土木工程拓展署
Civil Engineering and Development Department

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

AGREEMENT NO. CE 9/2024 (CE) -
SMART AND GREEN MASS TRANSIT SYSTEM IN KAI TAK – INVESTIGATION

Environmental Impact Assessment Report

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GLOSSARY

AAB	Antiquities Advisory Board
ADWF	Average Dry Weather Flow
AFCD	Agriculture, Fisheries and Conservation Department
AIA	Archaeological Impact Assessment
AMO	Antiquities and Monuments Office
ANL	Acceptable Noise Level
APCO	Air Pollution Control Ordinance
AQMS	Air Quality Monitoring Station
AQOs	Air Quality Objectives
ART	Autonomous Rail Rapid Transit
ASR	Area Sensitivity Rating
ASRs	Air Sensitive Receivers
BHIA	Built Heritage Impact Assessment
BNL	Basic Noise Level
BRT	Bus Rapid Transit
CAD	Civil Aviation Department
C&D	Construction and Demolition
CEDD	Civil Engineering and Development Department
CHAA	Cultural Heritage Assessment Area
CHIA	Cultural Heritage Impact Assessment
CKR	Central Kowloon Route
CM	Construction Phase Mitigation
CNMP	Construction Noise Management Plan
CNP	Construction Noise Permit
CO	Carbon Monoxide
CRTN	Calculation of Road Traffic Noise
CWTC	Chemical Waste Treatment Centre
D.O	Dissolved Oxygen
DASO	Dumping at Sea Ordinance
DA-TM	Technical Memorandum on Noise from Construction Work in Designated Areas
DCS	District Cooling System
DEVB	Development Bureau
DGs	Dangerous Goods
DP	Designated Project
DRE	Dedicated Rehousing Estate
DSD	Drainage Services Department
E&M	Electrical and Mechanical
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
EIAO GN	Environmental Impact Assessment Ordinance Guidance Note
EIAO-TM / TM-EIAO	Technical Memorandum on Environmental Impact Assessment Process
EM&A	Environmental Monitoring and Audit
EOI	Expression of Interest
EPD	Environmental Protection Department
ETWB	Environment, Transport and Works Bureau
ETWB TCW	Environment, Transport and Works Bureau Technical Circular (Works)
FNMP	Fixed Noise Management Plan
FSP	Fine Suspended Particulates
GI	Ground Investigation
GLTMS	Greening, Landscape and Tree Management Section
GW-TM	Technical Memorandum on Noise from Construction Work other than Percussive Piling
HKPSG	Hong Kong Planning Standards and Guidelines

IFs	Influencing Factors
IND-TM	Technical Memorandum on Noise from Places other than Domestic Premises, Public Places or Construction Sites
KAT	MTR Kai Tak Station
KCDC	Kowloon City District Council
KITEC	Kowloon Bay International Trade & Exhibition Centre
KTCT	Kai Tak Cruise Terminal
KTD	Kai Tak Development
KTGTS	Smart and Green Mass Transit System in Kai Tak
KTMP	Kai Tak Metro Park
KTSG	Kai Tak Sky Garden
KTSP	Kai Tak Sports Park
KTSS	Kai Tak Station Square
LCSD	Leisure and Cultural Services Department
LTSB	Lung Tsun Stone Bridge
mbgl	meter below ground level
mPD	metres above the Hong Kong Principal Datum
MSW	Municipal Solid Waste
NAPs	Noise Assessment Points
NCO	Noise Control Ordinance
NENT	North East New Territories Landfill
NH_3	Ammonia
NIA	Noise Impact Assessment
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NRMM	Non-road Mobile Machinery
NSR	Noise Sensitive Receiver
O_3	Ozone
OZP	Outline Zoning Plan
PFRF	Public Fill Reception Facilities
$PM_{2.5}$	Fine Suspended Particulates
PM_{10}	Respirable Suspended Particulates
PME	Powered Mechanical Equipment
PNAP	Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers
PP-TM	Technical Memorandum on Noise from Percussive Piling
ProPECC	Professional Persons Environmental Consultative Committee
ProPECC PN	Professional Persons Environmental Consultative Committee Practice Note
RPCC	Recommended Pollution Control Clauses
SAI	Site of Archaeological Interest
SENT	South East New Territories Landfill
SFRP	Shing Fung Road Park
SKS	Shing King Street
SO_2	Sulphur Dioxide
SQR	Sediment Quality Report
SS	Suspended Solid
SSTP	Sediment Sampling and Testing Plan
TM-DSS	Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters
TNMP	Traffic Noise Management Plan
tpd	Tonne Per Day
TTMS	Temporary Traffic Management Scheme
ULSD	Ultra Low Sulphur Diesel
VP	Key Public Viewing Point
WCZ	Water Control Zone
WDO	Waste Disposal Ordinance
WBTC	Works Branch Technical Circular
WMP	Waste Management Plan

WPCO	Water Pollution Control Ordinance
WQOs	Water Quality Objectives
WSRs	Water Sensitive Receivers

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 The Chief Executive announced in the 2023 Policy Address to construct the Smart and Green Mass Transit System in Kai Tak (hereafter refer as the Project), which serves as a light and green feeder service to nearby railway station within the area to strengthen connections among the residential and commercial developments, facilities focused on tourism, culture and recreation, sports and the community within the area, as well as the connection with the railway network, serving visitors and a living and working population of around 50,000. The Project was also included in "Hong Kong Major Transport Infrastructure Development Blueprint" issued by the Transport and Logistics Bureau in December 2023.

1.1.2 The Project will include the construction and operation of approximately 3.5km long elevated smart and green mass transit system from Kai Tak Cruise Terminal to the existing MTR Kai Tak (KAT) Station at Kai Tak Station Square to strengthen the connection among the residential and commercial developments at the Former Runway of Kai Tak, including facilities focused on tourism, recreation, sports and the community (**Figure 1.1** refers).

1.1.3 A Project Profile (No. PP-671/2024) for the Project was submitted to Environmental Protection Department (EPD) for application of an EIA Study Brief, which was subsequently issued on 29 August 2024 (No. ESB-369/2024).

1.1.4 This report presents the findings of an environmental impact assessment (EIA) study conducted for the Project in accordance with the requirements of the EIA Study Brief and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

1.2 OBJECTIVE OF THE EIA REPORT

1.2.1 The objectives of the EIA study as defined in Section 2 of the EIA Study Brief are as follows:

(i) to describe the Project and associated works together with the requirements and environmental benefits for carrying out the Project;

(ii) to identify and describe the elements of the community and environment likely to be affected by the Project and/or likely to cause adverse impacts to the Project, including both the natural and man-made environment and the associated environmental constraints;

(iii) to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses, and to propose measures to mitigate these impacts;

(iv) to identify and quantify potential waste management issues and impacts and to propose measures to mitigate these impacts;

(v) to identify any potential visual impacts and to propose measures to mitigate these impacts;

(vi) to identify any negative impacts on cultural heritage and to propose measures to mitigate these impacts;

(vii) to propose the provision of infrastructure or mitigation measures so as to minimise pollution, environmental disturbance and nuisance during construction and operation of the Project;

(viii) to investigate the feasibility, practicability, effectiveness and implications of the proposed mitigation measures;

(ix) to identify, predict and evaluate the residual environmental impacts (i.e. after practicable mitigation) and the cumulative effects expected to arise during the construction and operation phases of the Project in relation to the sensitive receivers and potential affected uses;

(x) to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation phases of the Project which are necessary to mitigate these residual environmental impacts and cumulative effects and reduce them to acceptable levels;

(xi) to investigate the extent of secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification;

(xii) to design and specify the environmental monitoring and audit requirements; and

(xiii) to identify any additional studies necessary to implement the mitigation measures of monitoring and proposals recommended in the EIA report.

1.3 STRUCTURE OF EIA REPORT

1.3.1 The background and description of the Project, objectives and scope of the EIA study are introduced in this section. Details of considerations of alternative options are provided in **Section 2**. **Sections 3** to **8** detail the relevant legislations, environmental conditions, assessment criteria, methodology and results and recommended mitigation measures of the technical assessments.

1.3.2 **Sections 3** to **8** are outlined as follows:

- **Section 3: Air Quality Impact**;
- **Section 4: Noise Impact**;
- **Section 5: Water Quality Impact**;
- **Section 6: Waste Management Implications**;
- **Section 7: Visual Impact**; and
- **Section 8: Cultural Heritage Impact**.

1.3.3 An outline of the requirements for the Environmental Monitoring and Audit (EM&A) is presented in **Section 9**. The EM&A programme is presented in detail in a separate EM&A Manual. A summary of environmental outcomes is provided in **Section 10** and a conclusion of the whole assessment is given in **Section 11**.

1.3.4 An Executive Summary has been prepared as a separate document in both Chinese and English, which contains summaries of the key findings, recommendations and conclusions of the EIA Report.

2 PROJECT DESCRIPTION

2.1 SITE LOCATION AND HISTORY

2.1.1 The Smart and Green Mass Transit System in Kai Tak (KTGTS) alignment sits mainly on reclaimed land formed since 1925 and is the former runway of Kai Tak Airport (**Figure 1.1** refers). The KTGTS falls within "Commercial", "Open Space ("O"), "Other Specified Uses" ("OU") annotated "Tourism Related Uses to include Commercial, Hotel and Entertainment" and "OU" annotated "Stadium" zones on the approved Kai Tak Outline Zoning Plan (OZP) No. S/K22/8.

2.1.2 Kai Tak is situated on the south-eastern part of Kowloon City, an area historically renowned for housing the iconic Kai Tak Airport from 1925 until its closure in 1998. Surrounded by rugged mountains and Victoria Harbour, the site's unique geography shaped its early aviation legacy. Following the airport's relocation, the Government initiated the ambitious Kai Tak Development (KTD) project, transforming the former airfield into a vibrant urban district. This re-planning encompasses over 320 hectares, which integrates residential, commercial, recreational, and green spaces.

2.1.3 The current environment of Kai Tak is characterized by a mix of land uses, including residential zones, commercial clusters, open spaces, and landmark facilities such as the Kai Tak Cruise Terminal and the Kai Tak Sports Park. Recent zoning amendments have further optimized land uses to address housing needs, enhance commercial opportunities, and promote waterfront recreation.

2.2 THE PROJECT

Scope of the Project

2.2.1 The key elements of the Project as assessed in this EIA Report are:

(i) Construction and operation of about 3.5km long elevated smart and green mass transit system and six associated stations from Kai Tak Cruise Terminal (KTCT) at the former Kai Tak Runway to Kai Tak Station Square (KTSS) and MTR Kai Tak (KAT) Station. The six stations are located at / near:

- Kai Tak Cruise Terminal (KTCT)
- Shing King Street (SKS)
- Kai Tak Sky Garden (KTSG)
- Shing Fung Road Park (SFRP)
- Kai Tak Sports Park (KTSP)
- Kai Tak Station Square (KTSS);

(ii) Construction and operation of an elevated transit depot at two commercial development sites, namely Kai Tak Area 4C Sites 4 and 5 (i.e. also as Site 4C4 and Site 4C5 respectively) and spanning across the existing Shing King Street and system-wide facilities, such as signaling system, operation control and maintenance facilities, station's passenger facilities and off-board fare collection system etc.; and

(iii) Implementation of associated civil, geotechnical, road and drainage works, waterworks, pedestrian connection facilities, advance works, electrical and mechanical installation and environmental mitigating measures.

Designated Projects under EIA Ordinance

2.2.2 The proposed transit system under this Project is composed of system of vehicles running on dedicated viaduct/track between stations, and a depot for keeping the transit system and its maintenance workshop which constitutes Designated Project of Items A.2 and A.4 under Part I, Schedule 2 of the EIAO:

(i) Item A.2 “A railway and its associated stations”; and

(ii) Item A.4 “A railway siding and depot, maintenance workshop, marshalling yard or goods yard.

2.3 NEED, DESCRIPTION AND BENEFITS OF THE PROJECT

Need of the Project

2.3.1 The Kai Tak area is undergoing extensive re-planning, transforming the former airport site into a vibrant urban district with residential, commercial, sports, tourism, and recreational facilities, including the KTSP and the KTCT. A smart and green mass transit system provided by this Project will enhance connectivity within this large, multi-use area by linking key developments, such as the KTCT, the MTR KAT Station, residential area at the former runway area, SFRP, and the KTSP efficiently. This connectivity is crucial to support a surge of visitors during various large-scale events, especially in the KTSP, which require a safe and efficient transit system of high transporting capacity.

2.3.2 The system is designed to be environmentally friendly, adopting smart and green technologies such as battery powered vehicles, natural ventilated stations, and elevated viaduct/track that minimise interference with road traffic and reduce pollution. The KTGTS will enhance the convenience of the system and commuting experience of passengers with new technologies to achieve efficient traffic management and provision of real-time information to passengers.

Environmental Benefit of the Project

Minimisation of air quality and noise impacts in the Former Kai Tak Runway area

2.3.3 The proposed smart and green mass transit system will relief road traffic pressure, in particular during the arrival and departure of mega cruises; and before and after large-scale events, in the area. Being electricity powered, the air quality will be improved with the reduction in vehicular emission. The road traffic noise nuisance will also be minimised.

Environmental friendly mode of transportation

2.3.4 The Project adopts cutting-edge energy-efficient technologies, including battery-powered vehicles equipped with rubber tires to minimise noise pollution and eliminate the need for overhead power lines, thereby reducing both construction complexity and environmental footprint. Stations are designed with open, naturally ventilated, and green features to promote passenger comfort and sustainability.

Supporting Sustainable Urban Development Through Public Transport

2.3.5 Beyond environmental advantages, the KTGTS promotes the sustainable development of the Kai Tak area by reducing reliance on private vehicles, improving air quality, quality of life, and community well-being. By facilitating frequent, reliable, and environmentally friendly transit, the system enables more sustainable patterns of

living, working, and recreation. This, in turn, supports the area's long-term environmental sustainability, and encourages green commuting habits.

In summary, the main benefits of the Project include:

- Enhances connectivity within Kai Tak and integrates with existing transit networks.
- Provides a reliable, fast, and convenient transit option with reduced travel times.
- Supports environmental sustainability through low-emission, energy-efficient technology.
- Alleviates traffic congestion, reducing traffic noise and vehicular emissions.
- Unleashes regional development potential and improves public transport services.

Scenario "With" the Project

2.3.6 The 3.5-kilometre elevated smart and green mass transit system will serve as a dedicated, traffic-independent route, ensuring reliable and punctual service unaffected by road traffic. The Project adopts cutting-edge energy-efficient technologies, including battery-powered vehicles equipped with rubber tires to minimise noise pollution and eliminate the need for overhead power lines, thereby reducing both construction complexity and environmental footprint. Stations are designed with open, naturally ventilated, and green features to promote passenger comfort and sustainability. Real-time monitoring systems will allow responsive service adjustments based on passenger demand, enhancing operational efficiency and user experience. These innovations collectively contribute to lowering carbon emissions and roadside pollutants by reducing reliance on conventional road transport, aligning with Hong Kong's broader sustainable development and decarbonization goals.

Scenario "Without" the Project

2.3.7 Without the Project, the local community and tourists will mainly rely on road-based transport for travelling within Kai Tak area. The former Kai Tak runway area, which is poised for residential and commercial growth, would face increased traffic loading as more people seek access to the KTCT, MTR KAT Station and surrounding facilities. The lack of a dedicated transit system would limit accessibility to essential services and recreational spaces, undermining the overall livability of the area. This would also increase the reliance on road-based vehicles while traffic congestion is expected. Environmental concerns including air and noise pollution from road-based transport would persist and worsen in future.

2.4 CONSIDERATION OF ALTERNATIVES/OPTIONS

Several alternatives/options of alignment were developed during the preliminary design stage. The preferred scheme for the Project to be taken forward for the preliminary design was selected according to various engineering, environmental and social factors. The sections below present the consideration of the alternatives/options of the Project's elements.

Station and Depot Location

2.4.1 The objective of the KTGTS is to strengthen connections among the residential and commercial developments, facilities focused on tourism, culture and recreation, sports and the community within the area, as well as the connection with the railway network. To achieve this objective, the terminal stations are proposed at KTSS (near the existing MTR Kai Tak Station) and KTCT, with intermediate stations at KTSP, SFRP/the future Kai Tak Metro Park (KTMP), the residential area on the former runway and adjacent to the proposed depot at SKS. For the station at KTSP, two possible locations (i.e. the

northern and southern part of KTSP) were considered. It is considered that the location at the northern part of KTSP is more suitable as it could minimise the impact to the existing facilities of the KTSP, such as the Kai Tak Stadium, Dining Cove and landscape area, etc. The proposed stations location at the SFRP/the future KTMP, and the residential area on the former runway would be further discussed in the following sections.

2.4.2 The depot of the system requires a site of sufficient size and regular configuration. The depot is proposed to be located within Sites 4C4 and 4C5, along the southern side of the KTSG and to the western side of the KTCT, where a single and regular podium could be formed to accommodate KTGTS's facilities, such as signalling system, power supply and charging facilities, vehicle parking areas, maintenance facilities, control centre, etc.

Consideration of Alignment Options

2.4.3 To assess the suitability of the different alternatives/options, a range of environmental, engineering, social considerations were developed, which are presented in **Table 2.1**, to facilitate the selection of preferred alignment.

Table 2.1 Considerations for Alternative/Options of Alignment Selection

Considerations	Description
Engineering Factors	
Interface with Existing / Planned Structures and Facilities	An option with the least interfacing issues relating to the existing / planned facilities, such as Kai Tak Sky Garden, Central Kowloon Route, Kai Tak Sports Park, Kai Tak Tunnel and Kai Tak Station Square, should be considered as far as practicable to avoid potential programme implication, land acquisition and disturbances to the environment.
Constructability	• Practicality in constructing the viaduct and station in the well-developed area; • Impact on promenade and landscaped facilities; and • Difficulty in undertaking utilities diversion and Temporary Traffic Management Scheme (TTMS).
Operational Safety, Flexibility and Maintenance Requirements	A number of safety, flexibility and maintenance requirements in the design and operation of transit system constrain certain alignment options. Particular constraints identified included: • horizontal curve radius for the transit system's alignment; • minimum gradients for long lengths of viaduct to improve energy efficiency; and • provision of stabling sidings at depot.

Considerations	Description
Construction Programme	Minimisation of construction period. Shorter construction period is preferred to minimise the disturbance to the community.
Environmental Factors	
Construction Dust	Minimisation of construction dust impact.
Noise	Minimisation of construction, transit and fixed plant noise impacts.
Visual	Minimisation of visual impact of the viaducts and the stations.
Cultural Heritage	Minimisation of cultural heritage impact, particularly the Lung Tsun Stone Bridge.
Social Factors	
Community Disruption	The construction works arising from the Project should be minimised as far as practicable to minimise the disturbance to the community.

Horizontal Alignment Options at the Former Runway

2.4.4 Taking into account the above stations and depot location, different alignment options of the KTGTS between the SKS Station and KTSP Station have been studied.

2.4.5 **Conforming Alignment (Preferred)**: The alignment, running along the Shing Fung Road with residential development at both sides as well as between SFRP and the future KTMP, could fulfill relevant transit system's design requirements and connect to proposed stations and depot. This alignment could serve the residents along the former runway area as well as the visitors to the two open spaces. The travelling distance for the residents and visitors to the KTGTS stations is the shortest with direct route adopted.

2.4.6 **Alternative Alignment running along Kai Tak Promenade:** The Alternative Alignment is proposed to run along southern Kai Tak Promenade, which provide direct access to southern Kai Tak Promenade. The anticipated usage of this alignment would be undesirable as the catchment area along Shing Fung Road is not as good as the Conforming Alignment. The stations of the Alternative Alignment would be located further away from the residential developments along the northern side of the former runway and the SFRP. The residents of the northern side developments and the visitors to the SFRP have to walk for a longer distance to reach the stations at southern Kai Tak Promenade and the future KTMP. The alignment is also less direct and longer than the Conforming Alignment. The overall journey time of the Alternative Alignment would be longer.

2.4.7 The Alternative Alignment also causes greater impact on the landscaped area, GreenWay and recreational facilities of the southern Kai Tak Promenade since the stations and viaduct would occupy a significant width of the promenade permanently. Partial closure to the promenade would be necessary during construction. To minimise the impact on the promenade, widening the promenade by reclamation in the Victoria

Harbour to create the required space for the stations and viaduct would be necessary. Reconstruction of a new seawall along the southern Kai Tak Promenade would be required. Potential noise impact to the residential buildings at the southern side of the former runway is anticipated.

2.4.8 Moreover, the proposed reclamation in the Victoria Harbour is subject to the requirements of Protection of Harbour Ordinance (PHO). The process of PHO involving reclamation in the Victoria Harbour would incur complexity and may require longer construction period to resolve additional objection arising from PHO. The Alternative Alignment proposal would incur higher project costs associated with longer alignment, reclamation and construction of seawall at the southern Kai Tak Promenade.

2.4.9 In view of the time and cost implications, the Alternative Alignment proposal is therefore not recommended. Conforming Alignment and Alternative Alignment at former runway is shown in **Figure 2.1**.

2.4.10 Based on the above discussion, the Conforming Alignment could achieve more project benefits which is preferable. Key considerations of two alignment options are summarised in **Table 2.2** below:

Table 2.2 Summary of Different Alignment Options

Options	Pros	Cons
Conforming Alignment (Preferred)	• Better catchment area hence anticipated usage is higher. • Shorter travelling distance for the residents and visitors to the KTGTS stations. • Seawall modification/ reclamation is not required. • Lower project cost.	• Potential noise impacts to residential buildings at both sides of Shing Fung Road.
Alternative Alignment running along Kai Tak Promenade	• Direct access to southern Kai Tak Promenade and residential buildings at southern side.	• Permanent reclamation in the Victoria Harbour may be required to create the necessary space for the stations and viaduct, implication to PHO requirements. • Large scale modification of seawall is required. • Higher project cost and longer construction period. • Longer journey time and walking distance for the residents of the northern side developments and

Options	Pros	Cons
		the visitors of SFRP to reach KTGTS stations. • Potential noise impact to residential buildings at southern side.

Vertical Alignment Options

2.4.11 Three options of vertical alignment have been explored under the Conforming Alignment in the investigation stages of this project, including locating the KTGTS underground, at-grade and elevated with piers.

- **Underground Option**: For this option, the KTGTS would run in tunnel below ground level. Underground KTGTS would generate minimal noise at the sensitivity receivers above ground, preserving the tranquility and aesthetics of the surrounding residential environment. Visual intrusion would be limited to station entrances and ventilation structures.

  However, the existing site environment in the Project area will incur difficulties for the underground option. The presence of as-built piles of adjacent buildings (e.g. KTSP and residential developments along the apron area) as well as underground structures (e.g. Central Kowloon Route Tunnels, drainage box culvert and District Cooling System (DCS) pipes, Kai Tak Tunnel, MTR Tuen Ma Line Tunnels) will form significant spatial constraints to the underground option.

  On the other hand, referring to the geological profile of Kai Tak apron area, the KTGTS would need to be constructed more than 50m below ground level in general and some locations may have to be constructed at 60-70m below ground, which would substantially increase construction cost and duration.

  Provisions of ventilation buildings and emergency accesses are required to be located at ground level. Hence, surface land will be required for provision of these structures, the existing roads, facilities and buildings may be affected and land acquisition may be required.

  Constructability of underground tunnels and stations is a much complex process as large site areas are required for providing large shafts as construction access, launching shaft and receiving shaft to 50m or more below ground. A huge amount of excavated materials would also be generated and removed from the site.

  Furthermore, the considerable depth of the station platforms would significantly reduce users' convenience and accessibility. Access between ground level entrance and station platform has to rely on large number of lifts and escalators, which the passengers will take longer time to reach the underground stations, making it inconvenient for passengers and lengthen the overall journey time. The waiting time at lifts and walking time between entrance and platform deep below ground would diminish the overall attractiveness and the competitiveness of the transit system as compared with other public transport services.

  In view of the above, this option is not recommended due to technical challenges, huge amount of excavated materials for tunnel construction, lower

overall attractiveness and competitiveness, much higher costs, and longer construction period.

- **At-grade Option**: For this option, the KTGTS would run along the existing ground level. A designated corridor would be formed for the KTGTS under the at-grade option. This option may require occupying the existing traffic lane of the road carriageways and road junctions (e.g. Shing Fung Road, Shing Kai Road and Muk Tai Street etc.). Obstructing traffic lanes and reducing the existing road link capacity are inevitable. These impacts would lead to delays and longer traffic queues for both the transit system and other road users, and are inconsistent with the Project objective outlined in **Section 2.3.6**.

  If keeping the number of existing traffic lanes is required, occupation of existing footpath, planting strips or demolition of existing facilities along the alignment is necessary for providing space for the designated corridor. Landscaped strips in existing footpath will be removed and the width of the footpath will be reduced for the designated corridor. This will cause serious impacts to both pedestrians, nearby residents, drivers and facilities users. As for the section of Shing Fung Road along the former runway, there is no sufficient space to house the designated corridor of the transit system due to the existence of the noise barrier, the DCS ventilation facilities along the footpath and run-in/out of the residential developments.

  Furthermore, at KTSP and KTSS, the at-grade transit system may substantially affect the existing recreational facilities, pedestrian path and landscaping facilities within this area. And barriers would have to be installed along the designated corridor with signal controlled junction crossings for safety.

  At locations of road junctions, roundabouts and pedestrian crossings at Shing Fung Road, Shing Kai Road and Muk Tai Street along the transit system alignment, additional stopping time have to be introduced at every junction/crossing allowing for other traffic/pedestrian to cross over the junctions. This waiting time at junctions/crossing will render the transit system non-effective and become an usual public transport system similar to bus or minibus. If priority is given to the transit system, the interruption to the operational service of the transit system will be lesser. However, the impact of time delay to other road users would be higher as they have to wait for the transit system to clear the junction/crossing.

  Although this option will not require the construction of viaduct and tunnel, it would have significant impact to both the road traffic and pedestrian as well as the operation of the transit system in terms of journey time. The pedestrian walking environment would be degraded and the existing facilities at ground level would have to be removed/relocated, not to mention the time and cost for the re-provisioning the facilities. Therefore, the at-grade option is not recommended.

- **Elevated Option (Preferred)**: For this option, the KTGTS would run on the viaduct above ground level and separated from the at-grade traffic which will not interfere with road traffic. Although construction of viaduct would be required, its impact on the existing structures/facilities would be minimised, thereby optimizing the construction duration and construction cost. On the other hand, elevated structures may result in visual impacts to public view points, which can be mitigated.

2.4.12 **Table 2.3** below summarises the evaluation of three vertical alignment options in terms of pros and cons:

Table 2.3 Summary of Different Vertical Alignment Options under Conforming Alignment

Options	Pros	Cons
Underground Option	• Generate minimal noise at the surface. • Less visual intrusion.	• Long construction duration due to the deep transit system. • Very high construction cost due to the deep transit system. • Low constructability due to the deep transit system. • Huge amount of tunnel excavated materials will be generated. • Surface land will be required for provision of the ventilation buildings and emergency accesses, the existing roads, facilities and buildings may be affected, and land acquisition may be required. • Inconvenience and low accessibility due to the excessive depth of the transit system between at grade entrance and underground station resulting longer travelling time rendering less attractive to users.
At-grade Option	• No need for construction of viaduct or tunnel.	• Permanent occupation of existing traffic lanes of carriageway would bring significant adverse impacts on the road traffic. • If keeping the number of existing traffic lanes is required, occupation of existing footpath, planting strips or demolition of existing facilities along the alignment is required, which would degrade the pedestrian walking environment.

Options	Pros	Cons
		• Additional stopping time have to be introduced at every junction/crossing, which increased the journey time of the transit system.
Elevated Option **(Preferred)**	• Separated from the at-grade traffic which will not interfere with road traffic. • Optimised construction duration and construction cost. • Relatively lower amount of excavated material.	• Visual impacts to public view points, which can be mitigated.

2.4.13 Based on the above analysis, elevated option is considered the most suitable vertical alignment to take forward for further development and refinement for the Project.

Refinements of Alignment Scheme

2.4.14 Taking into considerations discussed above, the preferred horizontal and vertical alignment in form of 3.5 km elevated viaduct along Shing Fung Road connecting between the former runway and the KTTS is the most suitable for the proposed Smart and Green Mass Transit System in Kai Tak.

2.4.15 Refinements on the design of alignment along Shing Fung Road were reviewed with consideration on the overall performance of the transit system under different alignment schemes, including the visual and noise impact on environmental sensitive receivers, as well as the impact on public usage of the KTSG during construction and operation of the Project. The alignments of the KTGTS can run:

- **Scheme A**: along Shing Fung Road westbound footpath/planting strip adjacent to the KTSG; and
- **Scheme B**: along Shing Fund Road atop of the KTSG.

The option of alignment running along Shing Fung Road eastbound is considered not feasible in view of the presence of existing noise barrier.

2.4.16 The alignments of **Scheme A** and **Scheme B** are shown in **Figure 2.1**.

Scheme A – Along Shing Fung Road Westbound

2.4.17 **Diagram 2.1** below shows the photomontage of **Scheme A** along Shing Fung Road westbound footpath/planting strip adjacent to the KTSG.

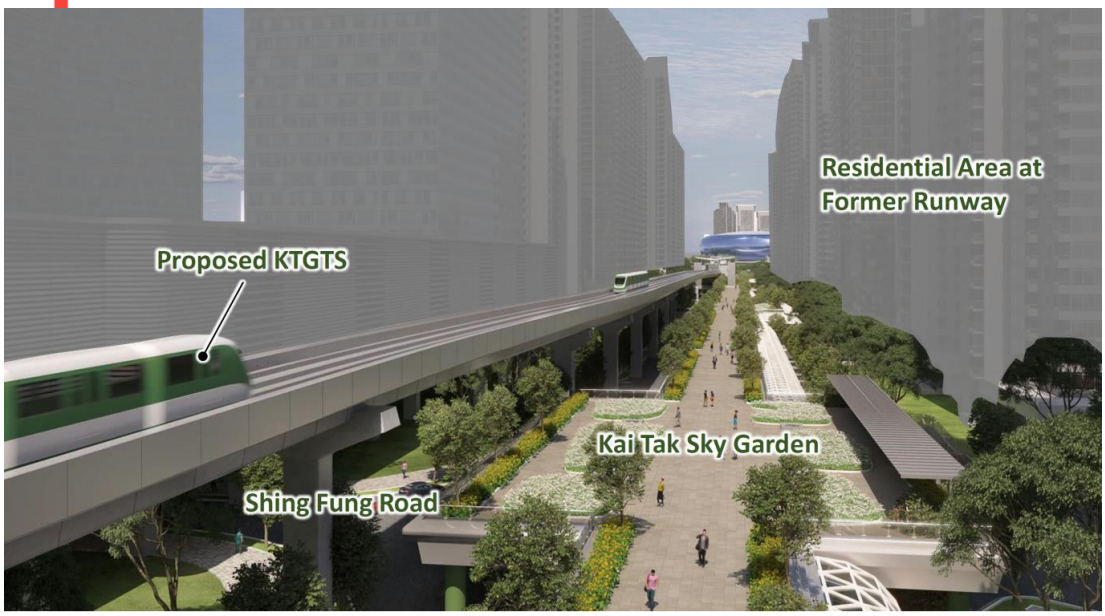

Diagram 2.1 – Photomontage for Scheme A

2.4.18 In **Scheme A**, the piers and foundations of the transit system would situate on the footpath or planting strip along the westbound of Shing Fung Road adjacent to KTSG, which could minimise the impact to KTSG. However, the viaduct would need to overpass the four footbridges connecting the residential buildings and the KTSG in order to maintain the pedestrian connectivity. The existing roadside facilitates and landscaping area would be affected by the piers and foundations of the transit system. The shortest distance between the proposed KTGTS and the residential buildings along the westbound of Shing Fung Road is about 10m.

