7 WASTE MANAGEMENT

7.1 Legislation, Standards and Guidelines

7.1.1 General

7.1.1.1 The relevant legislation and associated guidance notes related to the study for the assessment of waste management implications include:

- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO) Annex 7 and Annex 15;
- Waste Disposal (Amendment) Ordinance (Cap. 354) and subsidiary regulations;
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N);
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C);
- Dumping at Sea Ordinance (DASO) (Cap. 466);
- Land (Miscellaneous Provisions) Ordinance (Cap. 28);
- Public Health and Municipal Service Ordinance – Public Cleansing and Prevention of Nuisances By-laws (Cap. 132BJ).

7.1.2 Waste Disposal Ordinance (WDO)

7.1.2.1 The Waste Disposal Ordinance (WDO) prohibits any unauthorised disposal of wastes. Construction waste, defined under Cap. 354N of the WDO, refers to a substance, matter or thing which is generated from construction works. It includes all abandoned materials, whether processed or stockpiled or not, before being abandoned, but does not include sludge, screenings or matter removed or generated from desludging, desilting or dredging works.

7.1.2.2 Under the WDO, wastes can only be disposed of at designated waste disposal facilities licensed by Environmental Protection Department (EPD). Breach of this Ordinance can lead to a fine and/or imprisonment. The WDO also stipulates the requirements for issuing licenses for the collection and transportation of wastes.

7.1.3 Waste Disposal (Charges for Disposal of Construction Waste) Regulation

7.1.3.1 Under the WDO and the Charging Regulation, wastes can only be disposed of at designated waste disposal facilities licensed by EPD. Schedule 5 of Regulation defines that inert construction waste includes rock, rubble, boulder, earth, soil, sand, concrete, brick, tile, masonry or used bentonite. According to Schedule 6 of the Regulation, 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 must contain more than 50% by weight of inert material, and construction waste delivered to a public fill reception facility must consist entirely of inert material.

7.1.3.2 For construction work with a value of more than HK$1M, the main contractor is required to establish a billing account at EPD before transporting the construction

waste to the designated waste management facilities (e.g. landfill, public fill etc). The vessels for delivering construction waste to public fill reception facility would need prior approval from EPD. Breach of these regulations can lead to a fine and/or imprisonment.

7.1.3.3 Depending on the percentage of inert materials in the construction waste, construction waste can be managed at public fill, sorting facilities, landfills and outlying islands transfer facilities where different management cost would be applied. The scheme encourages reducing, reusing and sorting of construction waste such that the waste producer can minimise their disposal fee.

7.1.4 Waste Disposal (Chemical Waste) (General) Regulation

7.1.4.1 Chemical waste includes any scrap materials, or unwanted substances specified under Schedule 1 of this Regulation, if such a substance or chemical occurs in such a form, quantity or concentration that causes pollution or constitutes a danger to health or risk of pollution to the environment.

7.1.4.2 A person shall not produce, or cause to be produced, chemical wastes unless he is registered with EPD. Any person who contravenes this requirement commits an offence and is liable to a fine and/or imprisonment. Chemical wastes should be treated, utilising on-site plant licensed by EPD or have a licensed collector to transport 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 trace wastes from production to disposal.

7.1.4.3 This regulation also prescribes the storage facilities to be provided on site including labelling and warning sign. To minimise the risks of pollution and danger to human health or life, the waste producer is required to prepare and make available written emergency procedures for spillage, leakage or accidents arising from storage of chemical wastes. The waste producer must also provide employees with training for such procedures.

7.1.5 Dumping at Sea Ordinance

7.1.5.1 According to the Dumping at Sea Ordinance, a permit from EPD is required if any waste producer intend to dump materials from vessels to designated marine dumping areas. The Authority will consider a number of factors including sources and nature of materials to be dumped, dumping rates, need for inspection / testing, water pollution avoidance measures etc. before determining whether such a permit would be granted and, where deemed necessary, any conditions to be complied with. Breach of the requirements in the permit would result in a fine and/or to imprisonment.

