposal points, of a suitable vermin-proof design that minimises windblown litter.
- Arrangement for regular collection of waste for transport off-site and final disposal.
- Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers.
- Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.
- A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed.

Waste Reduction Measures

7.5.5 Good management and control of construction site activities/ processes can minimise the generation of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:

- Segregate and store different types of construction related waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.
- Provide separate labelled bins to segregate recyclable waste such as aluminium cans from other general refuse generated by the work force, and to encourage collection by individual collectors.
- Any unused chemicals or those with remaining functional capacity should be recycled.
- Maximising the use of reusable steel formwork to reduce the amount of C&D materials.
- Prior to disposal of C&D waste, it is recommended that wood, steel and other metals should be separated for reuse and / or recycling to minimise the quantity of waste to be disposed of at landfill.
- Adopt proper storage and site practices to minimise the potential for damage to, or contamination of, construction materials.
- Plan the delivery and stock of construction materials carefully to minimise the amount of waste generated.
- Minimise over ordering of concrete, mortars and cement grout by doing careful check before ordering.

7.5.6 In addition to the above measures, other specific mitigation measures are recommended below to minimise environmental impacts during handling, transportation and disposal of wastes.

Storage, Collection and Transportation of Waste

7.5.7 Storage of materials on-site may induce adverse environmental impacts if not properly managed. The following recommendations should be implemented to minimise the impacts:

- Waste, such as soil, should be handled and stored well to ensure secure containment, thus minimising the potential of pollution;
- Maintain and clean storage areas routinely;
- Stockpiling area should be provided with covers and water spraying system to prevent materials from being wind-blown or washed away; and
- Different locations should be designated to stockpile each material to enhance reuse.

7.5.8 Waste hauler with appropriate permits should be employed by the Contractor for the collection and transportation of waste from works areas to respective disposal outlets. The following recommendations should be implemented to minimise the impacts:

- Remove waste in timely manner;

- Employ the trucks with cover or enclosed containers for waste transportation;
- Obtain relevant waste disposal permits from the appropriate authorities; and
- Dispose of waste at licensed waste disposal facilities.

Construction Phase

Construction and Demolition Materials

7.5.9 Careful design, planning together with good site management can reduce over-ordering and generation of C&D materials such as concrete, mortar and cement grouts. Formwork and temporary works should be designed to minimise the use of standard wooden panels, so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse.

7.5.10 Inert C&D materials with suitable characteristics / size should be reused on-site as fill or recycled as aggregate for other projects where practicable. The C&D material to be delivered to a PFRF for beneficial reuse should only consist of soil, rock, concrete, brick, cement plaster / mortar, inert building debris, aggregates and asphalt. The material should be free from household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be unsuitable by the Filling Supervisor. Prior to disposal of non-inert C&D materials, wood, steel and other metals should also be separated for reuse and / or recycling where practicable so as to minimise the quantity of waste to be disposed of at landfill.

7.5.11 Suitable areas should be designated within the site boundaries for on-site sorting and providing temporary stockpiling of C&D materials. Within stockpile areas, the following measures should be taken to control potential environmental impacts or nuisance:

- Surface of stockpiled soil should be regularly wetted with water especially during dry season (i.e. November to March);
- Disturbance of stockpile soil should be minimised;
- Stockpiled soil should be properly covered with tarpaulin especially during heavy storms are predicted; and
- Stockpiling areas should be enclosed where space is available.

7.5.12 In order to monitor the delivery of C&D materials at the designated PFRF and landfill and to control fly-tipping, a trip-ticket system should be implemented in accordance with the DEVB TC(W) No. 6/2010 *Trip Ticket System for Disposal of Construction & Demolition Materials*. The Contractor should ensure that every truck carrying C&D materials leaving the Project Site must bear a completed CHIT which should be presented to the designated waste facility operator during waste delivery. Truck operator should return the Transaction Record Slip and stamped CHIT received from the facility operator to the Architect / Engineer representative to verify the compliance with waste handling policy. A recording system for the amount of waste generated, recycled and disposed, including the disposal sites, should also be set up. Warning signs should be put up to remind the designated disposal sites. CCTV should also be installed at the vehicular entrance and exit of the site to monitor handling of C&D materials disposal. To prohibit illegal dumping and landfilling of C&D materials, the dump trucks engaged on-site should be equipped with Global Positioning System (GPS) or equivalent automatic system for real time tracking and monitoring of their travel routings, parking locations and disposal activities.