Scheme B – Along Shing Fund Road Atop of the KTSG

2.4.19 In **Scheme B**, the KTGTS would run along Shing Fung Road atop the existing KTSG. The closest distance to the residential buildings along the westbound of Shing Fung Road can be increased to about 20m, while the closest distance to the residential buildings along the eastbound of Shing Fung Road remains at over 30m. All in all, the shortest distance between the proposed KTGTS and the buildings on both sides of Shing Fung Road would be increased from about 10m to about 20m. **Diagram 2.2** below shows the photomontage of **Scheme B**.

Diagram 2.2 – Photomontage for Scheme B

2.4.20 Moreover, in **Scheme B**, there is no need to overpass the four footbridges connecting the residential buildings and the KTSG, so the height of viaduct along this section could be reduced by about 2m compared to **Scheme A**. Taking into account the surrounding environment, the reduced viaduct height could reduce the visual impact to the nearby public view points.

2.4.21 In addition, in **Scheme A**, construction of foundation for the KTGTS would be required along the footpath or roadside planters along the westbound of Shing Fung Road. In contrast, in **Scheme B**, the KTGTS could make use of the existing foundation of the KTSG, which minimise the need for the foundation works near the residential buildings along Shing Fung Road. This will in turn minimise the environmental impacts to the residents on both sides of Shing Fung Road.

2.4.22 Furthermore, the viaduct of the KTGTS in **Scheme B** could also serve as a cover for public along part of the KTSG, providing sheltered pedestrian access. Although temporary closure of approximate 900m long KTSG would be required during construction, its function on pedestrian connection to provide access to facilities, such as the Shing Fung Road Park to the north and the KTCT to the south, could be maintained after construction of the Project.

Considerations of Preferable Schemes

2.4.23 On the whole, the refined alignment **Scheme B** could provide a better environmental performance in minimising the noise and visual impacts during the operation stage as well as the environmental impact during the construction stage, which achieve a better overall balance on the impact to the environment and the nearby facilities. Thus, **Scheme B** is recommended as the preferred scheme for KTGTS. The pros and cons of the refined alignment schemes as summarised in **Table 2.4**.

Table 2.4 Summary of Refinements of Alignment Scheme

Options	Pros	Cons
Scheme A	• Impacts to KTSG is minimal.	• Shortest distance between KTGTS and residential buildings along the westbound of Shing Fung Road is about 10m. • Higher viaduct level due to the need to overpass existing footbridges. • Relatively higher environmental impacts on the residents on both sides of Shing Fung Road due to the foundation works. • Existing roadside facilitates and landscaping area would be affected by the piers and foundations of the transit system.
Scheme B (Preferred)	• Optimal distance between KTGTS and residential buildings on both sides the former runway. • Lower viaduct level to reduce visual impact. • Foundation works of this section is not required. • Providing sheltered pedestrian access along a portion of the KTSG. • Achieve a better overall balance on the impact to the environment and the nearby facilities.	• Modification and enhancement works on KTSG would be required. • Temporary closure of approximate 900m long KTSG is required during construction.

Mode of Transit System

2.4.24 In consideration of the patronage demand in the Kai Tak area and site constraints, the use of smart and green mass transit system, which provides light and feeder services with medium-to-low passenger capacity is considered more appropriate and suitable to meet the transport demand than traditional railway.

2.4.25 Based on the preliminary design, KTGTS will adopt the smart and green mass transit system with the following features:

- medium-to-low passenger capacity to suit the local traffic demand;
- lighter design with a smaller footprint to suit local environment with space constraints;
- lightweight and equipped with rubber tyres to minimise noise impact;
- adopt battery-powered driving units which saves the need for providing power transmission system;
- adopt an open and environmentally friendly design, combined with natural ventilation and greening, for the stations;
- equipped with smart features such as real-time monitoring of passenger demand to facilitate responsive service adjustments and provision of real-time information to passengers, etc.

2.4.26 According to the 2023 Project Address, three smart and green mass transit system, namely SkyShuttle, Autonomous Rail Rapid Transit (ART) and Bus Rapid Transit (BRT) were considered. Various smart and green mass transit system were received from the respondents of the Expression of Interest (EOI) conducted in August – October 2024 for the Project. With reference to the information received from the EOI and actual site condition, BRT, which requires turning facilities at terminals, is considered not suitable in the Kai Tak area in view of the limited available land. In this connection, Sky Shuttle and ART are adopted in developing the preliminary design for the purpose of environmental impact assessment. The type of transit system for KTGTS will be confirmed by the Contracted Party of the Project at a later stage for implementation.

2.5 DETAILS OF THE PROJECT

Project Alignment and Proposed Works Area

2.5.1 The Project enhances the connectivity between the former Kai Tak Runway at KTCT to KTSS. The two single-track viaducts merge together after leaving the KTCT station and separate into two single-track viaducts before entering the SKS station. The two single-track viaducts merge together after leaving the SKS station to form a twin-track viaduct that runs in parallel atop of KTSG along Shing Fung Road to the SFRP station; and then turns northwards to KTSP station at Muk Tai Street. After leaving the KTSP station, the twin-track viaduct overpass the North Garden of KTSP adjacent to Muk Tai Street and then separates into two single-track viaducts and turns over to the KTSS and terminates at KTSS station adjacent to MTR KAT Station.

2.5.2 In the context of the EIA study, the proposed works areas were defined according to the nature of their uses during the construction of the Project. Works area(s) refer to the areas for temporary construction activities that would involve construction works on site (e.g. site formation, foundation works, excavation, and construction of station and viaduct). The preferred alignment, locations of works areas, site office and storage area are shown in **Figure 1.1**.

Construction Method

2.5.3 Typical bottom-up method would be adopted to construct foundations, substructures and superstructures for the viaducts and stations while top-down method may be adopted for the construction of depot. The following sections present the tentative construction sequences to be adopted for the construction of the Project.

1) Foundation and Construction of viaduct and stations

2.5.4 Mini piles, pre-bored socketed H-piles and bored piles arrangements have all been considered. After the consideration of structural loading and site constraints, pre-bored socketed H-piles are proposed as typical foundation type for viaduct and stations.

2.5.5 The roof is proposed to be a steel frame supported by steel posts positioned on the platform level columns. Prefabricated elements are proposed to be used in the station design, including the floor slabs, secondary beams, staircases and steel canopy roof.

2) Foundation and Construction of Depot

2.5.6 The depot and its station are positioned at the Sites 4C4 and 4C5, as part of the future development. Large diameter bored piles and reinforced concrete structure will be adopted as its foundation method and top-down construction method (i.e. both above-ground and below-ground structures are built simultaneously) may be implemented.

Environmental Friendly Design

2.5.7 In accordance with the strategic aim of sustainability, stations are designed with open, naturally ventilated, and green features to promote passenger comfort and sustainability.

2.5.8 Sustainable design principles will be integrated and expressed through the design of architectural elements. By focusing on sustainability, the design of KTGTS should aim to extend the lifespan of its assets, reducing waste and supporting sustainable operations.

2.5.9 By prioritising the use of low carbon materials as well as innovative construction technologies such as Modular Integrated Construction (MiC) and Design for Manufacture and Assembly (DfMA) in construction (i.e. viaduct, depot and stations), negative environmental impacts, such as the carbon footprint of the Project, could be reduced.

Construction Programme

2.5.10 Construction of the Project are anticipated to commence tentatively in 2027 and for commissioning of the KTGTS in 2031. A preliminary construction programme for Project is provided in **Appendix 2.1**.

2.6 COMMUNITY CONSULTATION

2.6.1 Project Profile (PP) No. PP- 671/2024 was submitted to EPD on 18 July 2024 and was exhibited for 14-day public inspection between 19 July 2024 to 1 August 2024. Traffic and Transport Committee of the Kowloon City District Council (KCDC) and Task Force on Kai Tak Harbourfront Development of Harbourfront Commission were consulted in March 2025. In addition, meetings have been held with representative from local residents in May 2025.

The Project design has taken into consideration the received comments on environmental aspects, and appropriate mitigation measures were recommended as appropriate in **Sections 3 to 8** of this EIA report to avoid and mitigate the potential environmental impacts of the Project. The key public views and corresponding design considerations are summarised in **Table 2.5**.

Table 2.5 Key Public Views and Corresponding Design Considerations

Environmental Aspect(s)	Public Views/Concerns	Response and Measures Adopted
Air Quality and Noise	• Potential construction dust and noise impact during the construction phase of the Project. • Potential transit system and fixed plant noise impact to the neighbourhood during operation stage.	• The preferred alignment could make use of existing foundation of KTSG, which minimise the need for foundation works as well as the environmental impacts to the residents at both sides of Shing Fung Road. • Mitigation measures including dust suppression measures, regular water spraying, quieter construction methods, adoption of quality power mechanical equipment and temporary barriers, etc would be adopted as far as practicable during construction phase. • Environmental Monitoring and Audit (EM&A) programme would be adopted to monitor the dust and noise impact for evaluation of effectiveness of adopted mitigation measures, and to ensure the proper implementation of measures by the contractor(s). • Appropriate mitigation measures would be

		considered during detailed design stage to minimise potential transit noise impact when necessary, including low noise road surfacing and installation of vehicle skirts and/or side absorption materials. • Compliance test will be conducted before operation to ensure the compliance of noise level at the noise sensitive receivers. • Mitigation measures such as adoption of quieter plant, silencers and acoustic lining would be considered to minimise the potential fixed plant noise impact during detailed design stage when necessary. For details, please refer to **Section 3 and 4**.
Visual Impact	• Potential visual impact at operation stage	• During the detailed design stage, aesthetically pleasing design elements as regard to the form, material and finishes would be incorporated into the stations, viaduct and associated engineering facilities so as to blend in the structures to the surrounding environment. • Viaduct and pier would keep neat and avoid bulkiness. For details, please refer to **Section 7**.

2.7 CONCURRENT PROJECTS

2.7.1 Major committed and planned projects that are located in the vicinity of the Project and may interface with the construction and operation of the Project were identified for evaluation of any potential cumulative environmental impacts to sensitive receivers/resources. The associated mitigation measures were also recommended where necessary to minimise the potential cumulative environmental impacts to the sensitive receivers/resources.

2.7.2 The concurrent projects would include:

Interfacing with the Construction Period of the Project

- Kowloon Bay International Trade & Exhibition Centre (KITEC) Area Redevelopment
- Central Kowloon Route - Remaining Works (Contract No. HY/2023/08)
- Development Sites along Shing Fung Road and Kai Tak Station Square (Area 2A Site 2, Area 2A Site 3, Area 2B Site 4, Area 2B Site 3, Area 2B Site 1 and Area 4E Site 2)
- Open Space along Kai Tak River
- Domestic Site at To Kwa Wan Road (Public Housing Development)
- Domestic Site at To Kwa Wan Road - Dedicated Rehousing Estate (DRE)
- District open space, sports centre and public vehicle park at Sze Mei Street
- Domestic Site 3E1
- Domestic Site 3E2
- Domestic Site 4B5

2.7.3 For the projects of (1) Development of the Tourism Node at Kai Tak (subject to the arrangement of Youth Post Hostel operation), (2) Kai Tak Metro Park, (3) Pedestrian cum Cyclist Bridge with Travellators across Kwun Tong Typhoon Shelter, (4) Comprehensive Development Area Site 2A5(B), (5) Domestic Site 2A4, (6) Commercial Site 1D2, (7) Commercial Site 3A6, (8) Commercial Sites 3B1-4, and (9) Domestic Site 4A2 (Victoria Voyage), there is no available information of the construction programme. As such, the said projects are not considered as concurrent under this EIA study.

Construction Complete before / Commence after the Construction Period of the Project

- Development Site along Shing Fung Road (Area 4C4 and Area 4C5) (Commence after the Year of 2030)
- Domestic Site 2B5 (In progress – 2025/2026)
- Domestic Site 1E1 (In progress – 2025/2026)
- Baptist Rainbow Primary School (In progress – 2026)
- New Acute Hospital Site 3C1B and Site 3C1A (In progress – 2026)
- Light Public Housing -Olympic Avenue, Kai Tak (2023 – 2026)
- “Youth Post" hostel and spaces for culture, arts and sports exchange in the Kai Tak Community Isolation Facility (In progress – 2025)
- Lung Tsun Stone Bridge Preservation Corridor at Kai Tak (2021– 2026)

2.7.4 The potential cumulative environmental impacts of the identified concurrent projects during the construction and operation of the Project (i.e. Construction Period: 2027 – 2031; Operation Period: from 2031 onward) were reviewed and discussed in **Table 2.6**. The locations of the identified concurrent projects are shown in **Figure 2.2**.

Table 2.6 List of Concurrent Projects and Potential Cumulative Impacts

Concurrent Project	Construction Programme Start	Construction Programme Complete	Potential Cumulative Impact at Construction Phase	Potential Cumulative Impact at Operation Phase
Kowloon Bay International Trade & Exhibition Centre (KITEC) Area Redevelopment	Under Planning	2029	Construction dust is not anticipated due to considerable separation distance between the Project and this concurrent project.	Not anticipated in view of the nature of the concurrent project.
Central Kowloon Route - Remaining Works (Contract No. HY/2023/08)	2024	2029	Construction dust and noise is not anticipated due to heavy construction works of concurrent project completed before commencement of the Project.	Not anticipated in view of the nature of the concurrent project.
Development Sites along Shing Fung Road and Kai Tak Station Square (Area 2A Site 2, Area 2A Site 3, Area 2B Site 4, Area 2B Site 3, Area 2B Site 1 and Area 4E Site 2)	In progress	2026 - 2030	Cumulative dust and noise impacts were evaluated in Chapters 3 and 4 of this EIA Report respectively.	Not anticipated in view of the nature of the concurrent project.
Open Space along Kai Tak River	Q4 2023	2026 / 2027	Construction dust and noise is not anticipated as the scale of	Not anticipated in view of the nature of the

Concurrent Project	Construction Programme Start	Construction Programme Complete	Potential Cumulative Impact at Construction Phase	Potential Cumulative Impact at Operation Phase
			construction works of the open space is relatively limited	concurrent project.
Domestic Site at To Kwa Wan Road (Public Housing Development)	Under Planning	2029	Cumulative dust was evaluated in Chapter 3 of this EIA Report. With sufficient separation distance (i.e., >300m) from our Project, no adverse cumulative construction noise impact is anticipated.	Not anticipated in view of the nature of the concurrent project.
Domestic Site at To Kwa Wan Road - Dedicated Rehousing Estate (DRE)	In progress	2028 - 2029	Cumulative dust was evaluated in Chapter 3 of this EIA Report. With sufficient separation distance (i.e., >300m) from our Project, no adverse cumulative construction noise impact is anticipated.	Not anticipated in view of the nature of the concurrent project.
District open space, sports centre and public vehicle park at Sze Mei Street	In Progress	2026 / 2027	Cumulative dust was evaluated in Chapter 3 of this EIA Report. With sufficient separation distance (i.e., >300m) from our Project, no adverse	Not anticipated in view of the nature of the concurrent project.

Concurrent Project	Construction Programme Start	Construction Programme Complete	Potential Cumulative Impact at Construction Phase	Potential Cumulative Impact at Operation Phase
			cumulative construction noise impact is anticipated.	
Domestic Sites 3E1 and 3E2	Under planning	2033	Cumulative dust was evaluated in Chapter 3 of this EIA Report. With sufficient separation distance (i.e., >300m) from our Project, no adverse cumulative construction noise impact is anticipated.	Not anticipated in view of the nature of the concurrent project.
Domestic Site 4B5	Under Planning (i.e. Based on the best available information, the construction period of the Domestic Site 4B5 is expected to be overlapping with the construction programme of this Project.)		Cumulative dust and noise impacts were evaluated in Chapters 3 and 4 of this EIA Report respectively.	Not anticipated in view of the nature of the concurrent project.

3 AIR QUALITY

3.1 INTRODUCTION

3.1.1 Construction dust impact assessment is conducted in accordance with criteria and guidelines as stipulated in Annex 4 and Annex 12 of the EIAO-TM as well as the requirements given in Clause 3.4.3 and Appendix B of the EIA Study Brief (No. ESB-369/2024).

3.1.2 The potential dust impact arising from dusty construction activities of the Project are assessed and appropriate mitigation measures are proposed to alleviate any adverse air quality impact.

3.1.3 The transit system to be employed in the Project will be electric-powered, and air-emission free during the normal operation and thus the exhaust air from transit system during operation phase was considered insignificant. Non-road mobile machinery (NRMM) if any for the maintenance of transit system, shall comply with prescribed emission standards, according to the Air Pollution Control (Non-Road Mobile Machinery) (Emission) Regulation. In view of the infrequent operation of NRMM, the air quality impact due to the use of NRMM is expected to be minimum. No adverse operational air quality impact is anticipated.

3.2 ENVIRONMENTAL LEGISLATIONS, STANDARDS AND GUIDELINES

Air Quality Objective & Technical Memorandum on EIA Process

3.2.1 The criteria and guidelines for air quality assessment are laid down in Annex 4 and Annex 12 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

3.2.2 The Air Pollution Control Ordinance (APCO) provides the statutory authority for controlling air pollutants from a variety of sources. The Hong Kong Air Quality Objectives (AQOs), which stipulate the maximum allowable concentrations over specific periods for typical pollutants, should be met. The relevant prevailing AQOs are listed in **Table 3.1**.

Table 3.1 Air Quality Objective

Pollutant	Averaging Time	AQO Concentration [i] ($\mu g/m^3$)	Allowable Number of Exceedance per Calendar Year[iv]
Respirable Suspended Particulates (PM_{10}) [ii]	24-hour	75	9
	Annual	30	NA
Fine Suspended Particulates ($PM_{2.5}$) [iii]	24-hour	37.5	18
	Annual	15	NA
Nitrogen Dioxide (NO_2)	1-hour	200	18
	24-hour	120	9
	Annual	40	NA
Sulphur Dioxide (SO_2)	10-minute	500	3
	24-hour	40	3

Pollutant	Averaging Time	AQO Concentration [i] (μg/m³)	Allowable Number of Exceedance per Calendar Year[iv]
Carbon Monoxide (CO)	1-hour	30,000	0
	8-hour	10,000	0
	24-hour	4,000	0
Ozone (O_3)	8-hour	160	9
	Peak season	100	NA
Lead	Annual	0.5	NA

Note:
[i] All measurements of the concentration of gaseous air pollutants, i.e., sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325kPa.
[ii] Respirable suspended particulates mean suspended particles in air with a nominal aerodynamic diameter of 10μm or less.
[iii] Fine suspended particulates mean suspended particles in air with a nominal aerodynamic diameter of 2.5μm or less.
[iv] NA denotes not applicable.

Air Pollution Control (Construction Dust) Regulation

3.2.3 Notifiable and regulatory works are under the control of Air Pollution Control (Construction Dust) Regulation. Notifiable works include site formation, reclamation, demolition, foundation and superstructure construction for buildings and road construction. Regulatory works include building renovation, road opening and resurfacing, slope stabilisation, and other activities including stockpiling, dusty material handling, excavation, concrete production, etc. The Project is expected to include notifiable works (site formation, demolition, foundation and superstructure construction for station structure) and regulatory works (dusty material handling and excavation). Contractors and site agents are required to inform EPD and adopt dust reduction measures to minimize dust emissions, while carrying out construction works, to the acceptable level.

Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation

3.2.4 The Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation comes into operation on 1 June 2015. Under the Regulation, NRMMs, except those exempted, are required to comply with the prescribed emission standards. From 1 September 2015, all regulated machines sold or leased for use in Hong Kong must be approved or exempted with a proper label in a prescribed format issued by EPD. Starting from 1 December 2015, only approved or exempted NRMMs with a proper label are allowed to be used in specified activities and locations including construction sites. The Contractor is required to ensure the adopted machines or non-road vehicle under the Project could meet the prescribed emission standards and requirement.

Air Pollution Control (Fuel Restriction) Regulations

3.2.5 The Air Pollution Control (Fuel Restriction) (Amendment) Regulation 2024 was gazetted on 15 November 2024 and took effect on 1 April 2025 to tighten the statutory limit on the sulphur content of liquid fuel for industrial and commercial use to 0.001 per cent to reduce SO_2 emissions. Since 1 April 2025, liquid fuel with a sulphur content not exceeding 0.001% by weight such as Ultra Low Sulphur Diesel (ULSD) shall be used, unless a valid certificate of compliance with emission limits issued by a competent examiner.

Recommended Pollution Control Clauses for Construction Contracts

3.2.6 The Recommended Pollution Control Clauses (RPCC) are a set of good engineering practice to minimize environmental nuisance to nearby residents and sensitive receivers. Relevant requirements of the RPCC should be included in the works contract for the contractor to follow with a view to reducing the environmental impacts arising from the construction works.

3.3 DESCRIPTION OF THE ENVIRONMENT AND FUTURE TRENDS

Existing Environment

3.3.1 The Project Site is located in the south-eastern part of Kowloon City. The proposed alignment of the KTGTS is about 3.5km long elevated smart and green mass transit system, connecting from station adjacent to KTCT and the proposed Tourism Node at the former Kai Tak Runway, passing via a station cum depot at SKS, station abutting KTSG, station at SFRP, station at the northern boundary of KTSP, station near the existing MTR KAT Station at KTSS. The surrounding areas adjacent to the proposed alignment comprising a mix of commercial development, residential, open space and facilities on tourism, culture and recreation as well as railway station.

3.3.2 The closest EPD's air quality monitoring station to the assessment area is the Kwun Tong Air Quality Monitoring Station (AQMS) situated at the Kwun Tong Police Station, 9 Lei Yue Mun Road, Kwun Tong, Kowloon. Its most available 5-year air quality data are summarized in **Table 3.2** to depict the trend of the localised air quality. To further protect public health, an updated Hong Kong's AQOs has been put in force on 11 April 2025. All measured pollutant concentrations met the prevailing AQOs, except for 24-hour $PM_{2.5}$, annual $PM_{2.5}$, PM_{10}, and annual NO_2. Nonetheless, 24-hour $PM_{2.5}$, annual $PM_{2.5}$, and PM_{10} exhibited a downward trend from 2019 to 2023, while annual NO_2 showed a decreasing trend from 2021 to 2023.

Table 3.2 Ambient Air Quality from 2019 to 2023 at EPD's Kwun Tong AQMS

Pollutant [3]	Averaging Time	Conc. Limits (μg/m³)	Number of exceedances allowed per Calendar Year [2]	Concentration (μg/m³) [1]					Remarks [2]
				2019	2020	2021	2022	2023	
Respirable Suspended Particulates (PM_{10})	24-hour	75	9	73	67	72	49	57	10th highest conc.
	Annual	30	NA	**38**	**32**	**31**	24	26	NA
Fine Suspended Particulates ($PM_{2.5}$)	24-hour	37.5	18	**40**	32	32	31	28	19th highest conc.
	Annual	15	NA	**21**	**16**	**17**	14	15	NA
Nitrogen Dioxide (NO_2)	1-hour	200	18	184	153	164	145	147	19th highest conc.
	24-hour	120	9	96	81	97	83	75	10th highest conc.
	Annual	40	NA	**45**	**43**	**49**	**45**	**41**	NA
	10-min	500	3	41	24	24	19	29	4th highest conc.

Pollutant [3]	Averaging Time	Conc. Limits (μg/m^3)	Number of exceedances allowed per Calendar Year [2]	Concentration (μg/m^3) [1]					Remarks [2]
				2019	2020	2021	2022	2023	
Sulphur Dioxide (SO_2)	24-hour	40	3	11	8	7	11	10	4th highest conc.
Ozone (O_3)	8-hour	160	9	150	126	136	148	136	10th highest conc.
	Peak Season	100	NA	93	84	79	81	85	NA
Carbon Monoxide (CO)	1-hour	30,000	0	NA	NA	NA	NA	NA	Maximum
	8-hour	10,000	0	NA	NA	NA	NA	NA	Maximum
	24-hour	4,000	0	NA	NA	NA	NA	NA	Maximum

Note:
[1] Corrected to nearest integer. **Bolded** concentrations indicate exceedance of the air quality objectives, if any.
[2] NA denotes not applicable.
[3] All concentration units are in microgram per cubic metre (μg/m^3).
[4] CO is not measured in Kwun Tong AQMS.

3.3.3 Apart from the air quality monitoring data, background pollutant concentrations as estimated by PATH v3.0 were presented. Since the project is targeted to be awarded for construction in 2027, therefore data in Year 2027 extracted from PATH V3.0 was adopted as the background concentration as a conservative approach. The project site is located within the grids (42,33), (42,34), (42,35), (43,32), (43,33), (43,34), (43,35), (44,31), (44,32), (44,33), (45,31) and (45,32) of PATH V3.0 and shown in **Figure 3.1**. Background pollutant concentrations at the grid are shown in **Table 3.3**.

Table 3.3 Summary of PATH V3.0 Background Concentrations in Year 2027

Pollutants [2]	Averaging Time	Conc. Limits ($\mu g/m^3$)	Number of exceedances allowed per Calendar Year [1]	PATH Grid Conc. ($\mu g/m^3$) [3]												Remark [1]
				(42,33)	(42,34)	(42,35)	(43,32)	(43,33)	(43,34)	(43,35)	(44,31)	(44,32)	(44,33)	(45,31)	(45,32)	
Respirable Suspended Particulates (PM_{10})	1-hour	75	9	56.24	56.77	54.75	55.09	56.33	56.19	54.88	55.08	55.77	57.17	55.22	56.97	10^{th} highest conc.
	Annual	30	NA	20.98	21.54	21.14	20.73	21.01	21.26	21.15	20.59	20.94	21.77	20.63	21.51	NA
Fine Suspended Particulates ($PM_{2.5}$)	24-hour	37.5	18	32.68	33.49	32.6	32.59	33.21	33.08	32.86	32.89	33.05	34.5	32.95	34.32	19^{th} highest conc.
	Annual	15	NA	13.12	13.61	13.3	12.85	13.12	13.35	13.31	12.73	13.03	13.76	12.76	13.51	NA
Nitrogen Dioxide (NO_2)	1-hour	200	18	98.86	98.33	88.46	97.37	93.94	91.64	83.98	88.41	93.84	91.97	86.79	90.62	19^{th} highest conc.
	24-hour	120	9	43.06	43.02	36.98	43.74	40.29	39.76	35.57	40.88	42.64	40.61	38.8	40.49	10^{th} highest conc.
	Annual	40	NA	19.84	19.6	17.75	21.36	18.37	18.56	17.09	18.44	19.06	19.07	16.45	17.43	NA
Sulphur Dioxide (SO_2)	10-min	500	3	22.73	22.82	22.96	25.09	22.79	22.93	22.85	25.29	25.05	22.98	25.08	23.02	4^{th} highest conc.
	24-hour	40	3	7.66	7.39	7.27	7.96	7.57	7.42	7.3	7.77	7.81	7.6	7.59	7.58	4^{th} highest conc.
Ozone (O_3)	8-hour	160	9	**176.44**	**174.36**	**175.38**	**174.62**	**177.02**	**174.61**	**173.65**	**177.15**	**175.78**	**174.13**	**178.52**	**177.13**	10^{th} highest conc.
	Peak Season	100	NA	**120.77**	**119.87**	**120.55**	**121.16**	**121.57**	**119.41**	**120.19**	**123.04**	**122.15**	**119.9**	**124**	**121.87**	NA
Carbon Monoxide	1-hour	30,000	NA	591.54	618.51	588.26	586.13	589.02	589.08	587.61	579.63	584.07	590.37	581.29	583.72	Maximum
	8-hour	10,000	0	568.34	570.98	565.66	559.47	567.77	566.31	562.8	556.64	558.87	572.23	557.01	563.26	Maximum
	24-hour	4,000	0	536.36	542.12	533.22	529.63	532.18	531.16	527.98	529.6	528.62	538.85	532.4	534.33	Maximum

Note:
[1] NA denotes not applicable.
[2] All concentration units are in microgram per cubic metre ($\mu g/m^3$).
[3] **Bolded** concentrations indicate exceedance of the air quality objectives, if any.

3.3.4 With reference to the prediction by PATH V3.0, the PATH background demonstrates that the future concentrations of air pollutants in these areas are well below the prevailing AQOs as mentioned in **Table 3.2**, except for exceedances in ozone, which is more a regional issue of the Pearl River Delta area.

3.4 IDENTIFICATION OF AIR SENSITIVE RECEIVERS

3.4.1 In accordance with Annex 12 of the EIAO-TM, any domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public worship, library, court of law, sports stadium or performing arts centre are considered as air sensitive receivers (ASRs). Any other premises or place with which, in terms of duration or number of people affected, has a similar sensitivity to the air pollutants as the aforementioned premises and places is also considered to be a sensitive receiver. As stated in the EIA Study Brief (No. ESB-369/2024), the boundary of the assessment area for air quality assessment should be 500m from the Project boundaries of all associated areas under the Project.

3.4.2 The representative ASRs (existing / planned) within the 500m assessment area that may be affected by the potential impacts from the construction of the Project were identified based on relevant available information including on the latest Outline Zoning Plans (OZPs), Layout Plan, Outline Development Plans, and other relevant published land use plans. Locations of the representative ASRs along the KTGTS are presented in **Table 3.4** and illustrated in **Figure 3.2**.