7.1.6 Land (Miscellaneous Provisions) Ordinance

7.1.6.1 The inert portion of C&D materials may be taken to public filling facilities including public filling area, public filling barging points and stockpiling areas. This ordinance requires Dumping Licenses (to be issued by Civil and Engineering Development Department (CEDD)) to be obtained by individuals or companies, who deliver inert C&D materials to the public filling facilities.

7.1.6.2 Individual licenses and windscreen stickers are issued for each vehicle involved. Public filling areas will accept only inert building debris, soil, rock and broken

concrete. The material should, however, be free from marine mud, household refuse, plastic, metal, individual and chemical wastes, animal and vegetable matters and any other materials considered unsuitable by the Filling Supervisor.

7.1.7 Public Cleansing and Prevention of Nuisances by-Laws

7.1.7.1 This regulation provides further control on illegal tipping of wastes on unauthorised (unlicensed) sites.

7.1.8 Construction & Demolition Material Management Plan (C&DMMP)

7.1.8.1 According to the "Project Administrative Handbook Chapter 4, Section 4.1.3", for Designated Projects, a Construction and Demolition Material Management Plan (C&DMMP) has to be submitted to the Public Fill Committee (PFC) for approval in case of C&D materials disposal exceeding 50,000m^3.

7.1.8.2 ETWB TCW No. 19/2005, Environmental Management on Construction Site, sets out the policy, procedures and requirements for contractor to prepare and implement an Environmental Management Plan for on-site sorting and waste reduction of C&D materials.

7.1.9 Disposal Criteria for Dredged / Excavated Sediment

7.1.9.1 ETWBTC (Works) No. 34/2002 stipulates the procedures for seeking approval to dredged/excavated sediment and the management framework for marine disposal of such sediment. Applications for approval of dredging proposal and allocation of marine disposal shall be made to the Secretary of Marine Fill Committee (MFC). Marine Dumping Permits as stipulated under the Dumping at Sea Ordinance are required from EPD for the disposal of dredged sediment. No dredging works is allowed to proceed until all issues on management of dredged sediments have been resolved and all relevant arrangements have been endorsed by the relevant authorities including MFC and EPD. Exact location of marine disposal will be assigned by MFC.

7.1.10 Other Relevant Guidelines

7.1.10.1 The following documents and guidelines in **Table 7.1** also relate to waste management and disposal:

Table 7.1 Other relevant documents and information

Bureau / Department	Documents / Guidelines / Technical Circulars
Development Bureau	• WBTC No. 2/93, Public Dumps • WBTC No 2/93B, Public Filling Facilities • WBTC No. 16/96, Wet Soil in Public Dumps • WBTC Nos. 4/98 and 4/98A, Use of Public Fill in Reclamation and Earth Filling Project • WBTC No. 12/2000, Fill Management • WBTC No. 19/2001, Metallic Site Hoardings and Signboards • WBTC No. 12/2002, Specification Facilitating the Use of Recycled Aggregates

Bureau / Department	Documents / Guidelines / Technical Circulars
	• ETWB TCW No. 34/2002, Management of Dredged / Excavated Sediment • ETWB TCW No. 19/2005, Environmental Management on Construction Site • DEVB TCW No. 06/2010, Trip-ticket System for Disposal of Construction and Demolition Material • DEVB TCW No. 08/2010, Enhanced Specification for Site Cleanliness and Tidiness • DEVB TCW No. 09/2011, Enhanced Control Measures for Management of Public Fill
CEDD	• Project Administrative Handbook for Civil Engineering Works, 2010 Edition
EPD / CEDD	• New Disposal Arrangements for Construction Waste (1992)
EPD	• Waste Disposal Plan for Hong Kong (December 1989) • Waste Reduction Framework Plan, 1998 to 2008 • A Policy Framework for Management of Municipal Solid Waste (2005 - 2014), (December 2005) • Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992)
PlanD	• Hong Kong Planning Standards and Guidelines, Chapter 9 (Section 6 – Waste Management)

7.2 Description of the Environment

7.2.1.1 The Project involves an elevated pedestrian corridor over the section of existing Yuen Long Town Nullah from the Long Ping West Rail Station to Kau Yuk Road. The whole section of the nullah is channelized and lined with concrete bottom and banks. The current source of waste is mainly the debris and sediment remained in the nullah after the water level retreated from peak flow. The waste would be cleared from the nullah by DSD's contractor.