7.5.13 For non-inert biomass waste arising from the construction activities, such as yard waste, they are required to be handled in accordance with the principles of reduce, reuse, and recycle (3Rs). Specifically, to minimise the generation of yard waste, the following measures should be adopted:

- Avoid unnecessary removal or excessive pruning of trees. Preserve trees in their original locations and implement tree transplanting when on-site preservation is not feasible;
- Segregate various types of yard waste and shred wood into smaller pieces if necessary to facilitate reuse and recycling;
- Reuse yard waste on-site for a variety of purposes (e.g. decomposition and composting, recreational and decorative uses, and mulching in planting areas, etc.); and
- Identify recycling options (e.g. delivery to Y·Park) for yard waste that cannot be directly reused on-site.

7.5.14 Where yard waste generation is unavoidable, sorting of yard waste for recycling and reuse on-site should always be the priority. Yard waste should be separated from C&D materials to facilitate recycling, such as delivering them to Y·Park so as to minimise the quantity of waste to be disposed of at landfill site. Under the construction stage of the Project, woodchippers should be provided on-site for processing of the tree/yard waste for reuse and recycling, e.g. use as wood chip mulch for planting. With the experience under the Phase 1 development of the Kwu Tung North New Development Area, the contractors will be required to reuse the tree/yard waste and its derived products, e.g. upcycling of tree wastes and its derived products on-site in site office as construction materials, furniture, signage, etc. The remaining yard wastes that are 6 m long or below tree trunks and its attached tree branches, twigs and leaves will be transported to Y·Park, a yard waste recycling centre. Where appropriate, the Contractor should be responsible to cut and shred the yard waste on-site in order to meet the collection requirement of the recycling outlet for processing / disposal. Disposal of yard waste directly at landfills should only be regarded as the last resort, when no alternatives are available.

7.5.15 In addition, the Architect / Engineer should prioritise materials with higher recycled content or those that are more easily recyclable, such as engineered wood products over solid lumber. Procuring materials in standardised sizes can also help reduce the need for on-site cutting and trimming, which often generates significant wood waste. Establishing take-back agreements with suppliers for unused or damaged goods is another effective way to prevent these materials from ending up in landfills. Dedicated bins or storage areas for different waste streams, including non-inert biomass, in construction sites enables efficient sorting and facilitates recycling and reuse. Ultimately, reducing non-inert biomass waste in construction requires a holistic approach that spans material selection, procurement, on-site management, and end-of-life processing.

Chemical Waste

7.5.16 Due to the potential large amount of ACM during the site clearance stage, asbestos investigation is required. However, as asbestos investigation will involve a large number of buildings and most premises will involve private access, which cannot be obtained at this stage, it is considered that an asbestos specialist shall be employed by the responsible parties during the construction stage to investigate this issue.

7.5.17 Sufficient and reasonable lead time shall be allowed for preparation, vetting and implementation of Asbestos Investigation Report and Asbestos Abatement Plan in accordance with Air Pollution Control Ordinance before commencement of any demolition or site clearance work.

7.5.18 Some key precautionary measures related to the handling and disposal of asbestos are listed as following:

- Adoption of protection, such as full containment, mini containment, or segregation of works area;
- Provision of decontamination facilities for cleaning of workings, equipment and bagged waste before leaving the works area;
- Adoption of engineering control techniques to prevent fibre release from works area, such as use of negative pressure equipment with high efficiency particulate air (HEPA) filters to control air flow between the works area and the outside environment;
- Wetting of ACM before and during disturbance, minimising the breakage and dropping of ACM, and packing of debris and waste immediately after it is produced;
- Cleaning of works area by wet wiping and vacuuming with HEPA-filtered vacuum cleaner;
- Coating on any surfaces previously in contact with or contained by asbestos with a sealant;
- Proper bagging, safe storage and disposal of asbestos and asbestos-contaminated waste;
- Pre-treatment of all effluent from the works area before discharged; and
- Air monitoring strategy to check the leakage and clearance of the works area during and after the asbestos work.