Table 3.4 Representative Air Sensitive Receivers (ASRs) along KTGTS

ASR ID	Existing/ Planned	Description [2]	Land use	Approx. Distance between ASR and works area (m)	Assessment height (mAG) [1]
A01	Existing	Kai Yuet Court	Residential	440	1.5 - 100
A02	Existing	Kai Tak Youth Sports Ground	Recreation	265	1.5
A03	Existing	Kai Tak Arena	Recreation	60	1.5 - 30
A04	Existing	Kai Yan Court	Residential	140	1.5 - 130
A05	Existing	Kai Tak Mall	Commercial	40	1.5 - 40
A06	Existing	Regal Oriental Hotel	Hotel	375	1.5 - 80
A07	Existing	Po Sing Court	Residential	375	1.5 - 80
A08	Existing	Le Billionnaire	Residential	390	1.5 - 140
A09	Existing	Tung Wui Estate	Residential	460	1.5 - 120
A10	Existing	Lee Kau Yan Memorial School	Educational	350	1.5 - 30
A11	Existing	Ng Wah Catholic Secondary School	Educational	410	1.5 - 30
A12	Existing	Ng Wah Catholic Primary School	Educational	355	1.5 - 50
A13	Existing	Robert Black Health Centre	G/IC	325	1.5 - 20
A14	Existing	Yue Xiu Plaza	Commercial	370	1.5 - 20
A15	Existing	The Latitude	G/IC	255	1.5 - 170
A16	Existing	Trade and Industry Tower	Commercial	145	1.5 - 100
A17	Existing	On Fook Building	Residential	350	1.5 - 100
A18	Existing	Immigration Department Training and Youth Development Centre	Educational	260	1.5 - 30

ASR ID	Existing/ Planned	Description [2]	Land use	Approx. Distance between ASR and works area (m)	Assessment height (mAG) [1]
A19	Existing	Inland Revenue Centre	G/IC	145	1.5 - 80
A20	Existing	Kowloon East Regional Police Headquarters	G/IC	290	1.5 - 90
A21	Existing	The Twins	Commercial	205	1.5 - 120
A22	Existing	Cullinan Sky	Residential	30	1.5 - 150
A23	Existing	Airside	Commercial	20	1.5 - 200
A24	Existing	Kai Ching Estate	Residential	340	1.5 - 120
A25	Existing	De Novo	Residential	200	1.5 - 80
A26	Existing	Kai Long Court	Residential	145	1.5 - 80
A27	Existing	Tak Long Estate	Residential	265	1.5 - 120
A28	Existing	Kai Tak Avenue Park	Recreation	320	1.5
A29	Existing	One Kai Tak Phase 1	Residential	115	1.5 - 110
A30	Existing	One Kai Tak Phase 2	Residential	115	1.5 - 110
A31	Existing	Oasis Kai Tak	Residential	110	1.5 - 110
A32	Existing	Upper Riverbank	Residential	60	1.5 - 130
A33	Existing	T-Loft@Kai Tak	Residential	250	1.5 - 50
A34	Existing	Victoria Skye	Residential	285	1.5 - 120
A35	Existing	K.City	Residential	280	1.5 - 120
A36	Existing	Vibe Centro	Residential	265	1.5 - 120
A37	Existing	K.Summit	Residential	50	1.5 - 130
A38	Existing	The Henley	Residential	15	1.5 - 120
A39	Existing	Monaco One	Residential	25	1.5 - 120
A40	Existing	Henley Park	Residential	15	1.5 - 120
A41	Existing	EMSD Headquarters	G/IC	195	1.5 - 70
A42	Existing	Dorsett Kai Tak	Hotel	210	1.5 - 60
A43	Existing	CLP Kai Tak Office	G/IC	290	1.5 - 60
A44	Existing	Kitty Woo Stadium	Recreation	415	1.5 - 30
A45	Existing	Grand Waterfront	Residential	490	1.5 - 180
A46	Existing	Twin Victoria	Residential	<5	1.5 - 100
A47	Existing	KT Marina	Residential	15	1.5 - 110
A48	Existing	Hong Kong Children's Hospital	Hospital	305	1.5 - 80
A49	Existing	Pano Harbour	Residential	5	1.5 -130
A50	Existing	Double Coast	Residential	15	1.5 - 130
A51	Existing	One Victoria	Residential	15	1.5 - 120
A52	Existing	The Knightsbridge	Residential	10	1.5 - 120
A53	Existing	Cullinan Harbour	Residential	15	1.5 - 100
A54	Existing	Miami Quay	Residential	15	1.5 - 100

ASR ID	Existing/ Planned	Description [2]	Land use	Approx. Distance between ASR and works area (m)	Assessment height (mAG) [1]
A55	Existing	The Pavilia Forest	Residential	15	1.5 - 100
A56	Existing	Kai Tak Division of the Government Flying Service (GFS)	G/IC	220	1.5 - 20
A57	Existing	King Tai Court	Residential	400	1.5 - 110
A58	Existing	SKH Holy Cross Primary School	Educational	495	1.5 - 45
A59	Existing	P.L.K. Stanley Ho Sau Nan Primary School	Educational	480	1.5 - 45
A60	Existing	Animal Management and Animal Welfare Building Complex	G/IC	400	1.5 - 80
A61	Existing	Central Kowloon Route Kai Tak Administration Building	G/IC	10	1.5 - 40
A62	Existing	Kai Tak Stadium	Recreation	55	1.5
A63	Existing	Skyline Tower	Commercial	475	1.5 - 160
A64	Existing	Sino Industrial Plaza	Commercial	410	1.5 - 140
A65	Existing	HSBC Building Kowloon Bay	Commercial	375	1.5 - 40
A66	Existing	Kowloon Bay Fire Station	G/IC	450	1.5 - 40
A67	Existing	Hong Kong Post Central Mail Centre	G/IC	415	1.5 - 40
PA01	Planned	Domestic Site 2B5	Residential	365	1.5 - 100
PA02	Planned	Domestic Site 2B4 *	Residential	290	1.5 - 100
PA03	Planned	Domestic Site 2B3 *	Residential	215	1.5 - 120
PA04	Planned	Domestic Site 2B1 *	Residential	60	1.5 - 140
PA05	Planned	Comprehensive Development Area Site 2A5(B)	Commercial	355	1.5 - 120
PA06	Planned	Domestic Site 2A4	Residential	290	1.5 - 130
PA07	Planned	Domestic Site 2A3 *	Residential	220	1.5 - 130
PA08	Planned	Commercial Site 2A2 *	Commercial	140	1.5 - 130
PA09	Planned	Light Public Housing – Olympic Avenue, Kai Tak	Residential	10	1.5 - 60
PA10	Planned	Commercial Site 1D2	Commercial	155	-
PA11	Planned	Domestic Site 1E1	Residential	310	1.5 - 100
PA12	Planned	Baptist Rainbow Primary School	Educational	430	1.5 - 50
PA13	Planned	Kowloon Bay International Trade & Exhibition Centre *	Commercial	265	1.5 - 140
PA14	Planned	Kai Tak Metro Park	Recreation	10	1.5
PA15	Planned	Commercial Site 3A6	Commercial	270	1.5 - 100
PA16	Planned	Commercial Site 3B1,2,3,4	Commercial	215	-

ASR ID	Existing/ Planned	Description [2]	Land use	Approx. Distance between ASR and works area (m)	Assessment height (mAG) [1]
PA17	Planned	New Acute Hospital 3C1B	Hospital	260	1.5 - 60
PA18	Planned	New Acute Hospital 3C1A	Hospital	420	1.5 - 100
PA19	Planned	Domestic Site 3E1 *	Residential	445	1.5 - 100
PA20	Planned	Domestic Site 3E2 *	Residential	360	1.5 - 110
PA21	Planned	Domestic Site 4E2 * (Victoria Blossom)	Residential	10	1.5 - 100
PA22	Planned	Domestic Site 4A2 (Victoria Voyage)	Residential	15	-
PA23	Planned	Domestic Site 4B5*	Residential	25	-
PA24	Planned	Commercial Site 4C4	Commercial	within the works area (planned topside development of the depot)	1.5 - 120
PA25	Planned	Commercial Site 4C5	Commercial	within the works area (planned topside development of the depot)	1.5 - 100
PA26	Planned	Tourism Node/ Youth Post Hostel	Recreation/ Residential	<5	-
PA27	Planned	Domestic Site - Dedicated Rehousing Estate (DRE) *	Residential	395	-
PA28	Planned	Domestic Site at To Kwa Wan Road (Public Housing Development)*	Residential	440	1.5 - 130
PA29	Planned	District open space, sports centre and public vehicle park at Sze Mei Street *	Recreation	435	1.5 - 40
PA30	Planned	Open Space along Kai Tak River *	Recreation	<5	1.5
PA31	Planned	Lung Tsun Stone Bridge Preservation Corridor at Kai Tak	Recreation	85	1.5

Note:
[1] Since detail information of the planned ASRs is not available, therefore the assessment height of the building is subject to the design of the planned development.
[2] Based on the best available information as detailed in Section 2.7, the planned ASRs with remark asterisk (*) is considered as concurrent projects, whereas other planned ASRs without remark are not considered as concurrent project.

3.5 CONSTRUCTION PHASE IMPACT ASSESSMENT

Construction Works

3.5.1 Based on the preliminary design, KTGTS will adopt rubber-tire vehicles and operate on a viaduct structure between KTCT at the former Kai Tak Runway and MTR KAT Station with four intermediate stations at SKS, KTSG, SFRP and northern boundary of KTSP.

3.5.2 The major construction works under the Project include:

- Site clearance and formation

- Construction of 6 stations including KTCT Station, SKS Station, KTSG Station, SFRP Station, KTSP Station and KTSS Station
- Construction of depot
- Construction of viaduct structure
- Landscaping works and other associated works

Tentative Construction Programme

3.5.3 The Project is targeted to be awarded in 2026 for subsequent design, construction, operation and maintenance. The construction works of the Project is assumed to be commenced in 2027 and for target completion in 2031.

Identification and Evaluation of Potential Emission Sources and Key Air Pollutants

Construction Dust and Gaseous Emissions

3.5.4 The potential air quality impact would be the dust emissions associated with site clearance and formation works (e.g. open cut excavation), material handling and transportation, and wind erosion from stockpiling.

3.5.5 The site clearance and formation area would be limited at the transit stations and depot. No major dismantling works are anticipated. The estimated amount of excavation materials (soft materials only) generated is around 62,050 m^3. No site formation works (cut & fill / retaining wall) is anticipated for this Project. The viaduct section would be prefabricated as far as practicable to further minimise the construction dust impact on-site. Hence, the estimated total amount of C&D inert material to be handled for the whole construction period would also be limited. In addition, there are sufficient separation distance (e.g. more than 300m) of each major works areas to avoid the cumulative dust impact among the major works areas. Regular watering on the excavation areas or earth moving activities would be carried out to avoid the fugitive dust emissions.

3.5.6 Land transport should be utilised to deliver and dispose of the wastes generated from the Project area to designated disposal outlets, with a maximum 27 trucks per day for transportation of C&D materials/wastes out of the project site to respective public fill reception (i.e., Tuen Mun Area 38 Fill Bank or Tsuen Kwan O Area 137 Fill Bank. For Tuen Mun Area 38 Fill Bank, the disposal route will be via Lung Cheung Road, Ching Cheung Road, Kwai Chung Road, Tsuen Wan Road, Tuen Mun Road, Wong Chu Road, Lung Fu Road and Lung Mun Road. Disposal route to Tseung Kwan O Area 137 Fill Bank will be via Hoi Bun Road, Kwun Tong Bypass, Tseung Kwan O Road and Wan Po Road. The transportation routings may change subject to the actual traffic conditions of the roads. It is anticipated that the transportation of excavated materials would not cause adverse air quality impact along the routes with the implementation of appropriate mitigation measures. Before leaving the Project Site, dump truck loaded with excavated material would be covered entirely to ensure that dusty material would not leak from the dump truck according to the APCO requirement. The mitigation measures described in **Section 3.5.17** would also be implemented during the construction phase to minimise impacts on air quality on nearby ASRs.

3.5.7 With the implementation of procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation and good site practice as detailed in **Section 3.5.17**, dust emission from the construction works would be reduced as far as practicable and adverse air quality impacts on the identified representative ASRs are not anticipated during the construction phase.

3.5.8 On-site use of diesel-powered engines is the potential source for other gaseous pollutants such as CO, NO_2, SO_2 and smoke. The Air Pollution Control (Non-road

Mobile Machinery) (Emission) Regulation came into effect in 1 June 2015 to control emissions from diesel-powered engines. Fuel with sulphur content not exceeding 0.001% by weight will be used to minimize SO_2 emission in accordance with the Air Pollution Control (Fuel Restriction) Regulations. In addition, the use of non-road mobile machinery with exempted label under the Air Pollution Control (Non-road Mobile Machinery) (Emissions) Regulation will be avoided as far as practicable. The equipment would also be properly maintained to minimize any emissions. It is anticipated that no more than 10 numbers of diesel Powered Mechanical Equipment (PME) would be in operation at the same time during the construction phase. Also, the use of electrified NRMMs will be employed as far as practicable, which is unlikely to cause significant smoke and gaseous emissions.

3.5.9 Good site practices have also been recommended and implemented to control and reduce the emission from the use of NRMM from the Project as detailed in **Section 3.5.18**. Hence, the emissions from NRMM are considered relatively small and the associated emission is considered insignificant during the construction phase of the Project.

Concurrent Projects

3.5.10 Based on the best available information as detailed in **Section 2.7**, concurrent projects (i.e., the construction programme of other projects overlapped with this Project) are identified with details discussed in **Sections 3.5.11** to **3.5.16** below.

Development Sites along Shing Fung Road, Kai Tak Station Square and Cheung Yip Street

3.5.11 There are planned commercial/residential development project at Kai Tak Area 2A Site 2, Area 2A Site 3, Area 2B Site 4, Area 2B Site 3, Area 2B Site 1 and Area 4E Site 2 with a site area of 6000m^2 - 10000m^2 (about 10m – 290m from the Project). For Kai Tak Area 2A Site 2 and Area 2A Site 3, the construction works would be commenced in 2024 and completed in 2029 and 2030 respectively; For Kai Tak Area 2B Site 4 and Area 2B Site 3, Area 4E Site 2 and Area 2B Site 1, the construction works would be completed in 2026/2027 and 2028. Given that major construction works with dusty activities would be completed before the overlapping period of our project and the scale of site area are limited, therefore, it is anticipated that the cumulative air quality impacts generated from those projects could be limited.

3.5.12 There are residential development projects at Area 4B Site 5 along Shing Fung Road and Area 3E Site 1 and 3E Site 2 along Cheung Yip Street. Area 4B Site 5 is under planning and no detail construction programme is available. For Area 3E Site 1 and 3E Site 2, they will be completed by 2033. Considering that those planned construction period may overlap with the construction programme of this Project, proper mitigation measures including watering frequently and good site practice will be implemented from its project to ensure that the construction activities would not cause adverse construction dust impacts. Therefore, adverse cumulative construction dust impact arising from construction activities of these projects are not anticipated.

Kowloon Bay International Trade & Exhibition Centre (KITEC) Area

3.5.13 It is a composite redevelopment project on the existing KITEC Area about 265m away from the Project. According to the Town Planning Broad (Application No. A/K22/42), the proposed redevelopment would be completed in 2029. KITEC Area is under planning and no detail construction programme is available. Considering that the long distance and the planned construction period will overlap with this Project, proper mitigation measures including watering frequently and good site practice will be implemented from the project to ensure that their construction activities would not cause adverse construction dust impacts. Therefore, adverse cumulative construction

dust impact arising from construction activities of the concurrent projects of concern are not anticipated.

Domestic Sites at To Kwa Wan Road

3.5.14 It is a planned public housing development project (about 440m from the Project) and a planned Dedicated Rehousing Estate (DRE) at To Kwa Wan Road. According to the Town Planning Broad (Application No. A/K10/275), the anticipated occupation year of the public housing development is in 2029. For the planned DRE, the service commencement is expected in 2028-2029. Given that major construction works with dusty activities would be completed before the overlapping period of our project and the scale of site area are limited, therefore, it is anticipated that the cumulative air quality impacts generated from those projects could be limited.

District open space, sports centre and public vehicle park at Sze Mei Street and Open Space along Kai Tak River

3.5.15 It is a planned recreational development project at San Po Kong with a site area of about 10000m^2 (about 435m from the Project). According to the information from the websites of Architectural Services Department, the proposed development would be completed in 2026/2027. There is also open space development along Kai Tak River, which will be completed by 2026/2027. Given that major construction works with dusty activities would be completed before the overlapping period of our project and the scale of site area are limited, therefore, it is anticipated that the cumulative air quality impacts generated from those projects could be limited.

Central Kowloon Route (CKR) - Remaining Works

3.5.16 The remaining works of CKR commenced in 2024 and would be completed in 2029. The scale of the said remaining works is limited in nature. Therefore, adverse cumulative construction dust impact arising from construction activities of the concurrent projects are not anticipated.

Good Site Practice & Recommended Mitigation Measures

Construction Dust Control

3.5.17 Sufficient dust suppression measures as stipulated under the Air Pollution Control (Construction Dust) Regulation (Cap. 311R) and good site practices such as enclosing stockpiles of sand with three-side enclosure, covering the dusty materials with clean impervious sheet, water spraying of all access roads and site areas, and good house-keeping of the Site should be properly implemented in order to minimise the construction dust generated. These measures and good site practices listed below should be carried out to minimize the construction dust impact:

- The works area for site clearance shall be sprayed with water throughout the operation to maintain the entire surface wet;
- Restricting heights from which materials are to be dropped, as far as practicable to minimise the fugitive dust arising from unloading/ loading;
- All vehicles shall be washed to remove any dusty materials from its body and wheels before leaving a construction site;
- All spraying of materials and surfaces should avoid excessive water usage;
- When a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting;

- Travelling speeds should be controlled to reduce traffic induced dust dispersion and re-suspension within the Site from the operating trucks;
- Erection of hoarding of not less than 2.4m high from ground level along the Site boundary and higher hoarding should be adopted at locations close to ASRs;
- Locate the haul roads away from those ASRs that are located close to the Site;
- Avoid dusty works to be carried out or placing stockpile near to ASRs;
- Any stockpile of dusty materials shall be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 3 sides; and
- All dusty materials shall be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.
- Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.

Emission control on NRMMs

3.5.18 Fuel combustion from the use of PME during construction works would be a source of air emission. To improve air quality, EPD has introduced the Air Pollution Control (NRMMs) (Emission) Regulation, which came into operation in 2015 to regulate emissions from machines and non-road vehicles. Under the Regulation, NRMMs, except those exempted, are required to comply with the prescribed emission standards. All regulated machines sold or leased for use in Hong Kong must be approved or exempted with a proper label in a prescribed format issued by EPD. Only approved or exempted NRMMs with a proper label are allowed to be used in specified activities and locations including construction sites. In addition, the following good site practices that can control and reduce the emission from the use of non-road mobile machinery from the Project are recommended:

- Electric power supply for on-site machinery shall be provided as far as practicable to minimize aerial emissions;
- Regulated machines shall be used and exempted NRMMs should be avoided where practicable;
- Use cleaner fuel such as ULSD in diesel-operated construction plant to reduce sulphur dioxide emission;
- Use of electric PMEs where practicable;
- Use power supplied from power utilities when practicable (e.g. to replace generators);
- Switch off the engine of PMEs when idling;
- Implement regular and proper maintenance for plant and equipment;
- Employ plant and equipment of adequate size and power output and avoid overloading of the plant;
- Locate the PMEs away from sensitive receivers as far as possible; and
- Erect screen to shield the emission source from sensitive receivers where necessary and practicable.

3.6 ENVIRONMENTAL MONITORING AND AUDIT

3.6.1 EM&A for potential dust impacts are recommended during the construction phase of the Project so as to check compliance with legislative requirements. Real-time RSP and FSP monitoring will also be conducted. Details of the monitoring and audit programme are presented in a stand-alone EM&A Manual.

3.7 CONCLUSION

3.7.1 Potential air quality impacts from the construction works for the Project would mainly be related to fugitive dust and emissions from construction equipment. With the implementation of sufficient dust suppression measures as stipulated under Air Pollution Control (Construction Dust) Regulation, Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, Air Pollution Control (Fuel Restriction) Regulations as well as Recommended Pollution Control Clauses for Construction Contracts, adverse air quality impacts would not be anticipated. No adverse cumulative impact from other surrounding major construction works is anticipated. A comprehensive EM&A programme would be conducted to ensure the proper implementation of measures and the compliance of AQOs during the construction of KTGTS.

3.7.2 The transit system to be employed in the Project would be electric-powered, and air-emission free during the normal operation and thus the exhaust air from transit system during operation phase is considered insignificant. NRMM, if any, for the maintenance of transit system, shall comply with prescribed emission standards, according to the Air Pollution Control (Non-Road Mobile Machinery) (Emission) Regulation. In view of the infrequent operation of NRMM, the air quality impact due to the use of NRMM is expected to be minimum. No adverse operational air quality impact is anticipated.

4 NOISE

4.1 INTRODUCTION

4.1.1 This section presents the assessment of potential noise impacts on noise sensitive receivers (NSRs) arising from the construction and operation of the Project. Assessment is conducted in accordance with criteria and guidelines as stipulated in Annex 5 and Annex 13 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) as well as the requirements given in Clause 3.4.4 and Appendix C of the EIA Study Brief (No. ESB-369/2024).

4.2 ENVIRONMENTAL LEGISLATIONS, STANDARDS AND GUIDELINES

General

4.2.1 The criteria and guidelines for noise impact assessment are laid down in Annex 5 and Annex 13 of the EIAO-TM.

4.2.2 The Noise Control Ordinance, Cap. 400 (NCO) and Environmental Impact Assessment Ordinance, Cap. 499 (EIAO) provide the statutory framework for noise control. Assessment procedures and standards are set out in the following Technical Memoranda (TMs):

- Technical Memorandum (TM) on Noise from Construction Work other than Percussive Piling (GW-TM);
- TM on Noise from Percussive Piling (PP-TM);
- TM on Noise from Construction Work in Designated Areas (DA-TM); and
- TM for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM).

Construction Noise

Construction Noise controlled under EIAO

4.2.3 The noise standards for daytime construction activities (i.e., 0700 – 1900 hours of any day not being a Sunday or general holiday) are stipulated in Table 1B in Annex 5 of the EIAO-TM, as shown in **Table 4.1** . Noise criteria, as listed in **Table 4.1** , for construction or decommissioning of designated projects shall be met as far as practicable. All practicable mitigation measures shall be exhausted and the residual impacts are minimized.

Table 4.1 Noise Standards for Daytime Construction Activities

Uses	**0700 to 1900 hours on any day not being a Sunday or general holiday, L_{eq}(30 mins), dB(A)**
All domestic premises, Temporary housing accommodation, Hostels, Convalescent homes, and Homes for the aged	75
Places of public worship, Courts of law, and Hospitals and medical clinics	70

Uses	0700 to 1900 hours on any day not being a Sunday or general holiday, L_{eq}(30 mins), dB(A)
Educational institutions (including kindergartens and nurseries)	70 / 65 during examination

Note:

[1] The above standards apply to uses which rely on opened windows for ventilation.

Construction Noise controlled under NCO

4.2.4 General construction works between 1900 to 0700 hours (of the next day) from Monday to Saturday and at any time on Sundays or public holidays are governed by NCO. The use of Powered Mechanical Equipment (PME) for construction works would require a Construction Noise Permit (CNP). The GW-TM details the procedures adopted by EPD for assessing such application. The granting of a CNP is subject to conditions stated in the CNP, and it may be revoked at any time for failure to comply with the permit conditions.

4.2.5 In addition to the general controls on the use of PME during restricted hours, the use of Specified Powered Mechanical Equipment (SPME) and the undertaking of Prescribed Construction Work (PCW) during the restricted hours in a designated area are controlled by the DA-TM. Construction plant or equipment classified as SPME under the DA-TM includes hand-held breakers, bulldozers, concrete lorry mixers, dump trucks and vibratory pokers. The PCW includes the erection or dismantling of formwork or scaffolding, hammering, loading, unloading or handling of rubble, wooden boards, steel bars, wood or scaffolding material, and the disposal of rubble through plastic chutes.

4.2.6 The DA-TM details the procedures that should generally be adopted by the Noise Control Authority for assessing the use of SPME during restricted hours and for determining whether a CNP would be issued.

4.2.7 A CNP may be granted in cases where the noise can be contained within the Acceptable Noise Level (ANL) at the noise sensitive receivers (NSRs). ANLs are assigned depending upon the Area Sensitivity Rating (ASR). These ANLs are obtained with corrections for the duration of the CNP and multiple permit situations, if applicable, to the Basic Noise Levels (BNLs). The corresponding BNLs for the day, evening and night-time periods are given in **Table 4.2** .

Table 4.2 Construction Noise Criteria during Restricted Hours

Time Period	BNL, dB(A)		
	ASR A	ASR B	ASR C
All days during the evening (1900 to 2300 hours), and general holidays (including Sundays) during the day-time and evening (0700 to 2300 hours)	60 (45)	65 (50)	70 (55)
All days during the night-time (2300 to 0700 hours)	45 (30)	50 (35)	55 (40)

Note:
Figures in brackets are BNLs for SPME construction work in designated areas.

4.2.8 As defined in the Noise Control (Construction Work Designated Areas) Notice Plan No. EPD/AN/K&NT-02, the Kai Tak new development area is within the Designated Area (DA) at the time of commencement of the construction work (i.e., after 1 January 2027). For the existing residential uses near the MTR Kai Tak Station, such as Upper Riverbank and Henley Park, etc. are currently within the DA.

4.2.9 Percussive piling is governed under the PP-TM. If percussive piling is adopted in the construction works, a CNP is required in order to carry out such work. The issuance of a CNP by the Noise Control Authority would depend on the compliance of percussive piling noise impact with the limits set out within the PP-TM.

4.2.10 Despite any description made in this EIA, there is no guarantee that a CNP will be issued for the Project construction. The Noise Control Authority will consider a well-justified CNP application, once filed, for construction works within restricted hours as guided by the relevant TMs issued under the NCO. The Noise Control Authority will take into account contemporary conditions / situations of adjoining land uses and any previous complaints against construction activities at the site before making a decision in granting a CNP. Nothing in the report shall bind the Noise Control Authority in making a decision. If a CNP is to be issued, the Noise Control Authority shall include in it any conditions demand. Failure to comply with any such conditions will lead to cancellation of the CNP and prosecution under the NCO.

Operational Noise

Airborne Transit Noise

4.2.11 The appropriate ANLs for transit noise stipulated in Annex 5 of the EIAO-TM and IND-TM are adopted for the assessment of the airborne transit noise. The ANLs are dependent on ASR of the NSR and are shown in **Table 4.3** .

Table 4.3 ANL for Airborne Transit Noise

Time Period	ANL, L_{eq}(30min), dB(A)		
	A	B	C
Day (0700 to 1900 hours)	60	65	70
Evening (1900 to 2300 hours)	60	65	70
Night (2300 to 0700 hours)	50	55	60

4.2.12 The ASR and ANLs adopted in this report are used for assessment purpose only. They should not bind the Noise Control Authority's decision in determining the noise criteria based on the legislations and practices being in force, and contemporary conditions/ situations of adjoining land uses.

Fixed Plant Noise

4.2.13 The EIAO-TM and IND-TM stipulate the appropriate ANL for fixed noise sources. The ANLs as shown in **Table 4.3** are dependent on the ASRs of the NSRs, as defined in accordance with the IND-TM.

4.2.14 For planned fixed noise sources, more stringent criteria stipulated in the EIAO-TM as shown below.

- 5 dB(A) below the appropriate ANL shown in the IND-TM (as shown in **Table 4.4**); or
- The prevailing background noise levels (For quiet areas with level 5 dB(A) below the ANL).

Table 4.4 Acceptable Noise Levels for Fixed Noise Source

Time Period	ANL / ANL - 5, L_{eq}(30min), dB(A)		
	A	B	C
Day (0700 to 1900 hours)	60 (55)	65 (60)	70 (65)

Time Period	ANL / ANL - 5, L_{eq}(30min), dB(A)		
	A	B	C
Evening (1900 to 2300 hours)	60 (55)	65 (60)	70 (65)
Night (2300 to 0700 hours)	50 (45)	55 (50)	60 (55)

Note:

[1] The brackets show the permissible noise levels at NSRs for any planned fixed plant noise sources, i.e. 5 dB(A) below the corresponding ANLs.

4.2.15 A summary table on the noise standard for operation phase (transit noise and fixed noise sources) are shown in **Table 4.5**.

Table 4.5 Summary of the noise criteria of the Operation Noise

Operation Noise	Noise Criteria
Transit Noise	ANL of IND-TM
Fixed Noise Sources	"ANL-5" of IND-TM / Background Noise (whichever is lower)

4.3 DESCRIPTION OF THE ENVIRONMENTAL AND FUTURE TRENDS

Description of Environment and Future Trends

4.3.1 The Project Site is located in the south-eastern part of Kowloon City within the Kai Tak Development (KTD) Area. The proposed alignment of the Project is about 3.5km long elevated smart and green mass transit system, connecting from station adjacent to KTCT and the proposed Tourism Node at the former Kai Tak Runway tip, passing via a station cum depot at SKS, station above KTSG, station at SFRP, station at the northern boundary of KTSP, station near the existing MTR KAT Station at KTSS. The surrounding areas adjacent to the proposed alignment comprising a mix of commercial development, residential, open space and facilities on tourism, culture and recreation as well as railway station.

4.3.2 The existing noise climate in the vicinity of the Project area is dominated by the construction noise from the planned development nearby. However, most of the planned development will be completed before the construction of the Project in near future. As such, it is anticipated that the ambient noise climate within the assessment area will mainly comprise road traffic noise and neighbourhood commercial activities in the future.

Prevailing Noise Ambient

4.3.3 With reference to the EIA Report of Kai Tak Development (AEIAR-130/2009), prevailing background noise level measurements were conducted and demonstrated that the prevailing background noise levels are higher than ANL-5. Based on the desktop review, the current planning of KTD Area is similar to the proposed development package (e.g. mixed residential and commercial uses) in the Kai Tak Development EIA Report. A verification noise survey on prevailing background was conducted on 12 March 2025 to verify whether the observation in the EIA Report of Kai Tak Development is still valid. The background noise measurements were taken at Kai Tak Station Square and Kai Tak Sky Garden on free-field conditions by using Type 1 sound level meter and was calibrated before and after the measurement with a calibration signal of 94.0 dB(A) at 1kHz. For Kai Tak Station Square, it is observed that the prevailing background noise level is higher than "ANL-5" during the day,

evening and night-time period. For Kai Tak Sky Graden, it is observed that the prevailing background noise level is lower “ANL-5” during the day and evening time period, whereas the prevailing background noise level is higher than “ANL-5” during night-time period. With considering the future noise ambient of Kai Tak Sky Graden would be subject to change due to the upcoming population intake in the vicinity, it is recommended to carry out an updated prevailing noise survey in the Fixed Noise Management Plan (FNMP) during the detailed design stage to determine whether ANL-5 or prevailing background noise level should be adopted as the criteria for assessing the fixed noise sources impact. Details of the noise survey is shown in **Appendix 4.4**.

4.4 IDENTIFICATION OF NOISE SENSITIVE RECEIVERS

4.4.1 The Noise Sensitive Receivers (NSRs) within the 300m assessment area for noise impact assessments during the construction and operation phases were identified based on review of latest information from Planning Department, Lands Department, reports of potential concurrent projects, and findings from site visits.

4.4.2 In order to evaluate the noise impacts during construction and operation phases associated with the Project, representative existing/committed/planned NSRs located within the assessment area were identified for assessment. Representative NSRs located close to the subject noise sources (i.e. the first layer of NSRs) are considered as the most affected locations. The first layer of NSRs would provide acoustic shielding to those receivers at further distances behind. The first layer of NSRs represent the worst case scenario, and are selected as representative Noise Assessment Points (NAPs) for the noise assessment. The photographs of representative NSRs are shown in **Appendix 4.1**.

4.4.3 The locations of the identified NSRs and representative NAPs along the KTGTS are shown in **Figure 4.1**. The details of representative NAPs are presented in **Table 4.6** .

Table 4.6 Representative NAPs along KTGTS

NAP ID	Description [1]	Land Use [2]	No. of Storey (Sensitive Use Only)
Planned NSRs			
PN01a	Light Public Housing – Olympic Avenue, Kai Tak	R	17 [3]
PN01b		R	17 [3]
PN02	Domestic Site 2B1	R	40 [3]
PN03	Domestic Site 4E2 (Victoria Blossom)	R	28 [3]
PN04	Domestic Site 4A2 (Victoria Voyage)	R	29 [3]
PN05	Domestic Site 4B5	R	30 [3]
PN06a	Tourism Node / Youth Post Hostel	G/IC	4
PN06b			
PN06c			
Existing NSRs			
CS-01	Cullinan Sky	R	37
KLC-01	Kai Long Court	R	26

NAP ID	Description [1]	Land Use [2]	No. of Storey (Sensitive Use Only)
KT1-01	One Kai Tak Phase 1	R	29
KT1-02	One Kai Tak Phase 2	R	29
OKT-01	Oasis Kai Tak	R	29
UR-01	Upper Riverbank	R	31
KS-01	K.Summit	R	35
TH-01	The Henley Tower 3B	R	34
TH-02	The Henley Tower 2	R	34
HP-01	Henley Park Tower 1B	R	29
HP-02	Henley Park Mansion C	R	5
KYC-01	Kai Yan Court	R	40
TV-01	Twin Victoria	R	24
KM-01	KT Marina	R	30
PH-01	Pano Harbour	R	31
DC-01	Double Coast	R	34
OV-01	One Victoria	R	31
TK-01	The Knightsbridge	R	28
CH-01	Cullinan Harbour	R	23
MQ-01	Miami Quay	R	25
TPF-01	The Pavilia Forest	R	25

Notes:

[1] The noise assessments include only NSRs which rely on opened windows for ventilation.