7.3 Construction Phase Impact Assessment

7.3.1 Identification and Evaluation of Impact

7.3.1.1 Refer to the construction activities of the Project mentioned in **Chapter 3**, those activities would result in the generation of wastes. Different types of wastes would be generated during construction phase and these wastes can be divided into the following categories based on their compositions:

- Wastes from construction works;
- Excavated sediment;
- chemical wastes;
- general refuse; and
- sewage

C&D Materials and Wastes from Construction Works

7.3.1.2 The Project construction will involve demolition of the existing retaining wall of the nullah and construction of the elevated pedestrian corridor deck and its associated supporting components, including piles, pile caps and permanent columns of the elevated pedestrian corridor. Temporary working platform, steel sheet piles and cofferdams will be installed for the works. The types of materials and wastes to be generated during construction phase include inert soft C&D materials, rock, artificial hard materials, non-inert C&D materials, excavated sediment, chemical wastes, general refuse and sewage. The estimated amount of different type of wastes to be generated during construction phase is summarised in **Table 7.2**. It should however be noted that these quantities are initial estimates only and would need to be further reviewed and updated as the design progresses.

Table 7.2 Estimated amount of different types of wastes to be generated during construction phase

Waste types	Total generated (m^3)	Total On-site reuse (m^3)	Total off-site reuse and disposal (m^3)	Stage(s) of the materials arising	Management options
Inert C&D materials					
Inert soft C&D materials [1]	15,330	3,785	11,545	Excavation	Tuen Mun Area 38 Fill Bank (Proposed)
Rock [2]	5,120	0	5,120	Excavation	Tuen Mun Area 38 Fill Bank (Proposed)
Artificial hard materials [3]	3,040	0	3,040	Construction and Demolition	Tuen Mun Area 38 Fill Bank (Proposed)
Non-inert C&D materials [4]					
Non-inert C&D materials	5,870	0	5,870	Excavation/ Construction and Demolition	WENT Landfill (Proposed)
Others					
Excavated Sediment	<100	0	<100	Excavation	Type 1 – Open Sea Disposal
Chemical waste	100 L/ month	0	100 L/ month	Excavation/ Construction and Demolition	Chemical Waste Treatment Centre
General refuse	130 kg/day	0	130 kg/day	Throughout the whole construction programme	Collected and disposed by licensed collector to Recyclers/ Landfill
General sewage	30 m^3/day	0	30 m^3/day	Throughout the whole construction programme	Sanitary facilities to be provide on-site and maintained by licensed collector

Note:
[1] "Inert soft C&D materials" include, but not limited to, top soil, excavated soil etc.
[2] "Rock" includes all grade rock.
[3] "Artificial hard material" includes, but not limited to, broken concrete, asphalt, bitumen and granular materials etc.
[4] "Non-inert C&D materials" includes, but not limited to, bamboo, timber, paper and plastic etc.

7.3.1.3 The Project will generate construction wastes that mainly consist of inert C&D materials, including inert soft C&D materials, artificial hard material (AHM), and rock materials, as well as non-inert C&D materials. Other wastes include excavated sediment, chemical waste, general refuse and sewage are anticipated in relatively small quantities.

7.3.1.4 It is estimated that a total of 15,330m^3 inert soft C&D materials, 3,040m^3 AHM, and 5,120m^3 rocks will be generated during construction phase. Taking into consideration of the land availability for stockpiling and construction works sequencing, approximately 3,785m^3 inert soft C&D materials can be reused on-site as backfill material. The remaining inert C&D materials, including 11,545m^3 inert soft C&D materials, 3,040m^3 AHM, and 5,120m^3 rocks will be delivered to designate fill reception facilities for future reuse in other infrastructural or development projects. Non-inert C&D materials arise from the Project is estimated to be of 5,870 m^3. Upon exhaustion of reuse/ recycling effort, the non-inert C&D materials will be delivered to landfills.