7.5.19 The handling and disposal of ACM will be carried out in accordance with the EPD's Code of Practice on Handling, Transportation and Disposal of Asbestos Waste and ProPECCPN 2/97 Handling of Asbestos Containing Materials in Buildings.

7.5.20 For those processes which generated chemical waste, it may be possible to find alternatives to eliminate the use of chemicals, to reduce the generation quantities or to select a chemical type of less impact on environment, health and safety wherever possible.

7.5.21 If chemical waste is produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste. Chemical waste should be stored in appropriate containers and collected by a licensed chemical waste contractor. Chemical waste (e.g. spent lubricant oil) should be recycled at an appropriate facility wherever possible, while chemical waste that cannot be recycled should be disposed of at either the CWTC, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

General Refuse

7.5.22 General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical waste. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D materials and chemical waste, on a daily basis to minimise odour, pest and litter impacts. The collected general refuse would be disposed of at designated landfill. Clearly labelled recycling bins for various recyclables (including paper, aluminium cans, plastic wastes and glass bottles) should be provided on-site in order to encourage segregation and recycling in order to reduce general refuse production.

7.5.23 The Contractor should carry out an education programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided on-site as reminders. The recyclable waste materials should then be collected by reliable waste recycling agents on a daily basis.

Excavated Sediment

7.5.24 All excavated sediment generated from the pond excavation works will be treated and reused on-site as backfilling materials for the Project. Soil mixing or cement mixing work is suggested to improve the physical properties of the excavated sediment such that the grading and plasticity of the mixture will be suitable for the reuse. This approach avoids the need for off-site disposal that may result in impacts on the marine environment. In addition, all construction works near the watercourses should be undertaken within a dry zone and during dry season (i.e. November to March) to avoid adverse impacts to the environment. The excavated sediment, if stockpiled on-site, should be stored in enclosed containers and transported to the on-site treatment facilities as soon as practicable to minimise any potential odour impacts.

Desilted Materials

7.5.25 The desilted materials, if any, should be handled by the Contractor using standard good practices, including stockpiling the desilted materials as far away from the sensitive receivers as possible, and covering with tarpaulin sheets to minimise the release of potential odour, before transporting for disposal. Requirements of the Air Pollution Control (Construction Dust) Regulation and Water Pollution Control Ordinance (WPCO), where relevant, shall be adhered to during excavation, transportation and disposal of the desilted materials.

Floating Refuse

7.5.26 Proper waste management such as using collection bins with lids, avoiding placing waste collection bins close to any river channels or water bodies, and ensuring construction materials are well covered should be considered to avoid having waste transported to river channels or water bodies under extreme weather conditions. The Contractor should be responsible for the collection of floating refuse, if any, within the works area. The Contractor should collect and remove floating refuse, if any, at regular intervals on a daily basis to keep river channels or water bodies within the Project Site and the neighbouring water free from rubbish during the construction phase. The floating materials should be removed and eventually stored and disposed of together with the general refuse by the Contractor, after separating the recyclables for recycling.

Operational Phase

Municipal Solid Waste

7.5.27 Implementation of a waste prevention programme as well as materials recovery and recycling programme are recommended in order to minimise the production of waste. The programmes should consist of the following components:

- Recycling bins such as paper, aluminium cans, plastic bottles, glass bottles, food waste, etc., should be placed at prominent locations to encourage recycling;
- Banner should be erected at the recycling bins area;
- Operator should make arrangements with the recycler to collect and recycle used fluorescent lamps, toner cartridges, rechargeable batteries as well as the scrap electrical and electronic equipment, such as computers to avoid disposal at landfills where practicable;
- Staff awareness training should be provided on waste management procedures, including waste reduction and recycling;
- Operator should set up waste reduction and recycled targets; and
- Operator should participate in the Wastewi$e Label scheme to facilitate waste reduction.