[2] R – Residential Premises; G/IC - Government, Institution or Community

[3] The number of storeys is assumed for assessment purpose only and do not imply any building height for the future development. Actual number of floors is subject to future approved design.

ASR of the Noise Sensitive Receivers

4.4.4 The Project and associated NSRs are located within the urban area of Kai Tak. The identified NSRs are not affected by any Influencing Factors (IFs), such as major road with an annual average daily traffic flow greater than 30,000. Thus, ASR “B” would be assigned to the identified NSRs within this area in accordance with the IND-TM.

4.4.5 The ASR is based on the current best available information. The ASR is subject to review during the detailed design and further assessment (e.g. Construction Noise Management Plan, Transit Noise Management Plan, and Fixed Noise Management Plan) stages.

4.5 CONSTRUCTION PHASE NOISE IMPACT ASSESSMENT

Identification and Evaluation of Construction Noise Impact

4.5.1 Based on the tentative design, KTGTS will adopt rubber-tire vehicles and operate on a viaduct structure. As all the construction activities would be carried out above ground, ground-borne noise is not anticipated during the construction phase.

4.5.2 Based on the current tentative design, the major construction works under the Project include:

- Site clearance and formation, and small-scale concrete removal works
- Construction of 6 stations located at / near KTCT, SKS, KTSG, SFRP, KTSP and KTSS
- Construction of a depot
- Construction of viaduct structure
- Landscaping works and other associated works

4.5.3 Potential construction noise impacts would arise from the use of PME during the construction works of the Project. A tentative project-specific equipment inventory, including equipment type, number and utilization rates during any 30 minutes working period within the non-restricted hours without mitigation is shown in **Appendix 4.2**. The inventory list has been confirmed by the engineering consultant to be appropriate and practicable for completing the works within the proposed construction programme.

4.5.4 The key activities during construction phase include piling works, construction of the pile caps, piers and viaduct structure. According to the preliminary design, only small-scale concrete breaking works are required for column strengthening works and modification works on existing structure (i.e., Kai Tak Sky Garden). In view of the short separation distance between these proposed NSRs and the proposed works area, mitigation measures are recommended to minimize the potential construction noise impact. Details of the noise mitigation measures are presented in **Section 4.5.12** to **4.5.22**.

4.5.5 The construction of the Project would tentatively commence in 2027 for commissioning in 2031. According to **Section 2.7,** the concurrent projects that are located within 300 m assessment area and may potentially interface with the Project during construction phase are identified as below.

Development Sites along Shing Fung Road and Kai Tak Station Square

4.5.6 There are planned comprehensive residential development projects along Kai Tak Station Square, including Kai Tak Area 2A Site 2, Area 2A Site 3, Area 2B Site 1, Area 2B Site 4, and Area 2B Site 3 (located about 220m – 280m from the Project). For Kai Tak Area 2A Site 2 and Area 2A Site 3, the construction works would be completed in 2029 and 2030 respectively. For Kai Tak Area 2B Site 4, Area 2B Site 3 and Area 2B Site 1, the construction works would be completed in 2026/2027 and 2028. Kai Tak Area 4E Site 2, which is located along Shing Fung Road, would be completed by Q1 2027. Based on the best available information in **Section 2.7**, the construction period of the Domestic Site 4B5 is also expected to be overlapping with the construction programme of this Project.

4.5.7 There is no detailed construction programme for the said developments. Considering the residential development is mainly related to building construction works (i.e. not a large-scale infrastructure projects with extensive concrete breaking and excavation). Based on current good practices on mitigating construction noise, no insurmountable construction noise impact from the captioned project is anticipated. Nevertheless, the cumulative impact from the captioned project shall be reviewed in the later Construction Noise Management Plan (CNMP) stage.

Open Space along Kai Tak River

4.5.8 The construction of Open Spaces near Kai Tak River will be completed by 2026 / 2027. However, the scale of construction works of the open space is relatively limited. Potential cumulative noise impacts of both projects are therefore not anticipated.

Kowloon Bay International Trade & Exhibition Centre (KITEC) Area

4.5.9 There is a composite redevelopment project on the existing KITEC Area about 265m away from the Project. According to the Town Planning Broad (Application No. A/K22/42), the proposed redevelopment would be completed in 2029. KITEC Area is under planning and no detailed construction programme is available. Considering that the KITEC Area is located far from our Project Area (i.e. over 250m), cumulative construction noise impacts generated from both projects is not anticipated.

Central Kowloon Route (CKR) - Remaining Works

4.5.10 The remaining works of CKR commenced in Q3 2024 and would be completed in 2029. The scale of the said remaining works is limited in nature. Potential cumulative noise impacts of both projects are therefore not anticipated.

4.5.11 Other concurrent projects mentioned in **Section 2.7** are located beyond the 300m assessment area. With consideration of the sufficient separation distance (i.e., >300m) from our Project, no adverse cumulative construction noise impact is anticipated.

Recommended Noise Mitigation Measures

4.5.12 Mitigation measures are recommended to minimize the construction noise impact. It is recommended that the following noise mitigation measures should be implemented to minimize the construction noise impact:

- Good site practice to limit noise emission at source;
- Use of silenced equipment and quieter construction methods; and
- Use of movable noise barrier, noise insulating fabric and noise enclosures.

4.5.13 Details of the recommended mitigation measures are described in the following sections.

Good Site Practice

4.5.14 Good site practice and noise management can significantly reduce the impact of site activities on nearby NSRs. The following package of measures should be followed while carrying out of the Project:

- Only well-maintained plant to be operated on-site and plant should be serviced regularly during the works;
- Machines and plant that may be in intermittent use to be shut down between work periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from the NSRs;
- Mobile plant should be sited as far away from NSRs as possible; and
- Material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site construction activities.

4.5.15 In addition, the “Recommended Pollution Control Clauses for Construction Contracts” published by the EPD should be adopted in the Contract Specification for the Contractor to follow and implement relevant measures and good site practices in minimising noise impact.

Use of Quiet Construction Methods and Equipment

4.5.16 The Contractor may be able to obtain particular models of plant that are quieter than the standards given in the GW-TM. This is one of the most effective measures and is increasingly practicable because of the availability of quiet equipment. Quiet plant is

defined as Quality Powered Mechanical Equipment (QPME) which SWL is less than the value specified in GW-TM for the same piece of equipment.

4.5.17 To mitigate construction noise impacts, quiet construction methods should also be considered as far as practicable. The major noisy construction activity would be piling work. As such, it is recommended to adopt suitable piling method, such as bored piling or socket H-pile, etc. to be used instead of percussive piling.

Use of Movable Barriers, Noise Insulating Fabric and Noise Enclosures

4.5.18 To alleviate the construction noise impact on the affected NSRs, noise barriers will be placed as close to the PME as possible and at a location intercepting the line of sight between the NSRs and PME. They should have a minimum surface density of 10 kg/m^2 and be moved concurrently with the PME along the worksites. A cantilevered top cover would be used for noise screening for upper floors of NSRs to achieve screening benefits.

4.5.19 According to the EIAO Guidance Note No. 9/2023 "Preparation of Construction Noise Impact Assessment under the Environmental Impact Assessment Ordinance", noise reduction of 5dB(A) and 10dB(A) can be achieved by direct application of the noise barriers to movable and stationary plant, respectively. Movable noise enclosure made up of plywood is proposed to surround certain static PME. The internal wall of the enclosure should be laid with sound absorbent such as mineral wool. Without direct view of the noisy part of the enclosed PME from NSR, this design can achieve 10dB(A) reduction.

4.5.20 Noise insulating fabric could also be installed for certain PME such as pilling machine. The fabric should be lapped such that there are no openings or gaps on the joints. With reference to the approved West Kowloon Cultural District EIA report (AEIAR-178/2013), a noise reduction of 10 dB(A) could be achieved for the PME lapped with the noise insulating fabric.

4.5.21 A Tentative plant inventory with quieter construction method, QPME and noise mitigation measures are presented in **Appendix 4.2**. The feasibility for the quieter construction methods and noise mitigation measures will be further reviewed in the detailed design and construction stages via the Construction Noise Management Plan (CNMP, see below).

4.5.22 A CNMP based on the best available information should be submitted to the Director of the Environmental Protection before the commencement of construction of the Project. The CNMPs should be prepared by a Certified Noise Modelling Professional as recognized by the Hong Kong Institute of Qualified Environmental Professionals Limited (HKIQEP), or equivalent as agreed by the Director of Environmental Protection. The CNMP will contain quantitative construction noise impact assessment in accordance with EIAO Guidance Note No. 9/2023, proposed adopted quieter construction method and equipment, noise mitigation measures, and construction noise monitoring and auditing programme.

4.6 TRANSIT NOISE IMPACT ASSESSMENT

Identification of Noise Source

4.6.1 Based on the preliminary design, KTGTS would adopt rubber-tire vehicles on a viaduct structure, subject to the detailed design of Contracted Party.

4.6.2 The transit would be operated on a smooth track to ensure the safety and stable operation. Rubber tires absorb much of the vibration generated during operation. As

the vibration induced by the rubber-tire transit shall be minimal, adverse ground-borne noise impact is not anticipated.

4.6.3 The airborne transit noise impact is mainly dominated by the rolling noise from transit movements. Details refer to the discussion of source term in **Table 4.7** .

4.6.4 The section of Tuen Ma Line (TML) close to the Project site is in underground operation. The elevated section of Kwun Tong Line (KTL) is more than 300m from the Project site. As such, no cumulative airborne transit noise impact is anticipated from the TML and KTL. Based on the latest information, no other solid planned and existing airborne transit sources are expected within the 300m study area.

Assessment Methodology

4.6.5 The methodology for the rubber-tire transit systems is based on "HJ 2.4 - Technical guidelines for noise impact assessment (2021 version)" (hereafter as "HJ 2.4-2021") published by the Ministry of Ecology and Environment of the People's Republic of China. HJ 2.4-2021 is a well-established noise prediction methodology using standard acoustical principles and commonly adopted in the environmental impact assessment projects for urban transit systems in Mainland China.

4.6.6 SkyShuttle and Autonomous Rail Rapid Transit (ART), which were proposed among the various systems received during the EOI exercise, were considered in developing the reference scheme for the noise assessment. The type of system for KTGTS will be confirmed by the Contracted Party of the Project. The transit noise impact assessment will be updated in a Transit Noise Management Plan (TNMP) at detailed design stage.

4.6.7 A computational model, CadnaA developed by Datakustik GmbH of Germany, has been adopted to predict and assess the propagation of airborne transit noise. The modelling methodology for propagation is based on the prediction procedures in HJ 2.4 - 2021. The transit track would be divided into segments and the noise level of each segment are eventually integrated into an overall noise level of the whole transit track. Linear spectrum of equivalent continuous sound pressure level of the noise source term ($L_{Aeq,Tp}$) has been input to the CadnaA model. The noise source term should include the activities of manoeuvring and air conditioning units of the transit and the adopted source term in this assessment is assumed with a practicable manner by making reference to the noise data of existing rubber-tire transit operators available in the market.

4.6.8 The prediction model under HJ 2.4 - 2021 consists of transit noise and fixed noise sources. In this EIA report, fixed noise will be assessed in **Section 4.7** and thus only the formula related to transit noise is considered for transit noise assessment. By adopting the calculation method of HJ 2.4 - 2021 in CadnaA model, the equivalent continuous sound pressure level at receiver over 30 minutes ($L_{eq(30min)}$) for transit noise is determined by the following equation -

$$L_{Aeq(30min)} = 10\log\{\frac{1}{1800}[n \times t_{eq} \times 10^{0.1(L_{Aeq,Tp}+C_t)}]\}$$

Where

$L_{Aeq(30min)}$ is the equivalent continuous sound pressure level at receiver over 30 minutes

n is the vehicle frequency per hour per direction

t_{eq} is the equivalent pass by duration of the transit

$L_{Aeq,Tp}$ is the sound pressure level of the duration of transit pass-by

C_t is the correction factors for transit noise

4.6.9 C_t are considered in accordance with HJ 2.4 - 2021 for the assessment:

$$C_t = C_{speed} + C_{Vert-Dir} + C_{track} - C_{Distance} - C_{Air} - C_{Barrier} - C_{Ground} + C_{Hous}$$

Where

C_{Speed} *is the Speed Correction*

$C_{Vert\text{-}Dir}$ *is the Vertical Directivity Correction*

C_{Track} *is the trackform correction*

$C_{Distance}$ *is the Distance Correction*

C_{Air} *is the Air Absorption Correction*

$C_{Barrier}$ *is the Barrier Effects*

C_{Ground} *is the Ground Correction*

C_{Hous} *is the Reflection including Multiple Reflection and Façade Reflection*

4.6.10 In accordance with HJ 2.4 - 2021, the correction factors depend on the category of the transit system. For SkyShuttle (a rubber-tire transit system with guide wheels and/or stabilizing wheels on both sides of the bogie), it is considered to be similar to the category "Straddle monorail transit" as defined in HJ453-2018 "Technical guidelines for environmental impact assessment – Urban rail transit" also published by the Ministry of Ecology and Environment of the People's Republic of China. For ART (a rubber-tire transit system without guide wheels and stabilizing wheels), it is assumed as the category "Light rail (rotary motor)" defined in HJ453-2018 as a worst-case scenario.

4.6.11 The parameters and assumptions of the KTGTS to be adopted in the assessment are summarized in **Table 4.7** .

Table 4.7 Assumptions Adopted in the Transit Noise Impact Assessment

Parameters		**Assumptions**	**Remarks**
$L_{Aeq,Tp}$	Continuous sound pressure level of the duration of transit pass-by	Source Terms for 40m car length at 7.5m from transit line at 35kph or 60kph SkyShuttle [1] • $L_{Aeq,Tp}$ at 35kph = 64.5 dB(A) • $L_{Aeq,Tp}$ at 60kph = 69.2 dB(A) ART [2] • $L_{Aeq,Tp}$ at 35kph = 71.6 dB(A) • $L_{Aeq,Tp}$ at 60kph = 78.0 dB(A)	The air conditioning noise of transit vehicle should be included in the noise measurement of the source term. The reference speed should be within the range of 75% to 125% of the design speed (i.e., vehicle speed passing by the receiver). Ref: Table B.3 of HJ 2.4 - 2021 The source term of either 35kph or 60kph will be adopted, depending on the vehicle speed passing by the receiver.
n	Vehicle Frequency per hour per Direction	24 number during day and evening time periods (0700 – 2300 hours) 7 number during night-time period (2300 – 0700 hours)	Peak vehicle frequency of the corresponding time period. Final vehicle service frequency subject to the future operator.
t_{eq}	Equivalent pass by duration	$\frac{L}{v} \times \frac{\pi}{2\arctan\left(\frac{L}{2d}\right) + \frac{4dL}{4d^2 + L^2}}$	L = Car Length of the Transit System (40m) V = Vehicle speed passing by the receiver

Parameters		Assumptions	Remarks
			d = Distance to Transit Line Ref: Equation B.18 of HJ 2.4 - 2021
Correction Factors			
C_{Speed}	Speed Correction	K_s log (V / V_0) dB(A)	V = Vehicle speed passing by the receiver V_0 = Reference vehicle speed of source term (i.e., 35kph or 60kph) K_s = 20 for elevated line when 35kph≤V≤160kph K_s = 10 for elevated line when V<35kph Ref: Table B.3 of HJ 2.4 - 2021
$C_{Vert-Dir}$	Vertical Directivity Correction	For elevated line with no baffle structure (θ is based on 0.5 m horizontally above the track) - -2.5dB(A) if θ>50° $-0.0165(\theta-21.5°)^{1.5}$ dB(A) if 21.5°≤ θ ≤50° $-0.02(21.5°-\theta)^{1.5}$ dB(A) if -10°≤ θ≤21.5° -3.5 dB(A) if θ<-10°	θ = Horizontal angle between receiver and noise source (°) Ref: B.3.1 b(1) of HJ 2.4 - 2021
C_{Track}	Trackform Correction	+2dB(A) correction of the section with gradient at upslope >6‰ would be adopted.	Continuous track will be adopted for KTGTS. As SkyShuttle is a rubber-tire transit system with guide wheels and stabilizing wheels on both sides of the bogie (similar to "Straddle monorail transit"), the radius correction is considered not applicable to SkyShuttle with reference to B.3.1 c of HJ 2.4 - 2021. ART is a transit system of using rubber tyre and virtual track (i.e. without solid trackform) running on a road surface. Therefore, the trackform correction related to the traditional wheel/rail interaction is considered not applicable to ART. The gradient correction of upslope > 6‰ is adopted for both SkyShuttle and ART as conservative approach.

Parameters		Assumptions	Remarks
			Ref: Table B.4 of HJ 2.4 - 2021
$C_{Distance}$	Distance Correction	SkyShuttle $16log\frac{d}{d_0}$ ART $10log\frac{\frac{4L}{4d_0{}^2+L^2}+\frac{1}{d_0}\arctan(\frac{L}{2d_0})}{\frac{4L}{4d^2+L^2}+\frac{1}{d}\arctan(\frac{L}{2d})}$	d = Distance to the Transit Line d_0 = Reference vehicle distance of source term L = Car length of the transit system Ref: Table B.5 of HJ 2.4 - 2021
C_{Air}	Air Absorption Correction	$\frac{\alpha(r-r_0)}{1000}$	α = Atmospheric attenuation coefficient as per Table A.2 of HJ 2.4 - 2021 r = Distance to the Transit Line r_0 = Reference vehicle distance of source term Ref: A.3.2 of HJ 2.4 - 2021
$C_{Barrier}$	Barrier effect	$-10log\{10^{-0.1A'_{b0}}+10^{0.1[10log(1-NRC)-10log\frac{d_1}{d_0}-A'_{b1}]}\}$ Where A'_b is calculated by: $10log\frac{3\pi\sqrt{1-t^2}}{4arctan\sqrt{\frac{1-t}{1+t}}}$ if $t=\frac{40f\delta}{3c}\leq 1$ $10log\frac{3\pi\sqrt{t^2-1}}{2In\,t+\sqrt{t^2-1}}$ if $t=\frac{40f\delta}{3c}>1$	NRC = Noise Reduction Coefficient A'_{b0} = Attenuation provided by the diffraction edge A'_{b1} = Attenuation provided by the diffraction edge on the first order reflection d_0 = Distance between noise source and receiver d_1 = Distance between the reflected noise source and receiver f= sound frequency δ= path difference c= speed of sound Ref: B.3.1e of HJ 2.4 - 2021
C_{Ground}	Ground Correction	$4.8-(\frac{2h_m}{r})(17+\frac{300}{r})$	r = Distance to the Transit Line h_m = Mean height of propagation path above the ground Ref: A.3.3 of HJ 2.4 - 2021
C_{Hous}	Reflection including Multiple Reflection	Image source method	-

Parameters		Assumptions	Remarks
	and Façade Reflection		
Note - [1] – The source terms of SkyShuttle are referenced from the measurement report from EOI respondents during the EOI stage. The on-site measurement was conducted on a guide rail structure with loaded condition. The measurement result is converted to $L_{Aeq,Tp}$ by acoustic principles. Details are presented in **Appendix 4.5.** [2] – The source terms of ART are referenced from the measurement report from EOI respondents during the EOI stage. The on-site measurement was conducted on a concrete road surface with loaded condition. The measurement result is converted to $L_{Aeq,Tp}$ by acoustic principles. Details are presented in **Appendix 4.5**.			

Prediction and Evaluation of Transit Noise Impact

4.6.12 Based on the proposed assessment methodology and the assumptions above, the maximum transit noise levels for SkyShuttle and ART at the NAPs were predicted and are summarised in **Table 4.8** and **Table 4.9** . Details of results are presented in **Appendix 4.3**.

SkyShuttle

4.6.13 Based on the modelling results as shown in **Table 4.8** , the predicted noise levels for the operation of SkyShuttle would comply with the noise criteria with source terms not greater than that stipulated in **Table 4.7** .

Table 4.8 Summary of the Predicted Transit Noise Levels at the NAPs (Scenario: SkyShuttle)

NAP ID	ASR	Noise Criteria, dB(A)		Predicted Transit Noise Levels, dB(A)		Compliance [Y/N]	
		Day /Evening	Night	Day / Evening	Night	Day / Evening	Night
Planned NSRs							
PN01a	B	65	55	43 - 45	38 - 40	Y	Y
PN01b	B	65	55	42 - 43	37 - 38	Y	Y
PN02	B	65	55	39 - 41	33 - 36	Y	Y
PN03	B	65	55	45 - 50	39 - 44	Y	Y
PN04	B	65	55	45 - 48	40 - 43	Y	Y
PN05	B	65	55	42 - 44	37 - 39	Y	Y
PN06a	B	65	55	48	43	Y	Y
PN06b	B	65	55	48	42 - 43	Y	Y
PN06c	B	65	55	43 - 44	38	Y	Y
Existing NSRs							
CS-01	B	65	55	30 - 32	25 - 26	Y	Y
KLC-01	B	65	55	27 - 32	22 - 27	Y	Y
KT1-01	B	65	55	36 - 37	31	Y	Y

NAP ID	ASR	Noise Criteria, dB(A)		Predicted Transit Noise Levels, dB(A)		Compliance [Y/N]	
		Day /Evening	Night	Day / Evening	Night	Day / Evening	Night
KT1-02	B	65	55	36 - 37	31	Y	Y
OKT-01	B	65	55	38 - 39	33 - 34	Y	Y
UR-01	B	65	55	39 - 41	34 - 35	Y	Y
KS-01	B	65	55	40 - 42	34 - 37	Y	Y
TH-01	B	65	55	40 - 45	35 - 40	Y	Y
TH-02	B	65	55	41 - 46	35 - 40	Y	Y
HP-01	B	65	55	41 - 43	35 - 38	Y	Y
HP-02	B	65	55	41 - 44	36 - 38	Y	Y
KYC-01	B	65	55	36 - 39	31 - 34	Y	Y
TV-01	B	65	55	45 - 49	39 - 43	Y	Y
KM-01	B	65	55	45 - 47	39 - 42	Y	Y
PH-01	B	65	55	44 - 48	39 - 43	Y	Y
DC-01	B	65	55	44 - 47	39 - 42	Y	Y
OV-01	B	65	55	45 - 48	39 - 42	Y	Y
TK-01	B	65	55	45 - 46	39 - 41	Y	Y
CH-01	B	65	55	45 - 48	40 - 43	Y	Y
MQ-01	B	65	55	45 - 48	40 - 42	Y	Y
TPF-01	B	65	55	45 - 48	39 - 42	Y	Y

ART

4.6.14 Based on the modelling results as shown in **Table 4.9** , the predicted noise levels for the operation of ART would comply with the noise criteria with source terms not greater than that stipulated in **Table 4.7** .

Table 4.9 Summary of the Predicted Transit Noise Levels at the NAPs (Scenario: ART)

NAP ID	ASR	Noise Criteria, dB(A)		Predicted Transit Noise Levels, dB(A)		Compliance [Y/N]	
		Day /Evening	Night	Day / Evening	Night	Day / Evening	Night
Planned NSRs							
PN01a	B	65	55	51 - 54	45 - 48	Y	Y
PN01b	B	65	55	49 - 52	43 - 46	Y	Y
PN02	B	65	55	45 - 49	40 - 43	Y	Y

NAP ID	ASR	Noise Criteria, dB(A)		Predicted Transit Noise Levels, dB(A)		Compliance [Y/N]	
		Day /Evening	Night	Day / Evening	Night	Day / Evening	Night
PN03	B	65	55	53 - 60	48 - 55	Y	Y
PN04	B	65	55	53 - 59	48 - 53	Y	Y
PN05	B	65	55	49 - 53	44 - 47	Y	Y
PN06a	B	65	55	56	50 - 51	Y	Y
PN06b	B	65	55	54 - 55	49	Y	Y
PN06c	B	65	55	50	44 - 45	Y	Y
Existing NSRs							
CS-01	B	65	55	37 - 38	32 - 33	Y	Y
KLC-01	B	65	55	33 - 40	27 - 34	Y	Y
KT1-01	B	65	55	42 - 44	37 - 39	Y	Y
KT1-02	B	65	55	43 - 44	37 - 39	Y	Y
OKT-01	B	65	55	45 - 47	39 - 41	Y	Y
UR-01	B	65	55	46 - 48	41 - 43	Y	Y
KS-01	B	65	55	46 - 50	41 - 45	Y	Y
TH-01	B	65	55	47 - 54	42 - 49	Y	Y
TH-02	B	65	55	48 - 55	42 - 49	Y	Y
HP-01	B	65	55	48 - 52	42 - 47	Y	Y
HP-02	B	65	55	48 - 52	42 - 46	Y	Y
KYC-01	B	65	55	42 - 47	36 - 41	Y	Y
TV-01	B	65	55	53 - 59	48 - 54	Y	Y
KM-01	B	65	55	53 - 58	48 - 52	Y	Y
PH-01	B	65	55	52 - 58	47 - 53	Y	Y
DC-01	B	65	55	52 - 57	47 - 52	Y	Y
OV-01	B	65	55	53 - 58	48 - 53	Y	Y
TK-01	B	65	55	53 - 57	48 - 51	Y	Y
CH-01	B	65	55	54 - 59	49 - 54	Y	Y
MQ-01	B	65	55	53 - 58	48 - 53	Y	Y
TPF-01	B	65	55	52 - 57	47 - 51	Y	Y

4.6.15 From **Table 4.8** and **Table 4.9** , the assessment results indicated that the transit noise levels at the NAPs would comply with the noise criteria when transit system with source terms no greater than that stipulated in **Table 4.7** were adopted.

4.6.16 A Transit Noise Management Plan (TNMP) is recommended to be prepared and submitted to Director of Environmental Protection for approval during the detailed design stage. The TNMP should contain a quantitative transit noise impact assessment, accounting all latest design parameters including the source term and noise mitigation measures (if required) to ensure no NSR would be subject to the adverse transit noise impact.

Mitigation of the Transit Noise Impact

4.6.17 In case that exceedance is found during the TNMP stage, the following noise mitigation measures shall be considered in order to comply with the EIAO-TM as necessary:

- Adoption of low noise road surface (~ 2.5dB(A) reduction according to EPD's website[1]) to reduce noise level by absorbing tyre/road interaction noise or reducing tyre tread impact and shock noise for ART (i.e. not applicable to SkyShuttle)
- Installation of vehicle skirts and/or sound absorption materials at track side

4.6.18 Other mitigation measures for transit noise will be reviewed and provided in the TNMP during the detailed design stage if necessary. Should there be any change in design parameters and/or noise source terms in the later stage, noise mitigation measures shall also be proposed in TNMP for the compliance of EIAO-TM as necessary.

4.7 FIXED NOISE IMPACT ASSESSMENT

4.7.1 Based on the latest design, six stations, including a station cum depot, would be provided to support the transit system. The potential fixed noise sources have been identified below, subject to the updated information during the detailed design stage.

4.7.2 According to the preliminary design, all six stations will adopt an open-design and hence no centralized air conditioning systems will be required. The public address system (PA system) of stations will be designed to avoid directly facing the existing and planned NSRs. Mitigation measures such as using directional loudspeakers and setting limitation on upper bound of the output sound level shall be adopted when necessary. As such, adverse noise impact from the PA system is not anticipated.

4.7.3 The depot would be in the form of an enclosed building structure with a continuous concrete podium cover and concrete side walls / acoustic louvers. There would be no other opening except for the depot entrances, which are designed to avoid direct line of slight to the NSRs nearby. All maintenance activities would be carried out inside the depot, and hence no adverse noise impact from the maintenance activities is anticipated.

4.7.4 Majority of the Electrical and Mechanical (E&M) equipment such as water pumps, fire services pumps, emergency generator and lift machines will be installed inside plant rooms of the depot, which will thus be enclosed with acoustics louvres / silencer installed at the openings and ventilation outlets, where necessary. The air conditioning for the depot will be provided by the District Cooling System at Kai Tak Development and hence the noise of air-conditioning plants will be minimized. Only the small power split type or multi-split type outdoor units will be installed at the station for kiosk / back

[1] https://www.epd.gov.hk/epd/Innovative/greeny/eng/lnrs.html

of house. Thus, the noise impact from the air-conditioning system is considered to be insignificant.

4.7.5 Nevertheless, the potential fixed noise sources within this Project should be properly designed to meet the EIAO-TM noise standard (i.e. ANL -5 or prevailing background noise level, whichever lower). Provisions shall be made to control the fixed noise sources by suitable at source noise control measures such as quieter plant, silencers and acoustic linings when necessary. Details could be referenced to the "Good Practices on Ventilation System Noise Control" and "Good Practices on Pumping System Noise Control" issued by EPD.

4.7.6 Fixed Noise Management Plan (FNMP) should be prepared and submitted to the Director of Environmental Protection for approval during the detailed design stage. The FNMP should contain a quantitative fixed noise sources impact assessment, accounting all design measures including noise mitigation measures (if required) to ensure no NSR would be subject to adverse impact from the fixed noise sources of the Project, with fixed noise source impact monitoring and audit programme where necessary. The FNMP shall follow the principles mentioned in EIAO Guidance Note No. 16/2023 and in Annex 13 of the EIAO-TM.

4.8 ENVIRONMENTAL MONITORING AND AUDIT

Construction Noise

4.8.1 Environmental Monitoring and Audit (EM&A) is recommended during the construction phase of the Project to check compliance with the daytime construction noise criterion. A CNMP, which contains detailed quantitative construction noise assessment, noise mitigation measures, and construction noise monitoring and auditing programme, should be prepared and submitted to the Director of EPD before commencement of construction of the Project.

Transit Noise

4.8.2 Compliance check on transit noise against NCO criteria should be conducted before commencement of operation of the Project. A TNMP should be prepared and submitted to the Director of EPD for approval during the detailed design stage. Details of the EM&A programme are provided in a stand-alone EM&A Manual.

Fixed Noise

4.8.3 Adverse fixed noise impact arising from the operation phase of the Project is not anticipated based on the latest design of the stations and depot. A FNMP should be prepared and submitted to the Director of EPD for approval during the detailed design stage. With reference to the FNMP, verification of the noise performance of the fixed plants should be conducted before commencement of operation of the Project.

4.9 CONCLUSION

Construction Noise

4.9.1 Potential construction noise impact has been qualitatively assessed. Mitigation measures including good site practices, adoption of quieter construction method and equipment, QPME, deployment of construction noise barriers, noise insulating fabric and enclosure are recommended to minimize the potential construction noise impact to the NSRs. A CNMP, which contains quantitative construction noise impact assessment and practicality of all identified measures for mitigating the construction noise impact of the Project, would be prepared before the commencement of construction of the Project.

Transit Noise

4.9.2 Adverse transit noise impact is not anticipated as the predicted transit noise levels at the NSR would comply with the relevant noise criteria. A TNMP is recommended for conducting the transit noise impact assessment based on the detailed design of the Contracted Party during the detailed design stage.

Fixed Noise

4.9.3 Given that the potential fixed noise sources within this Project would be properly designed to meet the EIAO-TM noise standard, adverse fixed noise impact arising from the Project is not anticipated. A FNMP, which contains a quantitative fixed noise sources impact assessment, mitigation measures and monitoring and audit programme, should be submitted during the detailed design stage.

5 WATER QUALITY

5.1 INTRODUCTION

5.1.1 Water Quality Impact Assessment on construction and operation phases are presented and conducted in accordance with requirements described in Annexes 6 and 14 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and stated under Clause 3.4 of the EIA Study Brief (ESB-369/2024).