7.3.1.5 With proper implementation of good construction site practice and mitigation measures, the on-site handling and transportation of C&D materials to waste management facilities would not cause adverse environmental impacts.

Transportation Routing and Frequency of Truck/ Vessels for Waste Disposal

7.3.1.6 The Contractor will be requested to use the shortest route to transfer the wastes generated from the Project (e.g. non-inert C&D materials, vegetation, general refuse) via the existing New Territories Circular Road, Lung Fu Road, Lung Mun Road, Lung Kwu Tan Road and Nim Wan Road to the designated landfill site, e.g. WENT Landfill, for disposal. For surplus inert C&D materials, they will be transferred via the same routing to the nearest public fill reception facilities (e.g. Tuen Mun Area 38 Fill Bank) for future reuse. It is estimated that an average of 10 trucks of waste materials per day would be required to the designated receiving sites during the peak of the construction period. The transportation and disposal of other wastes including sediment, chemical wastes, general refuse and sewage would be planned and delivered to respective receiving facilities by future contractors.

7.3.1.7 Neither barging points, conveyor system nor stockpiling areas will be established in the Project area.

Excavated Sediment

7.3.1.8 As described in the construction method in **Chapter 3**, the construction of supporting columns and its pile foundations would require excavation of certain amount of land-based sediment beneath the nullah banks.

7.3.1.9 A Sediment Sampling and Testing Plan (SSTP) has been submitted to and agreed by EPD. The SSTP has proposed the sampling and testing procedures of sediment to evaluate the sediment quality, and it is annexed in **Appendix 7.1**. As the occurrence of land-based sediment in the area is localised, one sampling location S1-DH03 is proposed at the pedestrian footpath along Yuen Long Town Nullah

between Long Ping Station and Yuen Long On Ning Road. The proposed sampling location is indicated in Figure 5.1 of the SSTP in **Appendix 7.1**. After the approval of the SSTP by EPD, the works boundary has been revised to reserve space for traffic diversion and parapet walls installation along the nullah, which extend towards the south and include part of the existing On Ning Road, Castle Peak Road, Kau Yuk Road and Ma Tin Road. The previous and revised site boundaries are indicated in **Figure 7.1**. The extension at the southern part of the Project would only involve dismantling of existing rail bars along the nullah and replacement with parapet walls, and only traffic diversion would be involved on the existing On Ning Road, Castle Peak Road, Kau Yuk Road and Ma Tin Road. Hence no excavation works is expected within the extended works area, and the sampling and testing procedures proposed in the approved SSTP is considered appropriate in assessing the quality of land-based sediment occur within the Project Area.

7.3.1.10 Environmental ground investigation has been conducted in March 2016 in accordance with the approved SSTP to evaluate the sediment quality within the Project Area. The sampling location ID S1-DH03 in the approved SSTP was renamed as S1-EH01 on-site. The as-built sampling location is indicated in **Figure 7.1.** Only one land-based sediment sample was collected from the sampling location S1-EH1 at 3.0m – 3.9m bgl. The sediment quality is classified as Category L as all the testing parameters are below the Lower Chemical Exceedance Level. The management strategy for the excavated sediment will follow the "Management Framework for Dredged/excavated Sediment" as stipulated in the *ETWB Technical Circular (Works) No. 34/2002*.

7.3.1.11 A summary of the chemical testing results is presented in **Appendix 7.2** and the detailed laboratory report is given in **Appendix 7.3**. The GI report is given in **Appendix 7.4**.

7.3.1.12 Based on the current design, less than 100m^3 excavated sediment of Cat. L is estimated to be generated from the construction of foundation. The excavated Cat. L sediment is proposed for Type 1 - Open Sea Disposal. The SSTP in **Appendix 7.1** and the related sampling and testing procedures only serve for this EIA and is independent of the application for dumping permit in accordance with the Dumping at Sea Ordinance (DASO) (Cap. 466). Separated submission procedures should be followed to apply the dumping permit under DASO.