7.5.28 MSW generated from residential and C&I buildings should be collected with lidded bins, delivered to the refuse collection room and stored in enclosed containers installed in each building at the ground floor to prevent windblown, vermin, water pollution and visual impact. At least daily collection should be arranged by the waste collector to transport the waste to the RCPs within the Project. To avoid potential odour nuisance to the residents during transport and storage of waste, enclosed waste collection trucks should be used and the collection route and time should be properly planned. Odour treatment units and removal installations are recommended to be applied at the RCPs to treat the exhaust air and remove odourous gas in the air before discharging to the environment. The above recommendations are proposed as technical guidelines for the operator's consideration and will be subject to detailed design.

Chemical Waste

7.5.29 The proposed mitigation measures for operational phase are the same as that proposed for the construction phase. The operator should register with EPD as a chemical waste producer and follow the guidelines stated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. Chemical waste should be stored in appropriate containers and collected by a licensed chemical waste contractor. Chemical waste (e.g. spent lubricant oil) should be recycled at an appropriate facility wherever possible, while chemical waste that cannot be recycled should be disposed of at either the CWTC, or another licensed facility, in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation*.

Clinical Waste

7.5.30 In accordance with the Code of Practice for the Management of Clinical Waste - Major Clinical Waste Producers and Waste Collectors published under Section 35 of WDO, clinical waste shall be properly separated from other waste, packed, labelled, centrally

collected and stored in designated clinical waste storage rooms. Clinical waste shall be collected by licensed clinical waste collectors for disposal at the licensed disposal facility. It is the responsibility of the Hospital Authority to find the list of licensed waste collectors (as provided on EPD's website) and implement adequate clinical waste collection at regular intervals.

Desilted Materials

7.5.31 The desilted materials, if any, should be handled using standard good practices, including stockpiling the desilted materials as far away from the sensitive receivers as possible, and covering with tarpaulin sheets to minimise the release of potential odour before transporting for disposal. Requirements of the Air Pollution Control (Construction Dust) Regulation and WPCO, where relevant, shall be adhered to during excavation, transportation and disposal of the desilted materials.

7.6 Evaluation of Residual Environmental Impacts

7.6.1 With the implementation of recommended mitigation measures for the handling, transportation and disposal of the identified waste, no adverse and residual waste management implications would be anticipated during both the construction and operational phases.

7.7 Environmental Acceptability of the Schedule 2 Designated Projects

7.7.1 Waste management implication assessment for the construction and operational phases of the Project has been carried out taking into account the DPs under Schedule 2 and Schedule 3. It is noted that the DPs under Schedule 2 would only contribute to the generation of C&D materials during the construction phase of the Project. The majority of the non-inert C&D materials would be generated from construction of new buildings and infrastructures, while the majority of the inert C&D materials would be generated from refinement of site formation level and the proposed construction activities. Since most of the inert C&D materials generated from the Project would be reused as backfilling materials, the DPs under Schedule 2 are not anticipated to result in any adverse environmental impacts.

7.8 Conclusion

7.8.1 The main waste types to be generated during the construction phase of the Project will include C&D materials, chemical waste, general refuse, excavated sediment, desilted materials and floating refuse. It is estimated that a total of 1,778,871 m^3 of inert C&D materials would be generated from site clearance and site formation works as well as construction of new buildings and infrastructures. Reduction measures have been recommended to minimise the amount of materials generated by the Project by reusing C&D materials where practicable before off-site disposal. Provided that the waste is handled, stored, transported and disposed of using approved methods, adverse waste management implications, including potential hazards, air and odour emissions, noise, wastewater discharge, ecology and public transport, associated with handling, storage, transportation and disposal of wastes during the construction phase of the Project are not expected.

7.8.2 The main waste types to be generated during the operational phase of the Project will include MSW, chemical waste, clinical waste and desilted materials. Two new RCPs and a CRC will be provided by the Project. The proposed waste infrastructures will provide convenient collection of recyclables from the local community, and to create

synergy to achieve better operational efficiency and environmental sustainability. Provided that the waste is handled, stored, transported and disposed of using approved methods, adverse waste management implications, including potential hazards, air and odour emissions, noise, wastewater discharge, ecology and public transport, associated with handling, storage, transportation and disposal of wastes during the operational phase of the Project are not expected.