5.1.2 Appropriate mitigation measures are proposed to minimize potential water quality impacts.

5.2 ENVIRONMENTAL LEGISLATIONS, STANDARDS AND GUIDELINES

5.2.1 Relevant legislations, standards and guidelines governing water quality in Hong Kong include the following:

- Environmental Impact Assessment Ordinance (Cap. 499), Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM);
- Water Pollution Control Ordinance (WPCO) (Cap. 358);
- Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS);
- Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN 2/24);
- Practice Note for Professional Persons on Drainage Plans subject to Comments by Environmental Protection Department (ProPECC PN 1/23); and
- ETWB TCW No. 5/2005 Protection of Natural Streams/Rivers from Adverse Impacts Arising from Construction Works

Environmental Impact Assessment Ordinance (EIAO)

5.2.2 Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) was issued by EPD under Section 16 of the EIAO. The EIAO-TM specifies assessment methodologies and criteria that are to be followed in an EIA Study. Sections relevant to water quality impact assessment comprise:

- Annex 6 – Criteria for Evaluating Water Pollution
- Annex 14 – Guidelines for Assessment of Water Pollution

Water Pollution Control Ordinance (WPCO)

5.2.3 The WPCO provides the major statutory framework for the protection and control of water quality in Hong Kong. According to the WPCO and its subsidiary legislations, Hong Kong waters are divided into ten Water Control Zones (WCZs). Corresponding statements of Water Quality Objectives (WQOs) are stipulated for different water regimes (marine waters, inland waters, bathing beaches subzones, secondary contact recreation subzones and fish culture subzones) in each WCZ based on their beneficial uses.

5.2.4 This Project locates at the former Kai Tak Runway Area which falls within the Victoria Harbour WCZ (Phase Two) and is adjacent to Victoria Harbour WCZ (Phase One) and

Junk Bay WCZ. The Water Quality Objectives (WQOs) of the Victoria Harbour and Junk Bay WCZs are listed in **Table 5.1** and **Table 5.2** respectively.

Table 5.1 Water Quality Objectives for Victoria Harbour WCZ

Parameters	Objectives	Sub-Zone
Aesthetic Appearance	(a) There should be no objectionable odours or discolouration of the water.	Whole Zone
	(b) Tarry residues, floating wood, articles made of glass, plastic, rubber or of any other substances should be absent.	Whole Zone
	(c) Mineral oil should not be visible on the surface. Surfactants should not give rise to a lasting foam.	Whole Zone
	(d) There should be no recognisable sewage-derived debris.	Whole Zone
	(e) Floating, submerged and semi-submerged objects of a size likely to interfere with the free movement of vessels, or cause damage to vessels, should be absent.	Whole Zone
	(f) The water should not contain substances which settle to form objectionable deposits.	Whole Zone
Bacteria	The level of Escherichia coli should not exceed 1000 per 100 mL, calculated as the geometric mean of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days.	Inland waters
Colour	Waste discharges shall not cause the colour of water to exceed 50 Hazen units.	Inland waters
Dissolved Oxygen	(a) The level of dissolved oxygen should not fall below 4 mg per litre for 90% of the sampling occasions during the whole year; values should be calculated as the annual water column average (see Note). In addition, the concentration of dissolved oxygen should not be less than 2 mg per litre within 2 m of the seabed for 90% of the sampling occasions during the whole year.	Marine waters
	(b) The level of dissolved oxygen should not be less than 4 mg per litre.	Inland waters
pH	(a) The pH of the water should be within the range of 6.5–8.5 units. In addition, human activity should not cause the natural pH range to be extended by more than 0.2 unit.	Marine waters
	(b) Human activity should not cause the pH of the water to exceed the range of 6.0–9.0 units.	Inland waters
Temperature	Human activity should not cause the daily temperature range to change by more than 2.0°C.	Whole Zone
Salinity	Human activity should not cause the salinity level to change by more than 10%.	Whole Zone
Suspended Solids	(a) Human activity should neither cause the suspended solids concentration to be raised more than 30% nor give rise to accumulation of suspended solids which may adversely affect aquatic communities.	Marine waters
	(b) Human activity should not cause the annual median of suspended solids to exceed 25 mg per litre.	Inland waters

Parameters	Objectives	Sub-Zone
Ammonia	The un-ionized ammoniacal nitrogen level should not be more than 0.021 mg per litre, calculated as the annual average (arithmetic mean).	Whole Zone
Nutrients	(a) Nutrients should not be present in quantities sufficient to cause excessive or nuisance growth of algae or other aquatic plants.	Marine waters
	(b) Without limiting the generality of objective (a) above, the level of inorganic nitrogen should not exceed 0.4 mg per litre, expressed as annual water column average (see Note).	Marine waters
5-Day Biochemical Oxygen Demand	The 5-day biochemical oxygen demand should not exceed 5 mg per litre.	Inland waters
Chemical Oxygen Demand	The chemical oxygen demand should not exceed 30 mg per litre.	Inland waters
Toxic Substances	(a) Toxic substances in the water should not attain such levels as to produce significant toxic, carcinogenic, mutagenic or teratogenic effects in humans, fish or any other aquatic organisms, with due regard to biologically cumulative effects in food chains and to interactions of toxic substances with each other.	Whole Zone
	(b) Human activity should not cause a risk to any beneficial use of the aquatic environment.	Whole Zone

Source: Statement of Water Quality Objectives (Victoria Harbour (Phases One and Two) WCZ)

Note: Expressed normally as the arithmetic mean of at least 3 measurements at 1 m below surface, mid depth and 1 m above the seabed. However in water of a depth of 5 m or less the mean shall be that of 2 measurements (1 m below surface and 1 m above seabed), and in water of less than 3 m the 1 m below surface sample only shall apply.

Table 5.2 Water Quality Objectives for Junk Bay WCZ

Parameters	Objectives		Sub-Zone
Aesthetic Appearance	(a)	Waste discharges shall cause no objectionable odours or discolouration of the water.	Whole Zone
	(b)	Tarry residues, floating wood, articles made of glass, plastic, rubber or of any other substance should be absent.	Whole Zone
	(c)	Mineral oil should not be visible on the surface. Surfactants should not give rise to a lasting foam.	Whole Zone
	(d)	There should be no recognizable sewage-derived debris.	Whole Zone
	(e)	Floating, submerged and semi-submerged objects of a size likely to interfere with the free movement of vessels, or cause damage to vessels, should be absent.	Whole Zone
	(f)	Waste discharges shall not cause the water to contain substances which settle to form objectionable deposits.	Whole Zone
Bacteria	(a)	The level of Escherichia coli should not exceed 610 per 100 mL, calculated as the geometric mean of all samples collected in one calendar year.	Secondary Contact Recreation Subzone and Fish Culture Subzones *(L.N. 451 of 1991)*
	(b)	*(Repealed L.N. 451 of 1991)*	
	(c)	The level of Escherichia coli should not exceed 1 000 per 100 mL, calculated as the running median of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days. *(E.R. 5 of 2024)*	Inland waters
Colour	Waste discharges shall not cause the colour of water to exceed 50 Hazen units.		Inland waters
Dissolved Oxygen	(a)	Waste discharges shall not cause the level of dissolved oxygen to fall below 4 mg per litre for 90% of the sampling occasions during the year; values should be calculated as the water column average (arithmetic mean of at least 3 measurements at 1 m below surface, mid-depth and 1 m above seabed). In addition, the concentration of dissolved oxygen should not be less than 2 mg per litre within 2 m of the seabed for 90% of the sampling occasions during the year.	Marine waters excepting Fish Culture Subzones
	(b)	The dissolved oxygen level should not be less than 5 mg per litre for 90% of the sampling occasions during the year; values should be calculated as water column average (arithmetic mean of at least 3 measurements at 1 m below surface, mid-depth and 1 m above seabed). In addition, the concentration of dissolved oxygen should not be less than 2 mg per litre within 2 m of the seabed for 90% of the sampling occasions during the year.	Fish Culture Subzones

Parameters	Objectives	Sub-Zone
	(c) Waste discharges shall not cause the level of dissolved oxygen to be less than 4 mg per litre.	Inland waters
pH	(a) The pH of the water should be within the range of 6.5-8.5 units. In addition, waste discharges shall not cause the natural pH range to be extended by more than 0.2 units.	Marine waters *(L.N. 451 of 1991)*
	(b) *(Repealed L.N. 451 of 1991)*	
	(c) The pH of the water should be within the range of 6.0-9.0 units.	Inland waters
Temperature	Waste discharges shall not cause the natural daily temperature range to change by more than 2.0°C.	Whole Zone
Salinity	Waste discharges shall not cause the natural ambient salinity level to change by more than 10%.	Whole Zone
Suspended Solids	(a) Waste discharges shall neither cause the natural ambient level to be raised by 30% nor give rise to accumulation of suspended solids which may adversely affect aquatic communities.	Marine waters
	(b) Waste discharges shall not cause the annual median of suspended solids to exceed 25 mg per litre.	Inland waters
Ammonia	The ammonia nitrogen level should not be more than 0.021 mg per litre, calculated as the annual average (arithmetic mean), as unionized form.	Whole Zone
Nutrients	(a) Nutrients shall not be present in quantities sufficient to cause excessive or nuisance growth of algae or other aquatic plants.	Marine waters
	(b) Without limiting the generality of objective (a) above, the level of inorganic nitrogen should not exceed 0.3 mg per litre, expressed as annual water column average (arithmetic mean of at least 3 measurements at 1 m below surface, mid-depth and 1 m above seabed).	Marine waters
5-Day Biochemical Oxygen Demand	Waste discharges shall not cause the 5-day biochemical oxygen demand to exceed 5 mg per litre.	Inland waters
Chemical Oxygen Demand	Waste discharges shall not cause the chemical oxygen demand to exceed 30 mg per litre.	Inland waters
Dangerous Substances	(a) Waste discharges shall not cause the concentrations of dangerous substances in the water to attain such levels as to produce significant toxic effects in humans, fish or any other aquatic organisms, with due regard to biologically cumulative effects in food chains and to toxicant interactions with each other.	Whole Zone
	(b) Waste discharges of dangerous substances shall not put a risk to any beneficial uses of the aquatic environment.	Whole Zone

Source: Statement of Water Quality Objectives (Junk Bay Water Control Zone)

Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters

5.2.5 Besides setting the WQOs, the WPCO controls effluent discharging into the WCZs through a licensing system. This gives guidance on the permissible effluent discharges

based on the type of receiving waters (foul sewer, stormwater drains, inland and coastal waters). The standards control the physical, chemical and microbial quality of effluents. Any sewage from the proposed construction and operation activities must comply with the standards for effluents discharged into the foul sewers, inland waters and coastal waters of Victoria Harbour WCZ (Phase Two), as stipulated in the TM-DSS.

Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN 2/24)

5.2.6 A practice note for professional persons was issued by the EPD to provide guidelines for handling and disposal of construction site discharges. This Practice Note provides good practice guidelines for dealing with various types of discharge from a construction site. Practices outlined in ProPECC PN 2/24 should be followed as far as possible during construction to minimise the water quality impact due to construction site drainage.

Practice Note for Professional Persons on Drainage Plans subject to Comments by Environmental Protection Department (ProPECC PN 1/23)

5.2.7 The ProPECC PN 1/23 on Drainage Plans subject to Comments by Environmental Protection Department provides guidelines and practices for handling, treatment and disposal of various effluent discharges to stormwater drains and foul sewers.

Environment, Transport and Works Bureau Technical Circular (Works) No. 5/2005 Protection of natural streams/rivers from adverse impacts arising from construction works

5.2.8 The Technical Circular (Works) No. 5/2005 provides an administrative framework to better protect natural streams/river from the impact of construction works. The procedures promulgated under this Circular aim to clarify and strengthen existing measures for protection of natural streams/rivers from government projects and private developments.

5.3 DESCRIPTION OF BASELINE CONDITIONS

Baseline Marine Water Quality in Victoria Harbour and Junk Bay

5.3.1 The WPCO provides the statutory framework for the protection and control of water quality in Hong Kong. Hong Kong waters were divided into ten major Water Control Zones (WCZs) according to the WPCO and its subsidiary legislations. In each Water Control Zone (WCZ), a set of Water Quality Objectives (WQOs) were designated to maintain the water quality within the WCZ.

5.3.2 This Project Site, located at the former Kai Tak Runway, shall fall into the Victoria Harbour (Phase Two) WCZ, which lies adjacent to the Victoria Harbour (Phase One) WCZ and Junk Bay WCZ.

5.3.3 According to the Marine Water Quality in Hong Kong in 2023, which is the latest available information from the EPD, the Victoria Harbour WCZ in 2023 attained an overall WQOs compliance rate of 100%, with E.coli levels in the eastern and central parts of Victoria Harbour decreased noticeably since the implementation of HATS Stage 1 in 2001 and Stage 2A in 2015 respectively; while Junk Bay WCZ has achieved an overall WQOs compliance rate of 100% for the past 24 years.

5.3.4 Marine water quality monitoring data routinely collected by the EPD was used to establish the baseline conditions for this Project. EPD Marine Water Monitoring Stations within the Victoria Harbour (Phase One and Phase Two) WCZ and Junk Bay

WCZ closest to the Project Site were identified. Water Quality Objectives (WQOs) of those water monitoring station in Victoria Harbour WCZ and Junk Bay WCZ are shown in **Table 5.3** and **Table 5.4** respectively.

Table 5.3 Marine Water Quality in Victoria Harbour (Phase One and Phase Two) WCZ in Year 2023

Parameter		Victoria Harbour (East)		Victoria Harbour (Central)	WPCO WQO (in marine waters)
		VM1	VM2	VM4	
Temperature (°C)		23.8 (18.2 - 29.2)	24.1 (18.2 - 29.1)	24.2 (18.2 - 29.3)	Not more than 2℃ in daily temperature range
Salinity		32.7 (31.8 - 33.6)	32.4 (31.2 - 33.5)	31.8 (27.3 - 33.5)	Not to cause change by more than 10%
Dissolved Oxygen (DO) (mg/L)	Depth-averaged	5.8 (4.0 - 6.9)	6.5 (4.0 – 8.0)	6.2 (3.9 - 9.4)	Not less than 4 mg/L for 90% of the samples
	Bottom	5.9 (3.5 - 7.4)	5.5 (3.7 – 7.2)	5.6 (3.7 - 8.5)	Not less than 2 mg/L for 90% of the samples
Dissolved Oxygen (DO) (% Saturation)	Depth-averaged	82 (60 - 91)	92 (61 - 118)	88 (58 - 129)	Not available
	Bottom	83 (51 - 97)	78 (55 - 94)	79 (55 - 121)	Not available
pH		7.7 (7.3 - 8.0)	7.7 (7.1 - 8.1)	7.6 (7.1 - 8.1)	6.5 - 8.5 (± 0.2 from natural range)
Secchi Disc Depth (m)		2.9 (2.1 - 3.8)	2.8 (2.2 - 4.3)	2.7 (1.8 - 4.3)	Not available
Turbidity (NTU)		8.4 (1.6 - 54.7)	10.5 (1.9 - 78.2)	9.7 (1.8 - 72.4)	Not available
Suspended Solids (SS) (mg/L)		6 (1.4 - 11.7)	5.5 (2.3 - 8.7)	5.4 (3.0 - 9.5)	Not more than 30% increase
5-day Biochemical Oxygen Demand (BOD_5) (mg/L)		0.3 (0.1 - 0.7)	0.4 (<0.1 - 0.7)	0.4 (<0.1 - 0.8)	Not available
Ammonia Nitrogen (mg/L)		0.06 (0.032 - 0.092)	0.097 (0.041 - 0.180)	0.116 (0.033 - 0.217)	Not available
Unionised Ammonia (UIA) (mg/L)		0.002 (<0.001 - 0.005)	0.003 (<0.001 - 0.007)	0.003 (<0.001 - 0.010)	Annual mean not to exceed 0.021 mg/L
Nitrite Nitrogen (mg/L)		0.017 (0.004 - 0.032)	0.023 (0.009 - 0.038)	0.024 (0.008 - 0.042)	Not available
Nitrate Nitrogen (mg/L)		0.067 (0.029 - 0.127)	0.098 (0.051 - 0.150)	0.101 (0.028 - 0.183)	Not available
Total Inorganic Nitrogen (TIN) (mg/L)		0.14 (0.08 - 0.20)	0.22 (0.13 - 0.34)	0.24 (0.08 - 0.42)	Annual mean depth-averaged TIN not to exceed 0.4 mg/L
Total Kjeldahl Nitrogen (mg/L)		0.44 (0.18 - 0.92)	0.45 (0.21 - 0.75)	0.45 (0.22 - 0.77)	Not available
Total Nitrogen (mg/L)		0.53 (0.25 - 1.05)	0.57 (0.27 - 0.90)	0.57 (0.28 - 0.99)	Not available
Orthophosphate Phosphorus (mg/L)		0.009 (<0.002 - 0.018)	0.015 (0.007 - 0.025)	0.013 (<0.002 - 0.030)	Not available
Total Phosphorus (mg/L)		0.06 (0.04 - 0.09)	0.06 (0.05 - 0.10)	0.07 (0.05 - 0.10)	Not available

Parameter	Victoria Harbour (East)		Victoria Harbour (Central)	WPCO WQO (in marine waters)
	VM1	VM2	VM4	
Silica (as SiO_2) (mg/L)	0.72 (0.21 - 1.27)	0.77 (0.20 - 1.53)	0.83 (0.29 - 1.70)	Not available
Chlorophyll-*a* (µg/L)	1.7 (0.3 - 5.2)	1.8 (0.3 - 5.3)	1.7 (0.5 - 5.6)	Not available
E. coli (count/100ml)	150 (40 - 1100)	180 (52 - 1000)	250 (46 - 1000)	Not available
Faecal Coliforms (count/100ml)	320 (100 - 3000)	430 (96 - 3500)	670 (120 - 2500)	Not available

Note:
(1) Data source: marine water quality in Hong Kong in 2023 (EPD).
(2) Except as specified, data presented are depth-averaged values calculated by taking the means of three depths: surface, mid-depth, bottom.
(3) Data presented are annual arithmetic means of the depth-averaged results except for *E. Coli.* and faecal coliforms which are annual geometric means.
(4) Data in brackets indicate the ranges.

Table 5.4 Marine Water Quality in Junk Bay WCZ in Year 2023

Parameter		Junk Bay		WPCO WQO (in marine waters)
		JM3	JM4	
Temperature (°C)		23.9 (17.7 - 29.8)	23.6 (17.8 - 29.4)	Not more than 2°C in daily temperature range
Salinity		32.4 (30.6 - 33.5)	32.8 (32.1 - 33.6)	Not to cause change by more than 10%
Dissolved Oxygen (DO) (mg/L)	Depth-averaged	6.8 (4.9 – 9.8)	6.2 (5.0 - 7.5)	Not less than 4 mg/L for 90% of the samples
	Bottom	6.3 (4.0 - 11.6)	5.8 (3.5 - 7.9)	Not less than 2 mg/L for 90% of the samples
Dissolved Oxygen (DO) (% Saturation)	Depth-averaged	97 (78 - 148)	88 (74 - 100)	Not available
	Bottom	90 (63 - 176)	81 (50 - 101)	Not available
pH		7.7 (7.1 - 8.1)	7.7 (7.1 - 8.1)	6.5 - 8.5 (± 0.2 from natural range)
Secchi Disc Depth (m)		2.7 (2.0 - 3.9)	2.8 (1.8 - 3.6)	Not available
Turbidity (NTU)		6.5 (1.0 - 35.8)	4.1 (1.6 - 13.3)	Not available
Suspended Solids (SS) (mg/L)		5.0 (1.6 - 9.2)	5.3 (1.9 - 11.3)	Not more than 30% increase
5-day Biochemical Oxygen Demand (BOD_5) (mg/L)		0.5 (0.3 - 1.2)	0.4 (0.3 - 0.7)	Not available
Ammonia Nitrogen (mg/L)		0.059 (0.033 - 0.098)	0.056 (0.026 - 0.107)	Not available
Unionised Ammonia (UIA) (mg/L)		0.001 (<0.001 - 0.003)	0.001 (<0.001 - 0.003)	Annual mean not to exceed 0.021 mg/L
Nitrite Nitrogen (mg/L)		0.018 (0.006 - 0.043)	0.019 (0.003 - 0.046)	Not available
Nitrate Nitrogen (mg/L)		0.083 (0.030 - 0.177)	0.080 (0.013 - 0.210)	Not available
Total Inorganic Nitrogen (TIN) (mg/L)		0.16 (0.10 - 0.28)	0.15 (0.06 - 0.35)	Annual mean depth-averaged TIN not to exceed 0.3 mg/L
Total Kjeldahl Nitrogen (mg/L)		0.45 (0.16 - 0.79)	0.45 (0.15 - 0.74)	Not available

Parameter	Junk Bay		WPCO WQO (in marine waters)
	JM3	JM4	
Total Nitrogen (mg/L)	0.55 (0.24 - 0.88)	0.55 (0.21 - 0.93)	Not available
Orthophosphate Phosphorus (mg/L)	0.010 (<0.002 - 0.019)	0.013 (0.006 - 0.023)	Not available
Total Phosphorus (mg/L)	0.06 (0.05 - 0.12)	0.06 (0.04 - 0.08)	Not available
Silica (as SiO_2) (mg/L)	0.60 (0.19 - 1.23)	0.63 (0.17 - 1.23)	Not available
Chlorophyll-*a* (µg/L)	3.3 (0.3 - 10.4)	2.7 (0.3 - 9.5)	Not available
E. coli (count/100ml)	67 (5 - 360)	84 (5 - 360)	Not available
Faecal Coliforms (count/100ml)	170 (8 - 850)	190 (10 - 1000)	Not available

Note:
(1) Data source: marine water quality in Hong Kong in 2023 (EPD).
(2) Except as specified, data presented are depth-averaged values calculated by taking the means of three depths: surface, mid-depth, bottom.
(3) Data presented are annual arithmetic means of the depth-averaged results except for *E. Coli.* and faecal coliforms which are annual geometric means.
(4) Data in brackets indicate the ranges.

Baseline Marine Water Quality at various Typhoon Shelters

5.3.5 Likewise, Marine Water Monitoring Stations in typhoon shelters found in the vicinity of the Project Site are To Kwa Wan (VT11), Kwun Tong (VT4) and Sam Ka Tsuen (VT3) Typhoon Shelters, with respective measured Water Quality detailed in **Table 5.5.**

Table 5.5 Marine Water Quality at various Typhoon Shelters in Year 2023

Parameter		To Kwa Wan Typhoon Shelter	Kwun Tong Typhoon Shelter	Sam Ka Tsuen Typhoon Shelter	WPCO WQO
		VT11	VT4	VT3	
Temperature (°C)		24.1 (17.0 - 28.7)	24.2 (17.7 - 28.1)	24.0 (17.0 - 28.5)	Not more than 2°C in daily temperature range
Salinity		30.5 (25.1 - 33.3)	29.2 (24.1 - 32.9)	30.3 (23.6 - 33.6)	Not to cause change by more than 10%
Dissolved Oxygen (DO) (mg/L)	Depth-averaged	6.9 (4.3 - 7.9)	7.0 (2.8 – 9.2)	7.4 (3.5 – 9.4)	Not less than 4 mg/L for 90% of the samples
	Bottom	6.7 (4.5 - 7.8)	8.0 (3.9 – 10.6)	7.9 (4.0 – 9.8)	Not less than 2 mg/L for 90% of the samples
Dissolved Oxygen (DO) (% Saturation)	Depth-averaged	98 (64 - 117)	98 (42 - 133)	105 (53 - 129)	Not available
	Bottom	95 (67 - 117)	114 (59 - 155)	114 (60 - 145)	Not available
pH		7.8 (7.2 - 8.3)	7.8 (7.6 - 8.1)	7.8 (7.3 - 8.3)	6.5 - 8.5 (± 0.2 from natural range)
Secchi Disc Depth (m)		2.1 (1.5 - 3.2)	2.1 (1.6 - 2.8)	2.6 (2.0 - 3.8)	Not available
Turbidity (NTU)		5.9 (0.8 - 17.0)	3.0 (1.3 - 4.1)	3.0 (1.0 - 4.5)	Not available

Parameter	To Kwa Wan Typhoon Shelter	Kwun Tong Typhoon Shelter	Sam Ka Tsuen Typhoon Shelter	WPCO WQO
	VT11	VT4	VT3	
Suspended Solids (SS) (mg/L)	14.3 (4.5 - 47.3)	4.2 (3.0 - 7.3)	4.0 (1.9 - 5.6)	Not more than 30% increase
5-day Biochemical Oxygen Demand (BOD_5) (mg/L)	1.1 (0.5 - 2.2)	1.7 (0.6 - 2.2)	1.1 (0.2 - 1.8)	Not available
Ammonia Nitrogen (mg/L)	0.091 (0.040 - 0.150)	0.581 (0.157 - 1.490)	0.074 (0.052 - 0.135)	Not available
Unionised Ammonia (UIA) (mg/L)	0.003 (<0.001 - 0.008)	0.015 (0.004 - 0.029)	0.003 (<0.001 - 0.006)	Annual mean not to exceed 0.021 mg/L
Nitrite Nitrogen (mg/L)	0.025 (0.012 - 0.039)	0.258 (0.077 - 0.570)	0.021 (0.010 - 0.038)	Not available
Nitrate Nitrogen (mg/L)	0.141 (0.097 - 0.223)	0.884 (0.217 - 1.530)	0.122 (0.066 - 0.205)	Not available
Total Inorganic Nitrogen (TIN) (mg/L)	0.26 (0.17 - 0.36)	1.72 (0.61 - 3.41)	0.22 (0.15 - 0.31)	Annual mean depth-averaged TIN not to exceed 0.4 mg/L
Total Kjeldahl Nitrogen (mg/L)	0.47 (0.24 - 0.72)	1.02 (0.37 - 1.77)	0.52 (0.14 - 0.85)	Not available
Total Nitrogen (mg/L)	0.64 (0.36 - 0.88)	2.17 (0.83 - 3.68)	0.66 (0.26 - 0.97)	Not available
Orthophosphate Phosphorus (mg/L)	0.011 (<0.002 - 0.018)	0.230 (0.048 - 0.440)	0.009 (<0.002 - 0.017)	Not available
Total Phosphorus (mg/L)	0.08 (0.05 - 0.13)	0.34 (0.17 - 0.57)	0.08 (0.06 - 0.10)	Not available
Silica (as SiO_2) (mg/L)	0.50 (0.09 - 0.98)	2.57 (0.74 - 4.23)	0.52 (0.13 - 1.15)	Not available
Chlorophyll-*a* (µg/L)	9.3 (0.8 - 29.0)	9.9 (0.9 - 16.0)	7.5 (0.5 - 25.0)	Not available
E. coli (count/100ml)	290 (10 - 1300)	940 (230 - 14000)	950 (170 - 7900)	Not available
Faecal Coliforms (count/100ml)	600 (46 - 2200)	2200 (580 - 34000)	1800 (310 - 12000)	Not available

Note:
(1) Data source: marine water quality in Hong Kong in 2023 (EPD).
(2) Except as specified, data presented are depth-averaged values calculated by taking the means of three depths: surface, mid-depth, bottom.
(3) Data presented are annual arithmetic means of the depth-averaged results except for *E. Coli.* and faecal coliforms which are annual geometric means.
(4) Data in brackets indicate the ranges.

Baseline River Water Quality

5.3.6 The Project Site lies across the Kai Tak River, of which five river monitoring stations (KN1, KN2, KN3, KN4 and KN5) along the river falls within the 500-m assessment area of the Project Site. The latest river water quality data reported in the Annual River Water Quality Report are presented in **Table 5.6**.

5.3.7 Kai Tak River achieved high WQO compliance rates in 2023, at 81%. Two of the five river monitoring station, KN2 and KN5, received 'Good' Water Quality Index grading; while "Fair" Water Quality Index grading was achieved at the remaining stations, including KN1, KN3 and KN4.

Table 5.6 River Water Quality Monitoring Data along Kai Tak River in Year 2023

Parameter	Water Quality Objectives (WQOs)	Kai Tak River				
		KN1	KN2	KN3	KN4	KN5
Dissolved Oxygen (mg/L)	≥ 4	4.7 (3.4 - 5.3)	6.0 (5.1 - 6.6)	6.2 (5.5 - 6.9)	6.6 (5.8 - 7.5)	7.1 (6.4 - 8.0)
pH	6.0 - 9.0	7.2 (7.1 - 7.5)	7.3 (7.2 - 7.5)	7.3 (7.2 - 7.4)	7.2 (7.0 - 7.4)	7.2 (7.0 - 7.4)
Suspended Solids (SS) (mg/L)	≤ 25	3.5 (0.9 - 37.0)	3.4 (1.6 - 7.5)	4.9 (3.5 - 20.0)	9.9 (1.6 - 24.0)	10.5 (7.6 - 39.0)
5-day Biochemical Oxygen Demand (BOD_5) (mg/L)	≤ 5	1.8 (1.0 - 4.1)	3.6 (2.3 - 7.4)	4.5 (3.5 - 9.2)	7.0 (2.1 - 20.0)	6.7 (2.9 - 15.0)
Chemical Oxygen Demand (mg/L)	≤ 30	21 (9 - 40)	29 (12 - 46)	35 (19 - 54)	34 (14 - 66)	36 (18 - 55)
Oil & Grease (mg/L)	-	<0.5 (<0.5 - <0.5)	<0.5 (<0.5 - <0.5)	<0.5 (<0.5 - <0.5)	<0.5 (<0.5 - <0.5)	<0.5 (<0.5 - <0.5)
E. coli. (count/100ml)	-	29 295 (6 000 - 120 000)	26 903 (5 800 - 250 000)	32 382 (8 000 - 380 000)	20 184 (5 600 - 180 000)	14 915 (3 300 - 190 000)
Faecal Coliforms (count/100ml)	-	97 265 (11 000 - 480 000)	71 946 (15 000 - 800 000)	78 645 (22 000 - 1 000 000)	51 752 (16 000 - 370 000)	34 736 (9 000 - 380 000)
Ammonia-Nitrogen (mg/L)	-	1.750 (0.790 - 6.500)	1.950 (0.540 - 7.200)	1.800 (0.560 - 7.700)	1.550 (0.410 - 7.100)	1.075 (0.350 - 6.200)
Nitrate Nitrogen (mg/L)	-	2.300 (0.940 - 3.900)	3.050 (1.700 - 4.500)	3.150 (1.900 - 4.700)	3.550 (2.200 - 4.900)	3.850 (2.200 - 5.400)
Total Kjeldahl Nitrogen (mg/L)	-	2.40 (1.70 - 7.40)	2.90 (1.20 - 7.50)	2.85 (1.30 - 11.00)	2.40 (1.70 - 8.30)	3.15 (1.10 - 8.30)
Orthophosphate Phosphorus (mg/L)	-	0.680 (0.210 - 2.500)	0.810 (0.410 - 2.500)	0.825 (0.400 - 2.400)	0.785 (0.360 - 1.800)	0.785 (0.330 - 1.400)
Total Phosphorus (mg/L)	-	0.81 (0.27 - 3.50)	0.98 (0.44 - 3.70)	1.03 (0.43 - 3.80)	0.98 (0.53 - 2.70)	0.99 (0.51 - 6.40)
Sulphide (mg/L)	-	<0.02 (<0.02 - <0.02)	<0.02 (<0.02 - <0.02)	<0.02 (<0.02 - <0.02)	<0.02 (<0.02 - 0.03)	<0.02 (<0.02 - <0.02)
Aluminum (µg/L)	-	<50 (<50 - <50)	<50 (<50 - <50)	<50 (<50 - <50)	<50 (<50 - <50)	<50 (<50 - <50)
Cadmium (µg/L)	-	<0.1 (<0.1 - <0.1)	<0.1 (<0.1 - <0.1)	<0.1 (<0.1 - <0.1)	<0.1 (<0.1 - <0.1)	<0.1 (<0.1 - <0.1)
Chromium (µg/L)	-	1 (<1 - 2)	1 (<1 - 2)	<1 (<1 - 2)	<1 (<1 - 2)	1 (<1 - 2)
Copper (µg/L)	-	2 (2 - 3)	2 (1 - 3)	2 (2 - 3)	2 (1 - 3)	2 (1 - 4)
Lead (µg/L)	-	<1 (<1 - <1)	<1 (<1 - <1)	<1 (<1 - <1)	<1 (<1 - <1)	<1 (<1 - <1)
Zinc (µg/L)	-	10 (<10 - 20)	10 (<10 - 20)	10 (<10 - 30)	10 (10 - 20)	10 (10 - 30)
Flow (m^3/s)	-	NM	NM	NM	NM	11.824 (5.984 - 22.950)

Notes:
(1) Data source: EPD River Water Quality in Hong Kong in 2023.
(2) Data presented are in annual medians of monthly samples; except those for faecal coliforms and E. Coli. which are in annual geometric means
(3) Figures in brackets are annual ranges
(4) NM indicate no measurement taken.
(5) Values at or below laboratory reporting limits are presented as laboratory reporting limits
(6) Equal values for annual median (or geometric means) and ranges indicate that all data are the same as or below laboratory reporting limits

5.4 REPRESENTATIVE WATER SENSITIVE RECEIVERS

5.4.1 The Project will include the construction and operation of approximately 3.5km long elevated smart and green mass transit system from Kai Tak Cruise Terminal to the existing MTR Kai Tak (KAT) Station at Kai Tak Station Square, and an elevated transit depot at two commercial development sites, namely Kai Tak Area 4C Sites 4 and 5 and spanning across the existing Shing King Street. Any discharge from the Project works during construction and operation phases would affect the surrounding waterbodies. Water Quality Impact Assessment has been carried out in the assessment area, particularly the Victoria Harbour WCZ and Kai Tai River.