Chemical Waste

7.3.1.13 Chemical wastes likely to be generated from the construction activities and associated facilities may include:

- scrap batteries or spent acid/alkali from their maintenance;
- used paint, engine oils, hydraulic fluids and waste fuel;
- spent mineral oils/cleansing fluids from mechanical machinery; and
- spent solvents/solutions, some of which may be halogenated, from equipment cleansing activities.

7.3.1.14 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 Waste. These hazards may include:

- toxic effects to workers;
- adverse effects on air and water from spills and thereto ecological impacts to the sensitive areas in the downstream of the nullah; and
- fire hazards.

7.3.1.15 The amount of chemical wastes that will arise will be highly dependent on the contractor's on-site maintenance practice and the number of plant and vehicles utilized. Nevertheless, it is anticipated that the quantity of chemical wastes would be small.

7.3.1.16 Suitable arrangements for the storage, handling, transport and disposal of chemical wastes shall be made in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste. Wherever possible opportunities should be taken to reuse and recycle materials.

General Refuse

7.3.1.17 The general refuse generated by the construction workforces mainly consists of food waste, aluminium cans and waste paper. These general refuse will require off-site disposal. The number of workforce on site is estimated to be 200. Based on a generation rate of 0.65 kg per worker per day, the general refuse to be generated on-site is estimated to be 130 kg/day.

7.3.1.18 Effective collection of site waste will be required to prevent waste materials being blown around by wind, flushed or leached into the nullah, or creating an odour nuisance or pest and vermin problem. Waste storage areas shall be well maintained and cleaned regularly. In addition, disposal of waste at sites other than approved waste transfer or disposal facilities shall be prohibited.

7.3.1.19 With the implementation of good waste management practices at the site, environmental impacts arise from the storage handling and transportation of general refuse generated from the site are not insurmountable.

Sewage

7.3.1.20 Sewage will be generated from the sanitary facilities used by the staff on-site. The sewage generated should be properly managed to minimise the adverse impacts of odour and potential health risks to the workers by attracting pests and other disease vectors. According to the Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning, the unit flow in $0.15m^3$ per person per day. As the number of workforce on-site is estimated to be 200, $30m^3$ of general sewage per day is estimated during the construction period.

7.3.1.21 Adequate number of portable toilets should be provided within the site to ensure that sewage from site staff is properly collected. The chemical toilets should be properly maintained and licensed contractors should be employed for the collection and disposal of sewage on a regular basis to avoid adverse impacts arise from sewage generated on-site.

7.3.2 Mitigation measures

7.3.2.1 The mitigation measures for construction phase are recommended based on the waste management hierarchy principles. Recommendations of good site practices, waste reduction measures as well as the waste transportation, storage and collection are described in following sub-sections.

Good Site Practices

7.3.2.2 Adverse waste management implications are not expected, provided that good site practices are strictly implemented. The following good site practices are recommended throughout the construction activities:

- nomination of an approved personnel, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site;
- training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling;
- provision of sufficient waste disposal points and regular collection for disposal;
- appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;
- a Waste Management Plan (WMP) should be prepared by the contractor and submitted to the Engineer for approval.

Waste Reduction Measures

7.3.2.3 Amount of waste generation can be significantly reduced through good management and control. Waste reduction is best achieved at the planning and design phase, as well as by ensuring the implementation of good site practices. The following recommendations are proposed to achieve reduction:

- segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- proper storage and site practices to minimise the potential for damage and contamination of construction materials;
- plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste;
- sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.);
- provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling.

7.3.2.4 In addition to the above measures, specific mitigation measures are recommended for the specific waste types so as to minimise environmental impacts during handling, transportation and disposal of waste.