5.4.2 The assessment area for Water Quality Impact Assessment is 500 metres from the Site Boundary, in which representative Water Sensitive Receivers (WSRs) were identified. Descriptions of the representative WSRs are summarised in **Table 5.7**, with main elements, including project boundary, 500-assessment area and identified WSRs, taken into account in this Water Quality Impact Assessment indicated in **Figure 5.1**.

Table 5.7 Representative Water Sensitive Receivers

ID	Type	Description	Estimated Distance from Project Site
VT11 / VS20	Typhoon Shelter	To Kwa Wan Typhoon Shelter	310 m
VT4 / VS14	Typhoon Shelter	Kwun Tong Typhoon Shelter	390 m
WSR01	Cooling Water Intake	DCS Intake at Kai Tak Approach Channel (KTAC)	120 m
WSR02	Channelised watercourse	Kai Tak River	Overlapping with proposed works area

5.5 EVALUATION OF WATER QUALITY IMPACTS

5.5.1 Qualitative water quality impact assessment is adopted for this Project as no riverbed / river training / marine works will be carried out under the Project's scopes while potential land-based pollutant exposures from construction, such as viaduct, stations and depot, etc., would be sufficiently mitigated by best management practices and mitigation measures in water quality. Details of the assessment are presented below.

Identification of Potential Construction Phase Impacts

5.5.2 Potential sources of water quality impact associated with construction activities for the Project include(s):

- Construction site runoff;
- General construction activities;
- Accidental spillage of chemicals;
- Construction works in close proximity of inland watercourses; and,
- Sewage effluent from the construction workforce.

Construction Site Runoff

5.5.3 The surface runoff from construction works areas may contain increased loads of suspended solids (SS) and contaminants. Potential sources of pollution from construction site drainage include:

- Runoff and erosion from site surfaces, drainage channels, demolition works, earth working areas and stockpiles;
- Release of any bentonite slurries, concrete washings and other grouting activities;
- Wash water from dust suppression spray facilities; and
- Fuel, oil, solvents and lubricants from maintenance of mechanical equipment.

5.5.4 Sediment laden runoff particularly from works areas subjected to excavation or earthworks, if uncontrolled, may cause increased levels of suspended solids and pollutants entering the stormwater drainage system and into the marine environment.

5.5.5 During rainstorm, stormwater runoff from the construction site may be resulted.

General Construction Activities

5.5.6 On-site construction activities may result in water pollution from uncontrolled discharge of debris and rubbish such as packaging, construction materials, chemicals and refuse. Good construction and site management practices should be observed to ensure that litter, fuels and solvents do not enter the drainage system and marine environment.

5.5.7 With proper implementation of the good construction and site management practices, water pollution arising from the general on-site construction activities can be prevented, and water quality impacts would not be anticipated.

Accidental Spillage of Chemicals

5.5.8 A large variety of chemicals may be used during construction activities. These may include petroleum products, surplus adhesives, spent lubrication oil, grease and mineral oil, spent acid and alkaline solutions/solvent and other chemicals. The use of these chemicals and their storage as waste materials has the potential to create impacts on the water quality of adjacent watercourses or storm drains if spillage occurs. Waste oil may infiltrate into the surface soil layer, or runoff into local watercourses, increasing hydrocarbon levels. The potential impact could however be mitigated by practical mitigation measures and good site practices.

Construction works in close proximity of inland watercourses

5.5.9 Construction works in close proximity of inland watercourses, including the proposed viaducts built across the Kai Tak River at Kai Tak Station Square without encroachment to riverbed anticipated. Piling works and construction of pier performed on the riverbank of Kai Tak River require temporary working platform built above waterbody of Kai Tak River for construction of viaduct, and access of the construction site located on the west side of Kai Tak River, etc. It may pollute the inland waters due to potential release of construction wastes, wastewater and runoff, which commonly contain high SS levels with elevated pH. Good housekeeping and mitigation measures should be adopted to reduce generation of construction wastes and potential water pollution. Control of runoff and drainage from construction works adjacent to the inland water should also be implemented to prevent high levels of SS from entering the aquatic environment. With implementation of the recommended mitigation measures along with compliance of the effluent standards set under TM-DSS, construction

wastewater and site runoff can be effectively controlled, thus, adverse impacts to storm drains or the marine environment will not be anticipated.

Sewage Effluent from the Construction Workforce

5.5.10 During the construction of the Project, the workforce on site will generate sewage effluents, which are characterised by high levels of BOD, ammonia and E.coli counts. Potential water quality impacts upon the local drainage and freshwater system may arise from these sewage effluents, if uncontrolled.

5.5.11 The construction sewage should be handled by interim sewage treatment facilities, such as portable chemical toilets. Appropriate numbers of portable toilets should be provided by a licensed contractor to serve the large number of construction workers over the construction site. Provided that sewage is not discharged directly into the storm drains or watercourses adjacent to the construction site, and temporary sanitary facilities are used and properly maintained as mentioned above, it is unlikely that sewage generated from the Site would have a significant water quality impact.

Mitigation Measures for Construction Phase

Construction Site Runoff

5.5.12 The good site practices outlined in ProPECC PN 2/24 should be followed as far as practicable in order to minimise surface runoff and erosion, and also to retain and reduce any SS prior to discharge. The following measures are recommended to protect water quality:

- Surface run-off from construction sites should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sedimentation basins. Channels or earth bunds or sandbag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Perimeter channels at site boundaries should be provided on site boundaries where necessary to inte-cept storm run-off from outside the Site so that it will not wash across the Site. Catch-pits and perimeter channels should be constructed in advance of site formation works and earthworks.
- Silt removal facilities, channels and manholes should be maintained, and the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to prevent local flooding.
- Construction works should be programmed to minimise soil excavation works in rainy seasons (April to September). If excavation in soil cannot be avoided in these months or at any time of year when rainstorms are likely, for the purpose of preventing soil erosion, temporary exposed slope surfaces should be covered, e.g., by tarpaulin, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds.
- Earthworks final surfaces should be well compacted, and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary.
- Measures should be taken to minimise the ingress of rainwater into trenches. If excavation of trenches in wet seasons is necessary, they should be dug and backfilled in short sections. Rainwater pumped out from trenches or foundation excavations should be discharged into storm drain via silt removal facilities.

- Open stockpiles of construction materials (e.g., aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms.
- Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers. Manholes and intake chambers are recommended to design in accordance with the Drainage Imeact Assessment (DIA) that enhance the ability to trash separation. Discharge of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system. Regular inspection and maintenance to the manholes should be implemented. Debris and trash should be removed from the manholes regularly.
- Bentonite slurries should be reconditioned and reused wherever practicable. Temporary storage locations (typically a properly closed warehouse) should be provided on site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC PN 2/24 should be adhered to in the handling and disposal of bentonite slurries.
- All vehicles and plant should be cleaned at the wheel washing bay at every site exit before they leave the construction site. Wash-water should have sand and silt settled out before discharging into storm drains. It is recommended to pave the construction road between the washing bay and the public road with backfall to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.
- Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. It is recommended to clean the construction sites on a regular basis.

5.5.13 Besides the general site best management practices, extra care shall be paid for works watercourses near the Site, if any, to minimize the potential water quality impacts. The measures described in ETWB TC (Works) No.5/2005 should be adopted where applicable. The key measures are described as follows:

- Temporary storage of equipment and materials, stockpiling of construction materials and dusty materials should be located away from any watercourses, contained in bunded areas and covered with tarpaulin.
- Construction debris and spoil should be covered with tarpaulin during storage. Regular clearance of materials for disposal off-site should be arranged to avoid overwhelming and being washed into the nearby watercourses during rainfalls.
- Toe-boards and bunds should be provided along the edge of the works area/ temporary platform to prevent wastewater/ debris from falling into the watercourses.
- Construction plant size shall be restricted or reduced to minimise disturbance to the aquatics.
- Any temporary works site inside the watercourses should be temporarily isolated by placing of sandbags or silt curtains with lead edge at bottom and properly supported props to prevent adverse water quality impact.

General Construction Activities

5.5.14 Best Management Practices (BMPs) should be implemented at the construction site, including proper handling, sorting and storage of construction solid waste, debris and refuse generated on-site prior to disposal. General refuse and recyclable materials should be collected separately and stored in appropriately labelled bins and removed regularly to minimise the risk of windblown waste / debris discharging into the water bodies.

5.5.15 Effluent discharge from the construction site shall apply a discharge license under the WPCO. The discharge quality must comply with the requirements stated in the discharge license. All construction site runoff and wastewater generated from the work areas should be treated to satisfy all standards stipulated in the TM-DSS. Minimum distances of 100m between the discharge points of construction site effluent and the existing seawater intakes should be maintained, and no effluent shall be discharged into the typhoon shelter. The beneficial uses of the treated effluent for other on-site activities, such as dust suppression, vehicle and wheel washing and general cleaning, etc., shall be examined and utilized as far as practicable to minimize water consumption and reduce the effluent discharge volume.

Accidental Spillage of Chemicals

5.5.16 Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap.354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation, should be observed and complied with for control of chemical wastes.

5.5.17 Any service shop and maintenance facilities should be located on hard standings within a bunded area, sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential of leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.

5.5.18 Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows:

- Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport; Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents; and
- Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.

Construction works in close proximity of inland watercourses

5.5.19 Construction activities may pollute nearby inland waterbodies near Kai Tak River, which are generally characterised by high concentration of SS and elevated pH.

5.5.20 With implementation of adequate construction site drainage as detailed in ProPECC PN 2/24, Construction Site Drainage, and the provision of mitigation measures indicated in the ETWB TC (Works) No. 5/2005, Protection of natural streams / rivers from adverse impacts arising from construction works, as well as good site and

management practices available as mentioned previously, no adverse water quality impacts are anticipated.

Sewage Effluent from the Construction Workforce

5.5.21 The Contractor should provide temporary sanitary facilities, such as portable chemical toilets within the construction site to handle sewage from the workforce. The Contractor has the responsibility to ensure that chemical toilets are used and properly maintained, and that licensed Contractors are employed to collect and dispose of the waste off-site at approved locations.

Identification of Potential Operation Phase Impacts

5.5.22 Potential sources of water quality impact associated with operation of the Project include:

- Sewage generated from the Smart and Green Mass Transit System in Kai Tak (KTGTS);
- Surface runoff from paved areas; and
- Sewage generated from public and staff.

Sewage generated from the Smart and Green Mass Transit System in Kai Tak (KTGTS)

5.5.23 Sewage effluent generated during operation and maintenance includes vehicle and depot washing, heavy cleaning and maintenance activities would be key potential water pollution sources. Direct discharge of the generated effluent to the nearby drainage system and waterbodies may cause adverse water quality impacts and therefore, should be avoided. The effluent should be discharged to the sewerage system.

5.5.24 Drainage and Sewerage Impact Assessments were conducted to assess the impact of drainage and sewage generation against the existing and planned capacity of drainage and sewage facilities arising from the Project to ensure the sewage and wastewater could be properly discharged to the nearby drainage system and water environment.

5.5.25 With proper implementation of recommended mitigation measures, no adverse water quality impact is anticipated.

Surface runoff from paved areas including viaducts and stations

5.5.26 Surface runoff would be generated from the vehicle and trackwork, paved or developed areas within the Project Site, including stations and depot.

5.5.27 The runoff may contain grit, oil and debris from the pedestrians and roof of the buildings. Proper drainage system including gratings at the gully inlets shall be provided to remove grit and debris before the runoff discharge to the public storm water drainage system.

5.5.28 The extent of water quality impact due to surface runoff shall depend on the cleanliness within the development and the effectiveness of the mitigation measures on minimizing runoff. Therefore, good practices and management should be followed to achieve the required water quality.

5.5.29 The detailed design of the drainage system of the Project shall ensure that the drainage system would be properly connected to the public drainage system.

Sewage generated from public and staff

5.5.30 Sewage from the operation of the Project would be generated mainly from the proposed six stations and depot, including sanitary wastewater. Proper sewerage system would be provided for the collection and discharge into the public sewerage system. Hence, no adverse water quality impact is anticipated to arise from sewage generated during the operation of the stations and depot.

Mitigation Measures for Operation Phase

Sewage generated from the Smart and Green Mass Transit System in Kai Tak (KTGTS)

5.5.31 Wastewater generated by vehicle washing, heavy cleaning and maintenance facilities should be collected and diverted to the sewerage system of the Project. Standard oil and grit interceptors or chambers should be provided where necessary to remove the oil, lubricants, grease, silt and grit from wastewater generated from vehicle washing, heavy cleaning and maintenance before discharge to the sewerage system of the Development.

5.5.32 Sewage effluent generated from operation and maintenance activities is not allowed to be discharged into the storm drains or inland/marine water. Instead, it should be collected and diverted to public sewers for proper treatment and disposal.

5.5.33 Discharge of any effluent to the public sewers will be subject to control under the WPCO and the relevant dischargers shall apply to EPD for a discharge licence for discharge of commercial and industrial effluent and the discharge quality must satisfy all the standards listed in the TM-DSS and meet the requirements specified in the discharge licence. A licensed chemical waste collector should be employed to collect and dispose of waste chemical, such as spent cleaning fluids and lubrication oil, generated from maintenance activities in compliance with the Waste Disposal Ordinance.

5.5.34 Practices outlined in ProPECC PN 1/23 for handling, treatment and disposal of operation stage effluent should also be adopted where applicable.

5.5.35 Hence, no adverse water quality impact due to sewage and wastewater effluents generated from the stations and depot would be anticipated.

Surface runoff from paved areas

5.5.36 During operation phase, stormwater runoff from paved surfaces within the Project site will be directed to a managed stormwater drainage system. Runoff from the roofs of buildings and road surfaces within the site may carry SS. The stormwater drainage system will be designed in accordance with Drainage Services Department's (DSD) Stormwater Drainage Manual (SDM). As part of the design, silt removal facilities such as silt traps and oil interceptors should be installed to reduce the potential for suspended solids and floatable impurities (e.g., leaves and oil) from entering the drainage system.

5.5.37 The surface runoff could also be controlled by best management practice. It could be intercepted by properly designed and managed silt traps and oil interceptor at appropriate spacings, so that common roadside debris, refuse and fallen leaves etc. can be captured before allowing the runoff to public drain. The Contracted Party should undertake the cleaning at a frequent interval and the frequency should be increased to suit actual site conditions. After removal of the pollutants, the pollution levels from stormwater would be much reduced.

5.5.38 With implementation of stormwater best management practices in the ProPECC PN 1/23, adverse impacts to the water quality of the stormwater drainage system in the vicinity is not anticipated.

Sewage generated from public and staff

5.5.39 All sewage generated from public and staff during the operation of the stations and depot shall be properly collected and diverted to public sewers for proper treatment and disposal. No direct discharge of sewage into the storm drains or inland/marine waters will be allowed.

Residual and Cumulative Impacts

5.5.40 With the effective implementation of mitigation measures as described, residual impacts on water quality of the receiving water bodies due to the implementation of this Project are expected to be negligible. Cumulative impact during construction and operation is also not expected considering potential cumulative impacts arising in conjunction with concurrent projects described in **Chapter 2**, and implementation of water quality monitoring and audit programme which ensure early detection of deteriorating water quality and timely action to remedy the situation, further safeguarding the appropriate mitigation measures and verifying their effectiveness.

5.6 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

5.6.1 As only land-based construction activities (i.e., no encroachment to riverbed of Kai Tak River is anticipated) and operation of land-based transit system will be conducted, no adverse water quality impact would be expected during the construction and operation of the Project, with recommended mitigation measures implemented properly. Therefore, water quality monitoring shall only be confined to the relevant effluent discharge licensing requirements to be issued by EPD under WPCO. Regular site inspections during the construction phase should be undertaken to assess the construction activities and works areas in order to ensure the recommended mitigation measures are executed appropriately.

5.7 CONCLUSION

5.7.1 During construction phase, a discharge licence, specifying the allowable quality and quantity, should be obtained for any effluent discharge from the construction site under the WPCO through EPD. All the runoff and wastewater generated from the works areas should be treated to satisfy discharge standards stipulated in the TM-DSS. If monitoring of the treated effluent quality from the works areas is needed, the monitoring should be carried out in accordance with the relevant WPCO licence.

5.7.2 Water bodies may be impacted through general construction activities, construction site run-off, accidental chemical spillage, on-site sewage effluent during construction activities, construction works in close proximity of inland watercourses. These impacts can be readily mitigated through the implementation of suitable construction site drainage, good site management practices, careful working practices, proper sewage collection and disposal system, regular site inspection and effluent testing, implementation of site practices described in technical guidelines, especially on diversion of drainage system and existing watercourses. With precise and effective application of the recommended mitigation measures, no adverse water quality impact during construction phase is anticipated.

5.7.3 During operation phase, the sewage produced from the stations, depot, public and staff of KTGTS will all be discharged to the public sewerage system. Runoff produced from surface and stormwater will discharge to stormwater drainage system with silt removal facilities before entering the drainage system. With implementation of surface and stormwater best management practices, no significant impact is anticipated.

6 WASTE MANAGEMENT IMPLICATIONS

6.1 INTRODUCTION

6.1.1 This section presents the assessment of waste management implications associated with the construction and operation of the Project.

6.1.2 Mitigation measures including waste handling, storage and disposal are recommended with reference to applicable waste legislations and management guidelines.

6.2 ENVIRONMENTAL LEGISLATIONS, STANDARDS AND GUIDELINES

6.2.1 According to Clause 3.4.6 of the Environmental Impact Assessment (EIA) Study Brief (No. ESB-369/2024), waste management implications criteria and guidelines shall follow Annex 7 and Annex 15 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and the specified technical requirements in Appendix E of the EIA Study Brief.

6.2.2 The relevant legislations, standards and guidelines applicable to the study and assessment of waste management implications include:

- Waste Disposal Ordinance (Cap. 354);
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C);
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N);
- Building Ordinance (Cap. 123);
- Dumping at Sea Ordinance (Cap. 466);
- Guidance Note No. 1/2024 under Dumping at Sea Ordinance, Cap. 466
- Land (Miscellaneous Provisions) Ordinance (Cap. 28);
- Public Health and Municipal Services Ordinance (Cap. 132);
- Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK).

Criteria and Guidelines for Evaluating and Assessing Waste Management Implications as specified in Annex 7 and Annex 15 of the EIAO-TM

6.2.3 Annex 7 of the EIAO-TM describes the criteria for assessing waste management implications which include provision of adequate waste handling, storage, collection, transfer, treatment and disposal facilities during both construction and operational phases, provision of adequate facilities to facilitate waste reduction, exploration of beneficial use of waste generated as well as alternatives which generate minimal amount of waste.

6.2.4 Annex 15 of the EIAO-TM describes the approaches and methodologies for assessment of waste management implications arising from the project.

Waste Disposal Ordinance (Cap. 354)

6.2.5 The Waste Disposal Ordinance (WDO) prohibits any unauthorised disposal of waste. Waste can only be disposed of at designated waste disposal facilities licenced by the Environmental Protection Department (EPD) under the WDO. Breach of this Ordinance can lead to a fine and/or imprisonment. The WDO also stipulates the requirements for issuing licences for the collection and transportation of waste.

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

6.2.6 According to the definition under the Waste Disposal (Chemical Waste) (General) Regulation, chemical waste includes scrap materials or unwanted substances specified under Schedule 1 of the 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. The Regulation regulate for chemical waste control, and administers the possession, storage, collection, transportation and disposal of chemical waste. EPD has also issued a guideline document, the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992), which details how the Contractor should comply with the regulations on chemical waste.

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

6.2.7 Under the Waste Disposal (Charges for Disposal of Construction Waste) Regulation, construction waste delivered to a landfill for disposal must not contain more than 50% by weight of inert materials; construction waste delivered to a sorting facility for disposal must contain more than 50% by weight of inert materials; and construction waste delivered to Public Fill Reception Facilities (PFRFs) for disposal must consist entirely of inert materials.

Building Ordinance (Cap. 123)

6.2.8 Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAPs) is published by the Building Department under the Building Ordinance. According to PNAP No. 243 (ADV-19) Construction and Demolition Waste, opportunities should be identified to prevent generation of C&D waste at source during project planning, design stage, and construction stage. The Contracted Party should prepare a Waste Management Plan (WMP) covering areas as listed in the PNAP No. 243 (ADV-19). Enhancement measures to minimize C&D waste generation can be referred to the PNAP No 243 (ADV-19).

Dumping at Sea Ordinance (Cap. 466)

6.2.9 According to the Dumping at Sea Ordinance (DASO), a permit from EPD is required should 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 imprisonment.

Guidance Note No. 1/2024 under Dumping at Sea Ordinance, Cap. 466

6.2.10 The Guidance Note No. 1/2024 under Dumping at Sea Ordinance (DASO) sets out the general considerations to be taken into account when considering permit application of a permit under the DASO. With respect to the management framework for the testing and disposal of dredged material, reference shall be made to the Project Administration Handbook for Civil Engineering Works, 2024 Edition, published by CEDD, and the Administrative Guidance – Management Framework for Disposal of Dredged/Excavated Sediment published by EPD in January 2024, which sets out the procedures for seeking approval to dredge / excavate sediment and the management framework for marine disposal of such sediment. It outlines the requirements for sediment quality assessment and provides guidelines for the classification of sediment based on their contaminant levels. It also explains the disposal arrangement for the classified sediment.

Land (Miscellaneous Provisions) Ordinance (Cap. 28)

6.2.11 The inert portion of construction and demolition (C&D) materials may be taken to PFRFs including public filling areas, public filling barging points, public fill stockpiling areas, fill banks and C&D material recycling facility. These facilities are operated by the CEDD. The Land (Miscellaneous Provisions) Ordinance requires that individuals or companies who deliver public fill to the PFRFs 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. 132)

6.2.12 Under the Public Health and Municipal Services Ordinance, waste management should include the prevention of obstruction to sewers and drains, and maintenance of sewers and drains by removing any coverings from waste materials. Construction and operation phases shall prevent any accumulation of waste leading to the obstruction and covering of any sewers and drains.

Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK)

6.2.13 Waste management shall follow the general waste disposal requirements stated under this Regulation, which includes the prevention of littering on streets and public places, disposal of municipal solid waste and other dangerous goods. Works under the construction phase shall ensure no waste enters public areas and dangerous waste as specified in the Ordinance is disposed of in the stipulated method. Waste streams in the operation phase shall be designed to ensure all generated waste contained in waste bins and properly transferred to the waste treatment/disposal site.

Other Relevant Guidelines

6.2.14 The following guidelines and documents are also related to waste management and disposal in Hong Kong:

- WBTC No. 2/93, Public Dumps;
- WBTC No. 2/93B, Public Filling Facilities;
- DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction and Demolition Materials;
- A Guide to the Chemical Waste Control Scheme;
- A Guide to the Registration of Chemical Waste Producers;
- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes;
- Waste Blueprint for Hong Kong 2035;
- The Monitoring of Solid Waste in Hong Kong 2023;

6.2.15 Relevant guidelines posted by EPD through 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/);

- Guidelines on Yard Waste Reduction and Treatment issued by Development Bureau, July 2014;
- Development Bureau Technical Circular (Works) No. 4/2020 Tree Preservation; and
- Hong Kong Planning Standards and Guidelines, Chapter 9 (Section 6 – Waste Management).

6.3 ASSESSMENT APPROACH

6.3.1 The waste management hierarchy is to minimise waste generation. If waste generation cannot be avoided, a material / waste management plan will be established prior to commencement of excavation and construction work to outline the methods that can be incorporated into the project for waste minimisation, including reuse, recycling, handling, storage, transportation and disposal of expected waste materials.

6.3.2 The waste management hierarchy is a concept that shows the desirability of various waste management methods and comprises the following in descending order of preference:

- Avoidance;
- Minimisation;
- Reuse / recycling;
- Treatment; and
- Disposal.

6.3.3 The approach for assessing waste management implications is outlined in Annex 7 of EIAO-TM, whereas methods for assessing potential waste management impacts during construction and operation phases of the Project would be studied as per Annex 15 of EIAO-TM, which include the following:

- Estimation of types and quantities of the waste generated and fill to be imported;
- Assessment of potential impacts from waste management with respect to potential hazards, air and odour emissions, noise, wastewater discharge and public transport;
- Examination of the opportunities for reducing waste generation;
- Identification of disposal options for each type of waste; and
- Assessment of impacts on the capacity of waste collection, transfer and disposal facilities.

6.3.4 During the preliminary design of the Project, alternative design, general layout, construction methods, and programmes have been considered to minimize the generation of C&D material. Underground facilities of the Project have been minimized, to minimize soil excavation and thus generation of C&D materials. As discussed in **Chapter 2**, underground KTGTS option is considered less preferrable due to the huge amount of excavated materials to be generated and removed from the site. Alternative alignment scheme with the KTGTS running along Shing Fung Road atop the KTSG is adopted to reduce piling and foundation works. The marine deposits generated from foundation works will be treated and reused onsite. Furthermore, the construction works and programme have been planned to accommodate the temporary stockpiling of excavated materials generated for onsite reuse as backfilling.

6.3.5 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.

6.3.6 After considering all options and methods to reduce waste generation and maximising reuse, the types and quantities of waste required to be disposed of have been estimated and the disposal options for each type of waste have been described.

6.3.7 The disposal options recommended for the generated waste have considered the result of the assessment. The impacts caused by handling (including stockpiling, labelling, packaging and storage), collection, and reuse / disposal of waste have been addressed and appropriate mitigation measures have been proposed.

6.4 IDENTIFICATION AND EVALUATION OF WASTE MANAGEMENT IMPLICATIONS

6.4.1 The waste implications during the construction and operation phase include the following:

Construction Phase

6.4.2 Based on the current design, a variety of wastes are anticipated to be generated during the construction phase that can divided into different key categorise based on their composition and ultimate method of disposal. The identified waste types include:

- Construction and demolition (C&D) materials (includes inert and non-inert C&D materials);
- Land-based sediment;
- Chemical waste;
- General refuse; and
- Floating refuse.

6.4.3 It is anticipated that majority of wastes to be generated during construction phase is C&D materials generated from the construction of the approximately 3.5 km long elevated Smart and Green Mass Transit System in Kai Tak (KTGTS), new stations and depot at the former Kai Tak Runway. The proposed construction methods for the viaducts, stations and other associated facilities are described in **Chapter 2**.

Table 6.1 Summary of Waste to be Generated during the Construction Phase

Waste Types	Sources of Waste	Examples
Construction and demolition (C&D) materials (includes inert and non-inert C&D materials)	• Excavation works for pile cap and foundation works for viaducts and stations • Foundation works for the depot; • Site clearance and demolition works; and • Other associated works.	Inert C&D materials: • Rocks; • Soft materials; and • Artificial hard materials. Non-inert C&D materials: • Bamboo, timber, paper, plastic etc.
Land-based sediment	• Piling works	• Marine deposit
Chemical waste	• Operation and maintenance of plants and mechanical equipment	• Fluorescent tubes, cleaning fluids (e.g., detergents), solvents, waste lubricating oil and fuel etc.
General refuse	• On-site staff and workers	• Food waste, aluminium cans, wastepaper etc.
Floating refuse	• Accumulation along seawall	• Aluminium cans, wastepaper etc.

Construction and Demolition (C&D) Materials

6.4.4 C&D materials contain a mixture of inert and non-inert materials mainly generated from excavation for pile cap and piling works for viaducts and stations, piling works for the depot, and site clearance and demolition works, and other associated works. Inert

C&D materials generated would include (but not limited to) rock, soil, concrete, asphalt, bitumen and granular materials etc. that can be transported to public fill reception facilities (PFRF) or other destination, subject to the Public Fill Committee, as per DEVB TC(W) No. 6/2010; while non-inert C&D materials generated would include (but not limited to) bamboo, timber, paper and plastic etc. that cannot be transported to PFRF, which will be recycled as much as possible by reputable recyclers and recycling facilities prior to disposal of at landfills. Summary of the C&D materials generated from the key construction activities and recommended management options is summarised in **Table 6.2**. The estimated generation of C&D materials in each construction year is shown in **Table 6.3**.

Table 6.2 Estimated C&D Materials Generated from Different Construction Phases (Preliminary Estimate)

Construction Activities	Inert C&D Materials (m^3)			Non-inert C&D Materials (m^3)[4][5]	Total C&D Materials (m^3)
	Rocks[1]	Soft Materials[2][6]	Artificial Hard Materials[3]		
Excavation for pile cap (viaduct and stations)	0	18,450	1,050	100	19,600
Foundation works for viaducts (piling)	800	10,050	0	0	10,850
Foundation works for stations (piling)	300	3,900	0	0	4,200
Foundation works for the depot	2,200	28,000	0	0	30,200
Site clearance and demolition works	0	0	650	11,650	12,300
Other associated works[7]	0	1,650	350	1,750	3,750
Total	**3,300**	**62,050**	**2,050**	**13,500**	**80,900**
Management Options	On-site Reuse: 0 PFRF: 3,300	On-site Reuse: 13,950 PFRF: 48,100	On-site Reuse: 0 PFRF: 2,050	Recycling: 2,700 Landfill: 10,800	Inert C&D On-site Reuse: 13,950 PFRF: 53,450 Non-inert C&D Recycling: 2,700 Landfill: 10,800

Notes:
[1] "Rocks" includes all grade rock.
[2] "Soft Material" mainly refers to fill, etc.
[3] "Artificial Hard Material" includes, but not limited to, brick, broken concrete, asphalt, bitumen and granular materials, etc.
[4] "Non-inert C&D materials" includes, but not limited to, topsoil, vegetation, woody waste, bamboo, timber, paper and plastic, etc.
[5] A recycling rate of 20% is assumed, based on that adopted in approved EIA Reports, e.g. EIA-307/2024 Development of Integrated Waste Management Facilities Phase 2.
[6] Land-based sediments have been excluded from the quantity estimate of soft inert C&D materials.
[7] Other associated works include superstructure and external works and utilities works

Table 6.3 Estimated C&D Materials Generated in each Construction Year

C&D Materials		Estimated Quantity Generated from Construction Works (m^3) [1]				
		2027	2028	2029	2030	Total
Inert C&D Materials	Soft Materials	10,070	40,680	10,890	410	62,050
	Rocks	550	2,200	550	0	3,300
	Artificial Hard Materials	430	1,180	350	90	2,050
Non-inert C&D Materials		4,680	7,490	890	440	13,500

Notes:
[1] Tentative construction programme is shown in **Appendix 2.1**.

C&D Materials Generated from Excavation Works for Pile Cap and Foundation Works for Viaducts and Stations

6.4.5 Excavation for pile cap and foundation works for viaducts and stations will be the second major sources of C&D materials to be generated by the Project. Inert C&D materials such as soil, rocks and concretes, and non-inert C&D materials such as packaging waste of C&D materials, timber and wood are anticipated.

6.4.6 Total C&D materials from excavation works of about 19,600 m^3 is estimated, of which 19,500 m^3 is inert C&D materials. It is estimated 100 m^3 of non-inert C&D materials would be generated from pile cap formworks. For piling works of viaducts and stations, the generation of inert C&D materials is estimated at about 10,850 m^3 and 4,200 m^3 respectively. The inert C&D materials will be reused on-site as much as possible. Excess inert C&D materials will be transferred to PFRFs, whilst non-inert C&D materials will be recycled as much as possible prior to disposal of at landfills.

C&D Materials Generated from Foundation Works for the Depot

6.4.7 C&D materials will be generated from foundation works for the depot. Inert materials such as soil, rocks and concretes are anticipated.

6.4.8 Total inert C&D materials from piling works of about 30,200 m^3 is estimated. The inert C&D materials will be reused on-site as much as possible. Excess inert C&D materials will be transferred to PFRFs.

C&D Materials Generated from Site Clearance and Demolition Works

6.4.9 Site clearance and demolition works are expected to generate approximately 650 m^3 of inert C&D materials, including brick and concretes, and 11,650 m^3 of non-inert C&D materials, including top soil and yard waste. Inert C&D materials will be reused on-site as much as possible prior to transporting to PFPFs, whilst non-inert C&D materials will be recycled as much as possible prior to disposal at landfills. Recyclable materials (e.g. yard waste) should be segregated from the non-inert C&D materials for collection by reputable recyclers and recycling facilities.

C&D Materials Generated from Other Associated Works

6.4.10 Other associated works with C&D materials generation mainly include superstructure and external works and utilities works. Total inert C&D materials from other associated works of about 2,000 m^3 is estimated, including fill and broken concrete. A total of 1,750 m^3 of non-inert C&D materials, consisting of packaging waste and woody waste are estimated from the formworks. Inert C&D materials will be reused on-site as much as possible prior to transporting to PFPFs, whilst non-inert C&D materials will be recycled as much as possible prior to disposal of at landfills.

On-site reuse of inert C&D materials

6.4.11 The Contractor is responsible for segregating the inert C&D materials from the non-inert C&D materials for on-site reuse. In order to minimise the impact resulting from the collection and transportation of inert C&D materials to the PFRFs, the inert C&D materials, particularly the excavated materials, would be reused on-site as fill materials as far as practicable.

Surplus inert C&D materials to Public Fill Reception Facilities

6.4.12 On-site reuse of surplus inert C&D materials will be adopted as far as possible and delivery to PFRFs will be taken as the last resort. In the case that on-site reuse is not possible, the Contractor is responsible for the transfer of the surplus inert C&D materials to PFRFs operated by the CEDD, which are Tuen Mun Area 38 Fill Bank and Tseung Kwan O Area 137 Fill Bank. The estimated quantity of inert C&D materials to be reused on-site is 13,950 m^3 and surplus inert C&D materials to be transported to PFRF is 53,450 m^3. The materials shall be free from plastics, chemical waste, metals and other materials that are considered as non-inert C&D materials. No imported fill is required in this Project.

Non-inert C&D materials

6.4.13 The Contractor should separate the non-inert C&D materials from the inert C&D materials on-site. It is recommended to segregate recyclable materials (e.g. metals) from the non-inert C&D materials for collection by reputable recyclers. The remaining non-recyclable C&D waste will be disposed of at designated landfill sites by a waste collector. The Contractor may transport the non-inert C&D materials directly to the South East New Territories (SENT) Landfill. The disposal of non-inert C&D materials at the designated landfill shall be subject to agreement with EPD. In order to prevent any adverse environmental impacts arising from poor management of non-inert C&D materials, mitigation measures in **Section 6.5** should be referred to. This includes the proper storage, collection and transport of waste, as well as minimization of waste leakage to surrounding environment.

6.4.14 Yard waste, including timber and woody materials in non-inert C&D materials, should be handled in accordance with the principles of reduce, reuse, and recycle (3Rs). When the generation of yard waste is unavoidable, priority should be given to sorting it for recycling and reuse onsite. Yard waste shall be sorted and separated from C&D material to facilitate recycling, such as delivering to Y-park so as to minimize the quantity of waste to be disposed of at the landfills. Where appropriate, the Contractor should be responsible for cutting and shredding the yard waste to meet the collection requirement of the recycling facilities for processing. Disposal of yard waste directly at landfills should only be regarded as the last resort when no alternatives are available.

Land-Based Sediment

6.4.15 The Project Site is situated in reclaimed land and there is land-based sediment underlying the proposed structures. The Project covers foundation works for viaduct and stations, and the depot. Based on the current foundation design, bored piling will be adopted to the Depot only, which is considered to be the major source of the sediment generation from the Project. Excavation of land-based sediment is anticipated from the proposed piling of the depot. The estimation of volume of sediment generated from the Project shall be reviewed by the Contracted Party in the detail design stage. The assessment is based on the proposed pile top level and depth of the layer of marine deposit obtained from existing ground investigation data in the vicinity of the Project Site. An estimation of 2,525 m^3 of land-based sediment will be generated, based on the proposed pile top level of -9 mPD (14 mbgl) and the

anticipated bottom level of marine deposit layer at -15 mPD (20 mbgl) within the Depot area according to the geological profile. No land-based sediment is anticipated from pile cap construction in other Project area.

6.4.16 Geological information has been reviewed from the Hong Kong Geological Survey, Geological Map of Hong Kong Web-based Edition – 2006, published by the Geotechnical Engineering Office of the CEDD. It indicated that the Project Site is situated on formation from the granular sediment and rock material used for engineering purpose such as land reclamation (**Appendix 6.1**). Granular fill material from the seabed was first used to develop Kai Tak airfield in 1924[2]. The area was extended in 1929 and 1931 partly using hydraulic fill from Victoria Harbour. Offshore fill was then used in increasing quantities during the 1950s. Kai Tak runway was reclaimed using 0.5 Mm^3 of granular seabed material, mostly obtained from the Victoria Habour. Therefore, a layer of marine sources of fill is likely present as a superficial layer of geology after reclamation.

6.4.17 Historical aerial photographs from the Hong Kong Map Service 2.0 of Lands Department (LandsD) were also reviewed to identify past land uses. Historical aerial photographs are shown in **Appendix 6.2** and summarised in **Table 6.4**. The oldest aerial photograph of the Project Site was in 1945 where most of it was located in the open sea of Kowloon Bay. Reclamation was completed from 1950s to 1980s for the expansion of the former Kai Tak Airport. The airport remained in operation till 1998 and was developed into residential, commercial and recreation purposes since then.

Table 6.4 Description of Historical Land Use of the Project Site

Year	Photo Reference[3]	Photograph Height (feet)	Site Description
1945	681_5-4115, 681_5-4149, 681_5-4150	20,000	Most part of the Project Site located in the sea of Kowloon Bay, where only the northern part was located in the former Kai Tak Airport. Based on "Kai Tak Airport 1925-1998" published by the Civil Aviation Department (CAD), Kai Tak Airport was built on reclaimed land in Kowloon Bay.
1959	F64_775-0289, F65_775-0290	40,000	Reclamation and construction of a new northwest/southeast heading runway for the airport on a promontory into Kowloon Bay was completed in 1958 according to the information from the CAD, where the southern part of the Project Site located, whilst some portion of the Project Site remained to be the sea of Kowloon Bay.
1964	1964-2541	12,500	Reclamation was observed in the northern part of the Project Site, as well as to the east of Project Site. No changes observed in the other parts of the Project Site.
1974	09713	12,500	Further reclamation observed in the sea of Kowloon Bay and the end of the runway for the expansion of the airport. The whole Project Site now situated on reclaimed land.
1984	56177	9,000	No changes in land use observed between 1975 and 1984.
1994	CN06700	10,000	No changes in land use between 1985 and 1994.

[2] CEDD. The Geology of Hong Kong - 11 Onshore Superficial Deposits and Fill (available at: https://www.cedd.gov.hk/eng/about-us/organisation/geo/pub_info/memoirs/geology/onshore/index.html)
[3] Source: Historical aerial photographs from the Hong Kong Map Service 2.0 of Lands Department

Year	Photo Reference[3]	Photograph Height (feet)	Site Description
2004	CW55311	8,000	Based on historical information from the CAD, former Kai Tak Airport remained in operation till 5 July 1998. Site formation and construction activities were observed in the area of the former Kai Tak Airport since then.
2014	CW106530	8,000	Construction activities observed within and in the vicinity the Project Site between 2005 and 2014.
2024	E218647C, E218297C	6,000	Construction activities observed within and in the vicinity of the Project Site between 2015 and 2024. Residential developments and infrastructures were observed in the vicinity of the Project Site.

6.4.18 Existing information of ground investigations were reviewed to define site specific sediment conditions. There are no previous sediment quality assessment (SQA) reports or records available within the Project Site area with potential land-based sediment generation.

6.4.19 It is estimated all excavated sediment will be treated and reused on-site under this Project. The excavated sediment would be treated using cement stabilization / solidification, e.g. as backfilling materials. The treated sediment is proposed to be reused for backfilling of pile caps in the Project. The treated sediment shall be tested to confirm the compliance with the treatment targets of the Unconfined Compressive Strength (UCS) Test and the Toxicity Characteristic Leaching Procedure (TCLP) Test in accordance with the USEPA guidelines (1986) – Handbook for Stabilisation/Solidification of Hazardous Wastes, EPA/540/2-86/001 and the section 268.48 of Title 40 of the Code of Federal Regulations (CFR) – Universal Treatment Standards respectively. In addition to the UCS test requirement, the strength requirements of treated materials are subject to the respective geotechnical works. Pilot-scale trial should be conducted prior to commencement of treatment to determine the sediment and cement ratio, as well as the optimal curing time to achieve the treatment standards.

6.4.20 In case sediment treatment and/or reuse are not feasible, assessment, sampling and offsite disposal of sediment shall only be considered as the last resort and should follow the requirement and procedures stated in the Guidance Note No. 1/2024 under DASO.

6.4.21 If application of dumping permit under the DASO is required, separate submission (e.g. Sediment Sampling and Testing Plan (SSTP) and Sediment Quality Report (SQR)) shall be submitted to EPD's Marine Dumping Control Section of the Territorial Control Office in accordance with the Guidance Note No. 1/2024 under DASO. The Applicant of the dumping permit shall identify and estimate dredging/excavation, dredged/excavated sediment/mud transportation and disposal activities and requirement. Categories of the sediment within the Project Site shall be further verified by both chemical screening, and biological screening if necessary. The quantities shall also be verified accordingly. Sufficient time should be allowed for arranging a competent contractor for carrying out sediment sampling and relevant laboratory testing. The handling and disposal of the excavated sediment and the associated potential environmental impacts shall be adequately addressed in accordance with the Guidance Note No. 1/2024 under DASO. The preliminary assessment shall consist of information including but not limited to (i) the discussion of assessment methodology and corresponding framework; (ii) a desktop review of available records such as previously approved assessment report and GI records, geological map and aerial photographic records; and (iii) determination of excavation extent and the estimated quantity of land-based sediment anticipated from the Project.

Chemical Waste

6.4.22 Chemical waste arising during the construction phase would induce 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 to workers;
- Adverse impacts on water quality from spills; and
- Fire hazards.

6.4.23 The maintenance and servicing of construction site and plants and equipment may generate chemical waste such as fluorescent tubes, cleaning fluid (e.g. detergent), solvents, waste lubricating oil and fuel. Vehicle maintenance may also involve the use of a variety of chemicals, oil and lubricants including heavy duty cleaners, organic solvents, degreasers, brake fluids, battery acid and soldering fluids.

6.4.24 The quantity of chemical wastes that to be generated from the construction activities depends on the Contractor's on-site maintenance requirements and the equipment being used. However, based on the scale of the Project, it is estimated that the quantity of such chemical waste would be in the order of several hundred litres per month. The amount of chemical waste to be generated will be quantified in the Waste Management Plan (WMP) to be prepared by the Contractor for the site as part of the Environmental Management Plan (EMP) and submitted to the Contracted Party for approval prior to construction work referenced to the PNAP No. 243 (ADV-19).

6.4.25 Storage, handling, transport and disposal of chemical waste should be arranged in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste published by the EPD. Chemical waste should be collected by a licenced chemical waste collector and to be disposed of at a licenced chemical waste treatment and disposal facility. Wherever possible, opportunities for the reuse and recycling of materials will be taken. Provided that the handling, storage and disposal of chemical waste are in accordance with these requirements, potential environmental impacts (including potential hazard, air and odour emissions, noise, and wastewater discharge) are not expected. Mitigation and control requirements for chemical waste are detailed in **Section 6.5**.

General Refuse

6.4.26 The construction workforce will generate refuse comprising food scraps, wastepaper and empty containers during the construction period. Release of general refuse into roadside gullies or surface channels is not permitted as the introduction of these wastes are likely to have detrimental effects to the environment. Such refuse shall be properly managed, and intentional or accidental release to the surrounding environment must be avoided. General refuse shall first be sorted via tri-coloured waste bins for on-site segregation of recyclables. Non-recyclable general waste shall be disposed of in general refuse bins. Disposal of refuse to locations other than approved waste transfer or disposal facilities will be prohibited. Effective collection of site waste will be required to prevent waste materials being blown away by wind, flushed or leached into the river or marine environment, or creating an odour nuisance or pest and vermin problems. Waste storage areas should be well maintained and cleaned regularly. Collected general refuse may be disposed of at the North East New Territories (NENT) Landfill or to refuse transfer stations (closest ones being West Kowloon Transfer Station (WKTS) and Shatin Transfer Station (STTS)).

6.4.27 Since the information on the number of workers working on-site is not yet available at this preliminary design stage, a maximum of 400 workers working simultaneously is

assumed. Based on the general refuse generation rate of 0.65 kg per worker per day[4], it is estimated that the daily amount of general refuse that would be generated is approximately 260 kg. Adverse impact on the capacity of waste collection, transfer and disposal facilities is not anticipated as the amount of general refuse is limited.

6.4.28 Provided that the mitigation measures as detailed in **Section 6.5** are adopted, the potential environmental impacts caused by the storage, handling transport and disposal of general refuse are expected to be minimal. It is recommended that general refuse should be collected on a daily basis for disposal. With the proper implementation of the recommended mitigation measures, potential environmental impacts (including potential hazard, air and odour emissions, noise, and wastewater discharge) are not expected.

Floating Refuse

6.4.29 Floating refuse may be washed up onto the Project site by currents and wind, potentially becoming trapped or accumulating along the existing seawall along the proposed works area next to the Depot during construction. In view of no sharp turns or abrupt indentation for shoreline along the seawall of the proposed works area next to the Depot, entrapment or accumulation of floating refuse on the seawall is considered as minimal. Any floating refuse trapped within the Project area will be collected and disposed of as general refuse, which adopt the same proposed disposal outlets and tentative transportation routings for general refuse.

6.4.30 The construction workforce working along the seawall may also generate floating refuse, such as wastepaper and empty containers. With implementation of proper waste management and training to workers, floating refuse arising from the construction activities is not anticipated.

Temporary Stockpiling Areas

6.4.31 Inert C&D materials to be generated from construction works will be temporarily stored within the Project site for reuse on-site and transportation for off-site beneficial use. The designated area for temporary stockpiling of C&D materials is tentatively proposed to be the storage area in **Figure 1.1**.

6.4.32 Storage and stockpiling of C&D materials prior to utilisation on-site may contribute to the generation of dust, visual impacts from unsightliness and water quality impacts from runoff. The loading and unloading of C&D materials and emissions from haul vehicles also have the potential to result in noise and dust impacts. Mitigation and control requirements for C&D materials are detailed in **Section 6.5**. Provided that the handling, storage and transportation of C&D materials are in accordance with these requirements, the potential waste management implications, including potential hazards, air and odour emissions, noise and wastewater discharge, associated with handling, storage and transportation of C&D materials during the construction phase of the Project are not expected.

6.4.33 The designated area for temporary stockpiling of other wastes is tentatively proposed to be the storage area in **Figure 1.1**. Provided that the mitigation measures outlined in **Section 6.5** are adopted, the potential environmental impacts caused by the storage, handling, transport and disposal of wastes generated from the Project are expected to be minimal.

[4] General refuse generation rate adopted in approved EIA Reports, e.g. EIA-256/2023 Tuen Mun Bypass and EIA-307/2024 Development of Integrated Waste Management Facilities Phase 2.

6.4.34 Land transport should be utilised to deliver and dispose of the wastes generated from the Project area to designated disposal outlets. Marine transportation of wastes is not expected under this Project.

6.4.35 The frequency of trucks for inert C&D materials enroute to Tuen Mun Area 38 Fill Bank or Tseung Kwan O Area 137 Fill Bank is estimated at 14 vehicles per day on average during the construction phase. For non-inert C&D materials and non-recyclable general refuse, land transport will be utilised to dispose of the waste from the Project area to designated disposal outlets. It is estimated that, on average, 2 vehicle per day will transport the non-inert C&D materials and 1 vehicle per day will transport the non-recyclable general refuse to the designated disposal outlets during the construction phase. The details of estimated number of dump truck are shown in **Table 6.5**.

6.4.36 Nevertheless, with the implementation of appropriate mitigation measures, no adverse environmental impacts are expected due to the transportation of waste. **Table 6.6** summarises the management of each waste types, handling procedures and the tentative transportation routings of the wastes identified during construction phase. The transportation routings may change subject to the actual traffic conditions of the roads.

Table 6.5A Summary of Quantity C&D Materials and Non-recyclable General Refuse to be Delivered Offsite in each Construction Year for Dump Truck Transportation

Materials		Estimated Yearly Quantity to be Delivered Offsite from Construction Works (m^3) [1]				
		2027	2028	2029	2030	Total
Inert C&D Materials	Soft Materials [2]	7,740	31,380	8,570	410	48,100
	Rocks	550	2,200	550	0	3,300
	Artificial Hard Materials	430	1,180	350	90	2,050
Non-inert C&D Materials		4,680	7,490	890	440	13,500
Non-recyclable general refuse [3]		40	75	75	40	230

Notes:

[1] Tentative construction programme is shown in **Appendix 2.1**. The E&M installation works and testing and commissioning works from 2029 Q3 to 2031 Q4 are considered to generate minimal waste.

[2] The quantity of inert C&D materials that will be reused on-site are excluded.

[3] Assuming a density of the general refuse is 1,029 kg/m^3 according to EIA Report of Construction of Annex Block at Hong Kong Observatory Headquarters, Tsim Sha Tsui (Ref. No. AEIAR-260/2024). Based on the assumption that there are 25 working days per month.

Table 6.5B Summary of Estimated Dump Truck for the Construction Period

Type	Estimated Number of Dump Truck per day				
	Year				Average
	2027	2028	2029	2030	
Inert C&D Materials	14	27	8	1	14
Non-inert C&D Materials	5	4	1	1	2
Non-recyclable general refuse	1	1	1	1	1
Total	**20**	**32**	**10**	**3**	**17**

Notes:

[1] Based on the assumption that there are 25 working days per month and a dump truck capacity of 7.5m^3 per truck. No. of months in each construction year is shown in tentative construction programme (**Appendix 2.1)**. The estimated no. of dump truck has been rounded up.

[2] Bulk factors of 1.7 for inert C&D materials and 1 for non-inert C&D materials are adopted referring to that adopted in the approved EIA Report for Development of Integrated Waste Management Facilities Phase 2 (I PARK2) (Register No.:AEIAR-263/2024)

Table 6.6 Summary of Waste Types, Handling Procedures and Disposal Routes during Construction Phase

Types of Waste	Sources	Examples	Total amount generated	Handling Procedures	Disposal Routes and Disposal Outlets
Construction and demolition (C&D) materials	• Excavation works for pile cap • Foundation works for viaducts and stations • Foundation works for the depot • Site clearance and demolition works • Other associated works	Inert C&D materials: • Rocks; • Soft materials; and • Artificial hard materials. Non-inert C&D materials: • topsoil, vegetation, woody waste, Bamboo, timber, paper, plastic etc.	80,900 m^3	67,400 m^3 of inert C&D materials: • On-site reuse: 13,950 m^3 • Public Fill Reception Facility: 53,450 m^3 13,500 m^3 Non-inert C&D materials: • Recycling: 2,700 m^3 • Landfill disposal: 10,800 m^3	Inert C&D materials: • Surplus inert C&D materials should be transported to PFRFs operated by the CEDD at Tuen Mun Area 38 Fill Bank (via Lung Cheung Road, Ching Cheung Road, Kwai Chung Road, Tsuen Wan Road, Tuen Mun Road, Wong Chu Road, Lung Fu Road and Lung Mun Road) or Tseung Kwan O Area 137 Fill Bank (via Hoi Bun Road, Kwun Tong Bypass, Tseung Kwan O Road and Wan Po Road). Non-inert C&D materials: • Non-recyclable materials will be disposed of at a designated landfill site (to SENT via Hoi Bun Road, Kwun Tong Bypass, Tseung Kwan O Road and Wan Po Road) • Recyclable materials (e.g. metals and yard waste) should be segregated from the non-inert C&D materials for collection by reputable recyclers and recycling facilities, e.g. Y-park
Land-based sediment	• Foundation works for the depot	• Marine deposit	2,525 m^3	Treat using cement stabilization / solidification and reuse within the Project Site: 2,525 m^3	No disposal required as land-based sediment will be reused on-site.
Chemical waste	Operation and maintenance of plants and mechanical equipment	• Fluorescent tubes, cleaning fluids (e.g., detergents), solvents, waste lubricating oil and fuel etc.	Several hundred litres per month	Collect by a licenced chemical waste collector	Disposed of at licenced chemical waste treatment and disposal facility such as Chemical Waste Treatment Centre (CWTC) via Kwun Tong Road, Lung Cheung Road, Ching Cheung Road, Tsing Kwai Highway, Kwai Ching Road and Tsing Yi Road.
General Refuse	On-site staff and workers	• Food waste, aluminium cans, wastepapers etc.	Approximately 260 kg per day	• Store in enclosed bins or compaction units separated from inert C&D materials. • Remove by a reputable waste collector	Non-recyclable general refuse will be disposed of at a designated landfill site (to NENT via Kwun Tong Road, Lung Cheung Road, Tate's Cairn Highway, Tolo Highway, Fanling Highway, New Territories Circular Road, Heung Yuen Wai Highway and Wo Keng Shan Road). Recyclable materials to be recycled by local recyclers.
Floating Refuse	Accumulation along seawall	• Aluminium cans, wastepapers etc.	Insignificant		

Operation Phase

6.4.38 The Project consists of the following structures:

- 3.5 km long elevated smart and green mass transit system and associated stations; and
- Depot at the former Kai Tak Runway.

6.4.39 During the operation phase, quantity of waste to be generated would be insignificant and includes the followings:

- General refuse; and
- Chemical waste.

6.4.40 Types of waste to be generated during the operation phase are summarised in **Table 6.7**.

Table 6.7 Summary of Waste to be Generated during the Operation Phase

Waste Types	Sources of Waste	Examples
General refuse	• Staff from future stations and depot	• Food waste, aluminium cans, waste papers etc. • Non-recyclable general refuse
Chemical waste	• Maintenance of the vehicles in the depot • Maintenance activities in the stations	• Fluorescent tubes, cleaning products (e.g., detergents), solvents, waste lubricating oil and fuel, hazardous waste container (e.g., emergency generator, paints)

General Refuse

6.4.41 General refuse to be generated by staff from the Project shall be mainly commercial and industrial waste. This includes general refuse such as plastic, paper, aluminium, and food packaging. According to the latest statistics published by the EPD in 2023, the per capita commercial and industrial waste generation rate was 1.02 kg per person per day[5]. Based on the said waste generation rate and the estimated number of staff (tentatively 200), daily general refuse generation is estimated at 204 kg (~0.20 tonne per day (tpd)). The general refuse should be recycled as far as possible through the placement of recycling bins throughout the future stations and the depot. The remaining refuse should be collected by waste collectors and disposed of at landfills. It is estimated that 46% of general refuse produced shall be recycled (0.09 tpd) and amounting 0.11 tpd for final disposal. As passengers are only transient population and do not stay in the station, the amount of general refuse attributable to them is considered negligible in this estimation.

Chemical Waste

6.4.42 Chemical waste such as cleaning fluid (e.g. detergent), solvents, waste lubricating oil and fuel etc. may be generated during maintenance activities of the Project, particularly for the maintenance of vehicles at the depot. Chemical waste should be handled and disposal of according to the measures stipulated in the Waste Disposal

[5] Figure based on the recovery rate and disposal rate of commercial and industrial waste in 2023. Environmental Protection Department (2024). Plate 2.7 and Plate 3.2, Monitoring of Solid Waste in Hong Kong - Waste Statistics for 2023. Waste Data & Statistics, Resources and Downloads, Environmental Protection Department.

(Chemical Waste) (General) Regulation and the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. The quantity of chemical waste arising from the future operation of the proposed Project is expected to be low. The chemical waste should be collected by licenced chemical waste collectors and disposal of at licenced chemical waste treatment and disposal facility such as Chemical Waste Treatment Centre (CWTC).

6.4.43 **Table 6.8** summarised the proposed disposal methods of different types of waste generated during the operation phase.

Table 6.8 Summary of Waste Disposal Methods during Operation Phase

Waste Types	Proposed Disposal Methods
General Refuse	• Recycle as far as possible • Remaining refuse to be collected by waste collector and disposed of at landfills
Chemical Waste	• To be collected by licenced chemical waste collectors and disposal at licenced waste disposal facilities

6.4.44 As mentioned in this section, waste generated during the construction phase and the operation phase will be transported to or disposed of at Public Fill Reception Facilities (PFRFs), licensed waste disposal facilities and landfills depending on waste types. **Table 6.9** summarises the information on waste facilities.

Table 6.9 Summary of Waste Treatment and Disposal Facilities

Phase	Waste Type	Waste Facility	Location
Public Fill Reception Facility			
Construction	Inert C&D Materials	Tuen Mun Area 38 Fill Bank	Lung Mun Road, Tuen Mun
		Tseung Kwan O Area 137 Fill Bank	Fat Tong O, Tseung Kwan O
Strategic Landfill for Non-inert C&D Materials			
Construction	Non-inert C&D Materials	South East New Territories Landfill	Tai Chik Sha, Tseung Kwan O
Strategic Landfill and Refuse Transfer Stations for General Waste			
Construction	General Refuse, Floating Refuse	North East New Territories Landfill	Ta Kwu Ling, New Territories
Operation	General Refuse	Shatin Transfer Station	Sha Tin, New Territories [1]
		West Kowloon Transfer Station	West Kowloon Reclamation area, between the West Kowloon Expressway and Stonecutters Island [1]
Licenced Chemical Waste Treatment and Disposal Facility			
Construction and Operation	Chemical Waste	Chemical Waste Treatment Centre	51 Tsing Yi Road South, Tsing Yi

Notes:

[1] Non-recyclable general refuse will be transported to Shatin Transfer Station (via Kai Tak Bridge Road, Wang Chiu Road, Wai Yip Street, Kwun Tong Road, Lung Cheung Road, Tate's Cairn Highway, Tai Chung Kiu Road, On Sum Street and On Yiu Street) or West Kowloon Transfer Station (via Take Kai Tak Bridge Road, Wang Chiu Road, Wai Yip Street, Kwun Tong Road, Lung Cheung Road, Ching Cheung Road, Container Port Road South).

6.4.45 With the implementation of mitigation measures described in **Section 6.5,** potential environmental impacts (including potential hazards, air and odour emissions, noise, and wastewater discharge) are not expected.

6.5 MITIGATION MEASURES

Construction Phase

6.5.1 Based on the waste management hierarchy mentioned in **Section 6.3.2**, waste reduction measures are recommended as follows in order to reduce waste generation. Recommendations of good site practices and waste reduction measures are stated in this section.

Good Site Practices during Construction Phase

6.5.2 Adverse impacts related to waste management such as dust, odour, noise and wastewater discharge are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:

- Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal of all waste generated at the site to an appropriate facility.
- Training of site personnel in proper waste management and chemical handling procedures.
- Provision of sufficient waste disposal points and regular collection of waste.
- Appropriate measures to minimise windblown litter and dust/odour during transportation of waste by either covering trucks or by transporting waste in enclosed containers.
- Stockpiles of C&D materials should be kept covered by impervious sheets to avoid wind-blown dust.
- All dusty materials including C&D materials should be sprayed with water immediately prior to any loading transfer operation to keep the dusty material wet during material handling at the stockpile areas.
- Provision of wheel washing facilities for trucks before leaving the works area to minimise dust introduction to public roads.
- Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting inert or non-inert C&D materials is not anticipated.
- Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.
- General refuse should be removed as soon as possible and avoid overnight accumulation and storage of general refuse.

Waste Reduction Measures

6.5.3 The generation of a significant amount of waste can be prevented through good management and control. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. The following are recommendations to achieve waste reduction in the construction phase:

- Segregate inert C&D materials from non-inert C&D materials for reuse.

- Segregate any other recyclable materials (e.g. metals) from non-inert C&D materials for recycling.
- Segregation and storage of different types of waste in different containers or skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.
- Encourage collection of recyclable waste such as wastepaper and aluminium cans by providing separate labelled bins to enable such waste to be segregated from other general refuse generated by the workforce.
- Any unused chemicals or those with remaining functional capacity shall be recycled, and separation of chemical wastes for special handling and appropriate treatment.
- Proper site practices to minimise the potential contamination of inert C&D materials.
- Plan the use of construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.
- Provide training to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduce, reuse and recycling (3Rs).
- Prior to disposal of non-inert C&D materials, it is recommended that wood, steel and other metals to be separated for reuse and/or recycling to minimise the quantity of waste going to landfills.

6.5.4 The generation of yard waste shall be minimised by:

- Avoid unnecessary removal or excessive pruning of trees. Preserve trees in their original locations and implement tree transplanting only when on-site preservation is not feasible;
- Segregate various types of yard waste and shred wood to facilitate reuse and recycling;
- Reuse yard waste on-site for a variety of purposes as much as feasible (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.

6.5.5 The Contractor shall prepare and implement a Waste Management Plan (WMP) as part of the Environmental Management Plan (EMP) referenced to the PNAP No. 243 (ADV-19) to achieve waste minimization, avoidance, recycling, reuse, collection, treatment and disposal of various types of waste. The EMP should be submitted to the Contracted Party for approval. The Contractor should implement the waste management practices mentioned in the WMP throughout the entire construction stage of the Project. The WMP must be reviewed regularly and updated by the Contractor.