Storage, Collection and Transportation of Waste

7.3.2.5 Storage of waste on site may induce adverse environmental implications if not properly managed. The following recommendation should be implemented to minimise the impacts:

- waste such as sediment should be handled and stored well to ensure secure containment;
- stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away;
- different locations should be designated to stockpile each material to enhance reuse.

7.3.2.6 The collection and transportation of waste from works area to respective disposal sites may also induce adverse environmental impacts if not properly managed. The following recommendation 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
- disposal of waste should be done at licensed waste disposal facilities.

7.3.2.7 In addition to the above measures, other specific mitigation measures on handling the excavated and C&D materials, chemical waste and materials generated from construction phase are recommended in the following subsections.

Excavated and C&D Materials

7.3.2.8 Wherever practicable, C&D materials should be segregated from other wastes to avoid contamination and ensure acceptability at Public Fill Reception Facilities areas or reclamation sites. The following mitigation measures should be implemented in handling the excavated and C&D materials:

- maintain temporary stockpiles and reuse excavated fill material for backfilling;
- carry out on-site sorting;
- make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; and
- implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified.

7.3.2.9 Details of the recommended on-site sorting and reuse of C&D materials is given below.

On-site Sorting of C&D Materials

7.3.2.10 All C&D materials arising from the construction of the Project should be sorted on-site to recover the inert C&D materials and reusable and recyclable materials prior to disposal off-site. Non-inert portion of C&D materials should also be reused whenever possible and be disposed of at landfills as a last resort.

7.3.2.11 The Contractor would be responsible for devising a system to work for on-site sorting of C&D materials and promptly remove all sorted and processed materials

arising from the construction activities to minimise temporary stocking on-site. It is recommended that the system should include the identification of the source of generation, estimated quantity, arrangement for on-site sorting and/ or collection, temporary storage areas, and frequency of collection by recycling Contractors or frequency of removal off-site.

Use of Standard Formwork, Pre-cast Walls and Planning of Construction Materials Purchasing

7.3.2.12 Standard formwork should also be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork (e.g. metal hoarding), pre-cast walls or plastic facing should be encouraged in order to enhance the possibility of recycling. The purchasing of construction materials should be carefully planned in order to avoid over ordering and wastage.

Provision of Wheel Wash Facilities

7.3.2.13 Wheel wash facilities have to be provided at the site entrance before the trucks leaving the works area. Dust disturbance due to the trucks transportation to the public road network could be minimised by such arrangement.

Sediment

7.3.2.14 Less than 100m^3 land-based sediment was estimated to be generated during construction. Site investigation has been conducted in accordance with the proposed sampling and testing procedures of sediment stated in the approved SSTP (**Appendix 7.1)**. The land-based sediment quality in the area is classified as Cat. L, which is proposed for Type 1 – Open Sea Disposal. Separate application for disposal of sediment to respective disposal area should be made in accordance with DASO.

7.3.2.15 For the excavation of sediment, the following mitigation measures shall be followed to avoid adverse impact to the water quality of the nullah:

- Cofferdams should be installed prior to demolition of existing nullah structures or excavation in dry season for pile cap construction. One of the purposes of installing the cofferdams is to provide a confined work environment that can be isolated from the surrounding water during demolition and excavation. Hence water pollution from site runoff would be adequately controlled with the standard site drainage measures in place. The excavation works within nullah for the foundation will be programmed to be carried out as far as practicable to minimise impacts to water quality. Similarly, this measure will also be adopted for the construction of the supports for the temporary platform when necessary.
- Closed grabs or sealed grabs should be used and the mechanical grabs would need to be tightly sealed.
- The excavation operation should be carefully controlled to avoid splashing excavated materials or wastes into the surrounding water during the transportation. Dump trucks/lorries will be used to transport the excavated materials or wastes immediately so as to minimise the possibility of splashing on nullah.
- The works such as excavation for the foundation construction within nullah will be carried out in accordance with the approved method statement by the Engineer to minimise the impact to water quality

- Toe boards along both edges of the elevated pedestrian corridor deck will be provided in order to avoid construction materials falling into the nullah.
- Open stockpiles susceptible to erosion will be covered with tarpaulin or similar fabric and provided with sand bag barriers or equivalent measures, especially during the wet season (April – September) or when heavy raining is predicted.
- Temporary storage of materials should be located away from the nullah during carrying out of the construction works.
- Surface run-off and sewage from construction should be treated via adequately designed silt removal facilities such as sand traps and silt traps.
- All workers should be regularly briefed to avoid water pollution from site runoff to the nullah and supervisory staff should be assigned to station on site to closely supervise and monitor the works.

Chemical Waste

7.3.2.16 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 impacts on environment, health and safety as far as possible.

7.3.2.17 If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producers. Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the 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

7.3.2.18 General refuse should be stored in enclosed bins separately from construction and chemical wastes. Recycling bins should also be placed to encourage recycling. Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. A reputable waste collector should be employed to remove general refuse on a daily basis. It is expected that such arrangements would minimise potential environmental impacts.

Sewage

7.3.2.19 The Wastewater Management Plan should document the locations and number of portable chemical toilets depending on the number of workers, land availability, site condition and activities. Regularly collection by licensed collectors should be arranged to minimise potential environmental impacts.

7.3.3 Residual Environmental Impact

7.3.3.1 With proper implementation of the abovementioned mitigation measures, no adverse residual impact is anticipated during construction phase.

7.4 Operational Phase Impact Assessment

7.4.1 Identification and Evaluation of Impact

7.4.1.1 It is anticipated that the operation of the proposed pedestrian corridor would only generate small quantity of wastes from users, of which mainly are general refuses. The waste generated should be managed to prevent waste materials from being blown around by wind, flushed or leached into the nullah, or creating an odour nuisance or pest and vermin problem. Adequate waste collection bins should be provided and waste storage areas shall be well maintained and cleaned regularly.

7.4.2 Mitigation Measures

7.4.2.1 Refuse collection bins and recycling bins will be provided at proper locations on the future elevated pedestrian corridor. A reputable waste collector will be employed to collect and remove general refuse during routine cleaning activities. With the implementation of the abovementioned measures, impacts from waste management implications during the operation phase are not significant.

7.4.3 Residual Environmental Impact

7.4.3.1 With proper implementation of the abovementioned mitigation measures, no adverse residual impact is anticipated during operational phase.

7.5 Conclusion

7.5.1.1 During construction phase, the demolition of existing retaining wall of the nullah and construction works regarding the elevated pedestrian corridor and its supporting features will result in C&D wastes which need proper management to prevent waste implication to the environment. It is estimated that a total of 15,330m^3 inert soft C&D materials, 3,040m^3 AHM, and 5,120m^3 rocks will be generated during construction phase. Whilst approximately 3,785m^3 inert soft C&D materials can be reused on-site as backfill material. The remaining C&D materials, including inert C&D soft materials, AHM and rocks will be delivered to public fill reception facilities for future reuse in other infrastructural projects. 5,870m^3 non-inert C&D materials is estimated to be generated from the Project. The materials will be delivered to landfills for disposal. In addition, it is estimated that less than 100m^3 Cat. L land-based sediment would be generated from the construction works. The sediment is proposed for Type 1 – Open Sea Disposal, and application for dumping at designated sediment disposal area should be made in accordance with DASO. General refuse, sewage and chemical wastes will be also generated during construction phase, no residual impact is anticipated with the implementation of the waste management plan and recommended mitigation measures.

7.5.1.2 A Waste Management Plan should be prepared and implemented by the contractor to ensure proper management of the collection, sorting, storage, transportation and disposal of waste generated from the construction phase of the Project. With proper implementation of mitigation measures, including good site practices, waste reduction measures, proper containment and disposal of various types of wastes, no residual impact is anticipated during construction phase.

7.5.1.3 During operational phase, the major source of waste will be the general refuse generated by the future users of the elevated pedestrian corridor. Adequate refuse collection bins and recycling bins should be provided on the elevated pedestrian

corridor and reputable refuse collector should be employed to collect and dispose the waste regularly. No residual impact is anticipated during operational phase.