6.5.6 In addition to the above measures, specific mitigation measures are recommended below for the identified waste arising to minimise environmental impacts during storage, collection, transportation and disposal of these wastes.

Storage, Collection and Transportation of Waste

6.5.7 Materials stored on-site would give rise to adverse environmental impacts if they are not properly managed. Recommendations to minimise the impacts include:

- Clean the storage areas routinely.
- Waste such as soil should be stored well in secure containment facilities.
- Storage areas should be covered and provided with a water spraying system to prevent materials being blown away.
- Stockpiled C&D materials in open space should be properly covered with tarpaulin especially when typhoon or heavy rainstorms are predicted.

6.5.8 Waste should be collected by licenced collectors employed by the Contractor for the collection and transportation of waste from the work area to the respective disposal site. Recommendations to minimise the impacts include:

- Remove the waste as soon as possible.
- Use enclosed containers or covered trucks for waste transportation in order to minimise the impacts during transportation.
- Relevant permits should be shown by the waste collector prior to waste collection.
- Record the amount of waste generated, recycled and disposed.

Construction and Demolition Materials

6.5.9 In order to minimise impacts resulting from the collection and transportation of inert C&D materials for off-site disposal, the inert C&D materials (particularly excavated soil) should be reused on-site as fill material as far as practicable. In addition, inert C&D materials generated from excavation works could be reused as fill materials in local projects that require public fills for reclamation.

6.5.10 The surplus inert C&D materials will be transported to the Government's Public Fill Reception Facilities (PFRFs) for beneficial use by other projects in Hong Kong. The C&D materials generated should be sorted on site to segregate any inert C&D materials for reuse or transported to PFRFs whereas the non-recyclable non-inert C&D materials will be disposed of at the designated landfill site.

6.5.11 In order to monitor the disposal of inert C&D materials and non-recyclable non-inert C&D waste respectively at PFRFs and the designated landfill site, and to control fly-tipping, it is recommended that the Contractor follow the DEVB TC(W) No. 6/2010 for Trip Ticket System for Disposal of Construction & Demolition Materials issued by the Development Bureau. In addition, it is also recommended that the Contractor should prepare and implement a WMP detailing their various waste arising and waste management practices referenced to the PNAP No. 243 (ADV-19). The WMP becomes part of the EMP for Contracted Party's approval before commencement of construction works.

6.5.12 All dump trucks engaged on-site for delivery of inert and non-inert C&D material from the site to the designated disposal location, including PFRFs, landfill etc., should be equipped with GPS or equivalent system for tracking and monitoring of their travel routings and parking locations by the Contractor to prohibit illegal dumping and landfilling of materials.

6.5.13 The data collected by GPS or equivalent system should be recorded properly for checking and analysis the travel routing and parking locations of dump truck engaged on site.

Chemical Waste

6.5.14 When chemical wastes are produced at the construction site, the Contractor will be required to register with the 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. Good quality containers compatible with the chemical waste should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Contractor should use a licenced chemical waste collector to transport and dispose of the chemical waste at the approved Chemical Waste Treatment Centre or other licenced recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

6.5.15 Potential environmental impacts arising from the handling activities (including storage, collection, transportation and disposal of chemical waste) are expected to be minimal with the implementation of appropriate mitigation measures as recommended.

Potential Contamination from Construction Plants, Equipment or Chemicals Spillage or Leakage

6.5.16 As a precautionary measures, standard good site practices listed in **Sections 5.5.16** to **5.5.18** shall be observed during construction phase as spillage or leakage from construction plants, equipment or chemicals may pose potential contamination to the soil and/or groundwater.

General Refuse

6.5.17 During construction, general refuse should be segregated at source for recyclable and non-recyclable waste to be stored in either tri-coloured recycling bins or general refuse bins. Bins shall be enclosed or in the form of compaction units separated from C&D materials. A reputable waste collector should be employed by the Contractor to remove recyclable and non-recyclable general refuse from the site, separately from C&D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind-blown' light material. The collection frequency of general refuse during construction phase estimated to be not more than 1 truck trip per day.

Land-Based Sediment

6.5.18 The excavated sediment should be excavated, handled, treated, transported, reused, and/or disposed of, if required, in a manner that would minimize adverse environmental impacts. The excavated sediment is proposed to be treated and reused, e.g. as backfilling materials for pile caps. The excavated sediment would be treated using cement stabilization / solidification. The treated sediment shall be tested to confirm the compliance with the treatment targets of the Unconfined Compressive Strength (UCS) Test and the Toxicity Characteristic Leaching Procedure (TCLP) Test in accordance with the USEPA guidelines (1986) – Handbook for Stabilisation/Solidification of Hazardous Wastes, EPA/540/2-86/001 and the section 268.48 of Title 40 of the Code of Federal Regulations (CFR) – Universal Treatment Standards respectively. In addition to the UCS test requirement, the strength requirements of treated materials are subject to the respective geotechnical works. Pilot-scale trial should be conducted prior to commencement of treatment to determine the sediment and cement ratio, as well as the optimal curing time to achieve the treatment standards. In case sediment treatment and/or reuse are not feasible, offsite

disposal of sediment shall only be considered as the last resort and should follow the requirement and procedures stated in the Guidance Note No. 1/2024 under DASO.

6.5.19 The cement mixing process shall be properly scheduled and carried out in an enclosed environment to minimise noise and air quality impacts. Requirement of the Air Pollution Ordinance (Construction Dust) Regulation and Water Pollution Control Ordinance, where relevant, shall be followed during excavation, handling, treatment and transportation of excavated sediment.

6.5.20 To minimize the exposure of contaminated materials, workers shall wear appropriate personal protective equipment when handling sediment. Adequate washing and cleaning facilities shall also be provided on site.

6.5.21 Should marine disposal of sediment be unavoidable in later stage upon exhaustion of available reuse options, separate submission (e.g. SSTP and SQR) shall be submitted to EPD's Marine Dumping Control Section of the Territorial Control Office if application of dumping permit under the DASO is required. Rationale for sediment removal / disposal will also need to be submitted to the MFC of the CEDD for agreement in accordance with the Guidance Note No. 1/2024 under DASO.

Operation Phase

6.5.22 Mitigation measures are recommended for the identified types of waste in order to minimise the potential adverse impacts to the environment during operation phase.

General Refuse

6.5.23 As mentioned in **Section 6.4.41**, general refuse is estimated at 0.20 tpd and is the main waste type which would be generated during operation phase. General refuse should be collected on a daily basis and delivered to the refuse collection point accordingly. A reputable waste collector should be employed to remove general refuse regularly to avoid odour nuisance or pest and vermin problems. Sufficient recycling containers are recommended to be provided at suitable and noticeable locations in the area to encourage recycling of waste such as food waste, aluminium cans, plastics bottles and wastepaper. The Contracted Party should minimise the quantity of waste to be disposed of at landfill and maximise the recovery of materials from the waste stream.

6.5.24 With the proper implementation of the effective waste prevention and recycling programme, significant environmental impacts are not anticipated.

Chemical Waste

6.5.25 In the case of chemical waste being generated, the operator should register with EPD as a Chemical Waste Producer. The chemical waste should be collected periodically in drum-type containers and disposed of at licenced chemical waste treatment and disposal facilities by licenced chemical waste collectors. With proper handling, storage and disposal of the chemical waste, no adverse environmental impact is expected to be generated.

6.5.26 The Waste Disposal (Chemical Waste) (General) Regulation and the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes shall be followed when implementing a trip-ticket system by the operator to monitor the chemical waste disposal process.

6.6 RESIDUAL WASTE MANAGEMENT IMPLICATIONS

6.6.1 With the implementation of recommended mitigation measures for the storing, handling, transportation and disposal of the identified waste, adverse residual waste management implications are not anticipated for both the construction and operation phases.

6.7 ENVIRONMENTAL MONITORING AND AUDIT

6.7.1 The Contractor is responsible for ensuring all wastes generated are stored, handled and disposed of in accordance with good waste management practices, relevant guidelines and legislations during the construction period.

6.7.2 A Waste Management Plan (WMP) should be prepared as part of the Environmental Management Plan (EMP) referenced to the PNAP No. 243 (ADV-19) and submitted to the Contracted Party for approval. The recommended mitigation measures should form the basis of the WMP. The monitoring and auditing requirement stated in the PNAP No. 243 (ADV-13) should be followed regarding the management of C&D materials. A Construction and Demolition Material Management Plan (C&DMMP) should be prepared at early design stage.

6.7.3 General refuse as the main waste type, along with a small amount of chemical waste will be generated during operation phase. Adverse environmental impacts would not be anticipated through the implementation of good waste management practices, sufficient capacity of serving waste disposal facilities, and a waste reduction and recycling programme.

6.8 CONCLUSION

6.8.1 The types and volumes of waste generated during the construction and operation stages of the Project have been evaluated.

Construction Phase

6.8.2 Potential waste management implications from the generation of waste during the construction phase have been evaluated. Mitigation measures, including the opportunity for on-site sorting, reusing excavated clean soil and fill materials are devised in the construction method to minimise the surplus materials to be disposed. Recommendations have been made for implementation by the Contractor during the construction period to minimise waste generation and off-site disposal. The disposal quantities for C&D materials and their disposal methods have also been assessed.

6.8.3 An estimated total of 80,900 m^3 of C&D materials are expected to be generated, of which 67,400 m^3 are inert C&D materials and 13,500 m^3 are non-inert C&D materials. Assuming a 20% recycling rate, it is estimated that 2,700 m^3 of non-inert C&D waste will be recycled. The estimated quantity of inert C&D materials to be reused on-site is 13,950 m^3. Remaining inert C&D materials of 53,450 m^3 is estimated to be transported to the Public Fill Reception Facilities (Tuen Mun Area 38 Fill Bank and Tseung Kwan O Area 137 Fill Bank), whereas non-recyclable non-inert C&D materials of 10,800 m^3 will be disposed of at landfills (SENT). A Construction and Demolition Material Management Plan (C&DMMP) should be prepared at early design stage.

6.8.4 Land-based sediment of 2,525 m^3 is estimated to be generated. It is estimated that all excavated sediment will be treated and reused on-site. In case sediment treatment and/or reuse are not feasible, offsite disposal of sediment shall only be considered as

the last resort and should follow the requirement and procedures stated in the Guidance Note No. 1/2024 under DASO.

6.8.5 Construction waste is suggested to be on-site recycled and reused as much as possible. Various waste management measures and good site practices also provided to reduce the volume of waste. Provided that the waste is managed by implementing all the recommended measures, no unacceptable adverse environmental impacts arising from the handling, storage, transportation or disposal of the waste generated by the Project would be envisaged.

6.8.6 During construction phase, general refuse should be recycled as far as possible through the placement of recycling bins. The remaining refuse should be collected by waste collectors and disposed of at landfills. Chemical waste generated shall be collected by a licenced chemical waste collector and to be disposed of at a licenced chemical waste treatment and disposal facility. Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Waste published by the EPD.

6.8.7 Entrapment or accumulation of floating refuse on the seawall is considered as minimal. Any floating refuse trapped within the Project area will be collected and disposed of as general refuse, which adopt the same proposed disposal outlets and tentative transportation routings for general refuse. With implementation of proper waste management and training to workers, floating refuse arising from the construction activities is not anticipated.

Operation Phase

6.8.8 The types of waste that would be generated during the operational phase have been assessed. Recommendations have been made to ensure proper treatment and waste disposal.

6.8.9 From operational phase, general refuse is the main waste type which would be generated from the operation of the Project, other waste types include chemical waste is also expected. Approximately 0.20 tpd general refuse will be generated from the staff, of which 0.09 tpd shall be recycled and 0.11 tpd for final disposal. The amount of general refuse going to landfills should be minimised and the recovery of materials from the waste stream should be maximised.

6.8.10 Chemical wastes are anticipated from the operation of the depot for vehicle maintenance and maintenance activities in stations. Chemical waste shall be handled and disposal of according to the measures stipulated in the Waste Disposal (Chemical Waste) (General) Regulation, and the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes shall also be observed. Chemical wastes shall be collected periodically in drum-type containers and disposed of at licenced chemical waste treatment and disposal facilities by licenced chemical waste collectors.

7 VISUAL IMPACT ASSESSMENT

7.1 INTRODUCTION

7.1.1 This section identifies and assesses the potential visual impacts arising from the operation of the Project. Based on the impact identified, visual mitigation measures are proposed to alleviate potential adverse impact.

7.2 ENVIRONMENTAL LEGISLATIONS, STANDARDS AND GUIDELINES

7.2.1 The following or the latest legislations, standards, circulars, and guidelines are applicable to visual impact assessment associated with the operation of the Project:

- BD PNAP APP-152 – Sustainable Building Design Guidelines;
- DEVB TC(W) No. 3/2024 – Allocation of Space for Quality Greening on Roads;
- Environment Impact Assessment Study Brief No: ESB-369/2024;
- Environmental Impact Assessment Ordinance (EIAO) (Cap.499) and EIAO-TM Annexes 3,10,11, 18 & 20;
- Environmental Impact Assessment Ordinance Guidance Note 8/2023 - Preparation of Landscape and Visual Impact Assessment;
- General Standards and Maintenance Requirements for Landscape Works to be Handed Over to LCSD for Horticultural Maintenance (March 2021 or its prevailing version);
- Hong Kong Planning Standards and Guidelines Chapters 4, 10, 11 and 12;
- Topical Papers and Reports under the “Hong Kong 2030+: Towards a Planning Vision and Strategy Transcending 2030” (Hong Kong 2030+) promulgated by the Planning Department;
- Town Planning Ordinance (Cap 131);
- Town Planning (Amendment) Ordinance, 2023; and
- Any other relevant ordinances, circulars, international standards and guidelines.

7.3 ASSESSMENT METHODOLOGY

GENERAL

7.3.1 The assessment area for the visual impact assessment is defined by the visual envelope shown in **Figure 7.1**. All visual elements, key viewing points, direct impacts on existing/planned/approved land uses, and the proposed visual mitigation measures shall be indicated and demonstrated clearly with support of sufficient illustration materials including coloured plans, photos, and computer-generated photomontages. Where applicable and practicable, enhancement measures shall be adequately considered and proposed.

7.3.2 VIA is carried out to assess the potential visual impacts arising from the Project in accordance with EIAO GN No. 8/2023, relevant Annexes of the Technical Memorandum issued under EIAO, EIA Study Brief No: ESB-369/2024 and all other related prevailing technical circulars/guidelines listed in **Section 7.2**. The assessment methodology will appraise, evaluate and present the visual impact and recommend any improvement that could be made in refining the proposed development of the Project. The recommended mitigation and improvement measures shall consider the development potential provided in the relevant statutory plans, Building (Planning) Regulations, Sustainable Building Design Guidelines, planning briefs, and Urban Design Guidelines in the HKPSG and take into account existing constraints, the effectiveness, feasibility and practicability of these measures. It involves the following procedures.

7.3.3 **Identification and Plotting of the Visual Envelope (VE) -** The VE is the viewshed of the Project formed by natural or man-made features. It will be based on desktop study of topographic maps, street maps, photographs, cross-sections to determine visibility and subsequent site visits. Estimated heights of the proposed structures are used to determine their visibility within the VE Assessment. The preliminary layout plan of the proposed KTGTS is provided in **Appendix 7.1**. Existing vegetation will be assessed in its current condition and assumed to remain at a similar height and density.

7.3.4 **Identification of Key Public Viewing Points (VPs) -** VPs are the key public viewing points that may be affected by the Project during the operation phase. Key VPs can be kinetic or static. They include key pedestrian nodes, popular public areas used by public or tourists for outdoor activities, recreational activities, rest, leisure, sitting-out areas, walking, sight-seeing and prominent travel routes. VP will be assessed at the human eye level. Photomontages providing indicative illustrations of the impact will provide a combined, broad indication of how the Project will look overall.

7.3.5 **Identification of Visual Elements -** A description of the key visual elements within the sight of VP will be reported. These may include any major physical structures, visual resources or attractors, visual eyesores or detractors that currently exist or are known to be planned within the VE. The potential impact on views to ridgelines and harbour will also be reviewed.

7.3.6 **Assessment of Sensitivity of VPs -** Factors considered when assessing VPs sensitivity include the type of viewers and value of existing views. The sensitivity of the VPs is classified as follows:

Table 7.1 Sensitivity of VPs

High	The VP is highly sensitive to any change in their viewing experience.
Medium	The VP is moderately sensitive to any change in their viewing experience.
Low	The VP is only slightly sensitive to any change in their viewing experience.

7.3.7 **Identification of Potential Sources of Visual Impacts -** Various elements of the operation stage that have potential to cause visual impacts will be identified.

7.3.8 **Assessment of the Potential Magnitude of Change to VPs -** The magnitude of change depends on numbers of factors including the visual composition (impacts on

visual balance, compatibility, harmony, unity or contrast), visual obstruction (impacts on condition, quality and character of visual resources) and visual change (impacts on changes with direct sightlines (considering degree of visibility and viewing distance) to the existing and future public views by comparing before and after the proposed development of the Project). The magnitude of change is classified as follows:

Table 7.2 Potential Magnitude of Change to VPs

Substantial	The VPs will experience a major change in the character of their existing views.
Moderate	The VPs will experience a moderate change in the character of their existing views
Slight	The VPs will experience a small change in the character of their existing views.
Negligible	The VPs will experience no discernible change in the character of their existing views.

7.3.9 **Identification of the Potential Visual Mitigation and Enhancement Measures -** These may take the form of adopting alternative designs or revisions to the basic engineering, infrastructure and architectural designs to prevent and/ or minimise adverse impacts, remedial measures such as colour and textural treatment of built structures, landscape design and greening; compensatory measures such as tree planting. The agents responsible for the funding, implementation and management/ maintenance of mitigation measures will be identified. The visual mitigation measures will be recommended for operation phase.

7.3.10 **Prediction of the Impact Significance for Visual Impacts** - By assessing the magnitude of change and the sensitivity of VPs, the degree of significance of the impacts are categorised as adverse/ beneficial. The rationale for dividing the degree of significance into four thresholds, namely, Negligible, Slight, Moderate and Substantial, depending on the combination of a magnitude of change and sensitivity of VPs will be provided.

Table 7.3 Relationship between Sensitivity and Magnitude of Change in Assessing Impact Significance

Magnitude of Change	**Substantial**	Moderate	Moderate / Substantial	Substantial
	Moderate	Moderate / Slight	Moderate	Moderate / Substantial
	Slight	Slight	Slight / Moderate	Moderate
	Negligible	Negligible	Negligible	Negligible
		Low	**Medium**	**High**
		Sensitivity to Change		

Note: All impact significance will be adverse unless otherwise stated. ***Substantial*** *– If the adverse effects are considered too excessive and obstructive, and significant modification is required to mitigate the impacts.* ***Moderate*** *– there will be some adverse visual effects caused by the project, but these can be eliminated, reduced or moderated to a certain extent by design/mitigation measures.* ***Slight*** *– there will be slight adverse visual effects caused by the project.* ***Negligible*** *–There will be no noticeable effects or insignificant visual effects caused by the project.*

7.3.11 **Mitigation Measures** - The mitigation measures will not only be concerned with damage reduction but also include consideration of potential enhancement of existing visual quality. Agents shall be identified for the management and maintenance works of the proposed mitigation measures to ensure their effectiveness throughout the operation phase of the Project. A practical programme and funding proposal for the implementation, management and maintenance of the recommended visual mitigation measures and parties responsible from design to operation stage shall be provided.

7.3.12 The Operation Phase Measures shall be adopted during the detailed design stage and be built as part of the construction works so that they are in place at the date of commissioning of the Project.

7.3.13 Annotated illustration materials such as colour perspective drawings, plans, section/ elevation diagrams, annotated oblique aerial photographs, photographs taken at viewing points, and computer-generated photomontages will be adopted to fully illustrate the visual impacts of the Project. The visual impacts of the Project from the representative viewpoints will be prepared to illustrate existing conditions and proposed development of the Project with and without mitigation measures at the operation phase, by computer-generated photomontage in order to demonstrate the effectiveness of the proposed mitigation measures.

7.4 VISUAL BASELINE STUDY

GENERAL

7.4.1 The visual envelope (VE) is shaped by Kai Tak Avenue, Kai Tak Station Square, Kai Tak Sports Park, open view towards Lion Rock to the north, the planned Kai Tak Metro Park, Kai Tak Sky Garden and the open view towards Lei Yue Mun to the Southeast. The extent of Visual Envelope is presented in **Figure 7.1**.

7.4.2 According to the Approved Kai Tak Outline Zoning Plan No. S/K22/8, a regional visual corridor towards the Lion Rock and its mountain ridgeline shall be preserved. In addition, several views mentioned in the approved Kai Tak OZP, e.g. the planned Lung Tsun Stone Bridge Preservation Corridor, Kai Tak River and view towards Lei Yue Mun and Fei Ngo Shan shall also be preserved.

7.4.3 Although the Project may fall within the view from Strategic Viewing Point 4 (SVP4) – Quarry Bay Park in accordance with the website of Planning Department, the Project would be largely hidden among the residential and commercial developments and the view towards the ridgelines would be preserved.

7.4.4 The key visual resources for this Project include the open space and landscaped area at Kai Tak Station Square, Kai Tak Sports Park, Kai Tak Sky Garden, Kai Tak Avenue Park etc. Waterbodies such as Victor Harbour, Kai Tak River, open sky view and mountain backdrop with its ridgeline also formed as the visual resources for the Project. The key visual detractors are the construction sites, high-rise residential/commercial buildings and the urban transportations and infrastructures.

PLANNED / COMMITTED DEVELOPMENTS

7.4.5 A list of planned/committed development adjacent to the Site is shown and described below. A plan indicates the location of the planned / committed developments is provided in **Figure 7.1.**

1. Area 4D Site 2 - A planned Kai Tak Tourism Node is located at the area of the “Youth Post” Hostel, which is located to the southeast of the proposed station at proposed Depot (with Shing King Street below);

2. Area 4C Site 4 and Area 4C Site 5 – Two sites located to the northwest of Kai Tak Cruise Terminal will be used for the planned commercial developments. The proposed station at proposed Depot (with Shing King Street below) of KTGTS will also be located within these sites;
3. Area 4C Site 3 – A site located to the northwest of Area 4C Site 4 is under construction for planned private residential development;
4. Area 4E Site 2 – A site located to the northwest of Area 4A Site 2 under construction for planned private residential development;
5. An Area located to the northwest of Area 4E Site 2 will be developed as a planned Kai Tak Metro Park;
6. Site 4E1 and Site 4A1 – Two sites located opposite to Area 4E Site 2 and Area 4A Site 2 are under construction for the planned private residential developments;
7. Area 4B Site 4 and Area 4B Site 5 – Two sites (Area 4B Site 4 is under construction) adjacent to Area 4B Site 3, are planned for private residential development;
8. Area 2B Site 3, Area 2B Site 4 – Two pieces of land located to the west of North Garden of Kai Tak Sports Park are approved under the Planning Application (No.: A/K22/35) and planned for a public housing development;
9. Area 2B Site 1 – A piece of land adjacent to the planned Lung Tsun Stone Bridge Preservation Corridor is planned for a public residential development;
10. Area 2A Site 1 – A piece of land adjacent to the planned Lung Tsun Stone Bridge Preservation Corridor is planned for a comprehensive development area;
11. Area 2A Site 2 - A piece of land adjacent to the planned Lung Tsun Stone Bridge Preservation Corridor is approved under the Planning Application (Application No.: A/K22/38) and planned for private residential development
12. Lung Tsun Stone Bridge Preservation Corridor – A site located adjacent to the planned residential development of Area 2A Site 2 is under construction;
13. Area 1M Site 1 – A piece of land adjacent to Airside is planned for a comprehensive development.

VP IDENTIFICATION

7.4.6 Viewing points (VP) have been identified to assess the visual impact on the sensitivity of public viewers. VP can be kinetic or static and taken at human eye level for a realistic presentation and assessment. Summary of VPs, sensitivity, magnitude of changes and overall visual impact are described in **Table 7.5.**

7.4.7 Their locations and representative photos are shown in **Figure 7.1 and Figure 7.3 – Figure 7.13.**

7.4.8 Names of VPs are listed in the following:

VP1 - Kai Tak Station Square

VP2 - Open Space at Kai Tak River adjacent to Airside

VP3 - Planned Lung Tsun Stone Bridge Preservation Corridor

VP4 - Kai Tak Sports Park

VP5 - Promenade at Ma Tau Kok (adjacent to Hoi Sham Park)

VP6 - Planned Kai Tak Metro Park

VP 7 - Kai Tak Sky Garden – Garden Plaza

VP8 - Kai Tak Sky Garden – Fountain Plaza

VP9 - Southern End of Kai Tak Sky Garden

VP10 - Waterfront of Kai Tak Approach Channel – Kai Tak Bridge Road

VP11 - Promenade along Kai Tak Approach Channel – Hong Kong Children's Hospital

7.5 Sources of Visual Impact

LAYOUT OF THE PROJECT

7.5.1 The proposed alignment starts from the south and commences at the Kai Tak Cruise Terminal, follows the Kai Tak Sky Garden and pass on the southern side of the Shing Fung Road Park. From there, the alignment will pass on the eastern side of Kai Tak Sports Park and swinging into Kai Tak Station Square. The terminus will be located adjacent to the Kai Tak MTR Station at Kai Tak Station Square. The preliminary layout plan and the alignment drawing for the proposed KTGTS are provided in **Appendix 7.1** and **Appendix 7.2** respectively.

7.5.2 Six Stations and one depot are proposed for the KTGTS, and details are provided in the followings:

- **Station near Kai Tak Cruise Terminal,** will be the terminus station, it is proposed to be located near to exist hall of Kai Tak Cruise Terminal;
- **Station at Proposed Depot (with Shing King Street below),** is proposed to be located at the sites of Area 4C Site 4 and Area 4C Site 5;
- **Station at Kai Tak Sky Garden**, is proposed to be located between Area 4B Site 1 and Area 4C Site 1 above Kai Tak Sky Garden;
- **Station near Shing Fung Road Park,** is proposed to be located to the south of Shing Fung Road Park;
- **Station near Kai Tak Sports Park,** is proposed to be located to the northeast of the Kai Tak Sports Park;
- **Station at Kai Tak Station Square,** will be the terminus station at the Kai Tak Station Square, interchanging with MTR Kai Tak Station.

SOURCES OF IMPACTS

7.5.3 Potential visual impacts would result from permanent above-ground structure elements during operation phase. The sources of visual impacts are listed below.

Table 7.4 Sources of Visual Impact

Code	Description
Operation Phase	
O1	Operation of KTGTS and the associated above-ground stations
O2	Permanent removal of existing trees and other vegetations

Table 7.5 Matrix of Visual Impact

VP	Location	Sensitivity			Magnitude of Change				Significance of Visual Impact before Mitigation	Recommended Mitigation Measures (Section 7.6)	Significance of Visual Impact after Mitigation
		Type of Viewers	Value of Existing Views	Viewer Sensitivity	Visual Composition	Visual Obstruction	Visual Change	Magnitude of Change			
1	View from Kai Tak Station Square	Recreational users / travellers	Good	High	The proposed station at Kai Tak Station Square and the associated alignment will be located between the existing high-rise buildings in the midground and formed as a piece of building mass in an overall view. Visual composition in the foreground is not affected. The Project is considered not incompatible with the surroundings.	Although the Project would partially affect the soft landscaped area and sky view in the midground, the proposed landscape treatment and compensatory trees planting would screen off part of the building structure and enhance the visual interest. Urban landscaped area in the foreground would not be affected.	This viewpoint is at a relatively short-range view (approx. 75m) with a direct visibility to the Project. The direct sightline of existing high-rise residential building and landscaped area would be partially replaced by the proposed Station and alignment with reduced depth of view. However, with the implementation of aesthetic design of building, the scale of proposed structures would be minimized and blended in with the adjacent high-rise developments. In view of the above, the magnitude of changes is considered ***moderate***.	Moderate	Moderate / Substantial	OM1-OM3	Moderate
	Description of VP (i) Existing View: This VP is located at the north apron of the former Kai Tak Airport and links with the MTR Kai Tak Station. According to the Approved Kai Tak Outline Zoning Plan No. S/K22/8, Kai Tak Station Square is one of the primary activity nodes in the district. It is an urban leisure space with soft and hard landscaping environment for public enjoyment. It provides a quality open plaza with variety of recreational facilities available to meet the need of people of all ages. It represents the view from the northeast at a relative short-range view. The view shows the urban park setting with landscaped and hard paved areas in the foreground and midground views, high-rise residential and open sky view can be observed in the background. (ii) Approximate number of viewers: Many (iii) Sources of impact: O1-O2										
2	View from Open Space at Kai Tak River adjacent to Airside	Recreational users / travellers	Good	High	The proposed alignment will be in front of the existing high-rise building mass and formed a new visual element in the midground, while the proposed station at Kai Tak Station Square is partially observed to the left of this viewpoint. Visual composition in the foreground is not affected. With consideration of the surrounding high-rise building mass, the Project would form part of the urban infrastructure in the existing built environment, it is considered not incompatible with the surroundings.	Existing visual resources such as urban landscaped area in the midground and open sky view in both midground and background would be obstructed by the Station and alignment. Yet, with the implementation of the proposed landscape treatment such as vegetations and compensatory tree planting, visual amenity would be enhanced. Urban landscaped area in the foreground would not be affected.	This viewpoint is at a relatively short-range view (approx. 25m) with a direct visibility to the Project. The Project would integrate with the surrounding high-rise building structures and form part of the urban infrastructure in the existing built environment with reduced depth of view. Proposed landscape and aesthetic treatment would also scale down the hardness of building structures. In view of the above, the magnitude of changes is considered ***moderate.***	Moderate	Moderate / Substantial	OM1-OM3	Moderate
	Description of VP (i) Existing View: This viewpoint represents the recreational users or travellers of open space adjacent to Kai Tak River, viewing from the northwest to the Site. In accordance with the approved Kai Tak Outline Zoning Plan No. S/K22/8, the landmark tower – Airside, accompany with the landscaped Kai Tak River and elevated landscape walkway to signify the prominent image in the locality. The existing view is a short-ranged view dominated by Kai Tak River and outdoor landscaped area in the foreground, high-rise residential building mass in the midground. Open sky view formulates the background view. (ii) Approximate number of viewers: Many										

	(iii) Sources of impact: O1-O2									
3	View from planned Lung Tsun Stone Bridge Preservation Corridor	Future recreational users of the Planned Lung Tsun Stone Bridge Preservation Corridor	Fair	Medium	The existing construction site and the high-rise residential buildings would be replaced by the planned Lung Tsun Stone Bridge Preservation Corridor in the midground and the planned developments at both sides of the viewing point. Only limited portion of the proposed station near Kai Tak Sports Park and alignment would be viewed in this viewpoint. The Project is considered compatible with the surroundings.	The Project is in a far distance from this viewpoint, only limited portion of the proposed structures would be viewed, visual elements of the planned Lung Tsun Stone Bridge Preservation Corridor and open sky view would not be affected.	This viewpoint is at a relatively long-range view (approx. 286m) with a partial visibility to the Project. The direct sightline will be replaced by the planned Lung Tsun Stone Bridge Preservation Corridor and the planned commercial / residential buildings. The proposed structures would integrate with the planned developments, forms part of the urban infrastructures and blend in with the existing visual context. In view of the above, the magnitude of changes is considered ***negligible***.	Negligible	Negligible	OM1	Negligible
	Description of VP (i) Existing View: The existing foreground view is dominated by a construction site (to be replaced by the planned Lung Tsun Stone Bridge Preservation Corridor in the future) with plastics panel for safety purpose, high-rise residential building mass formulates the mid-ground view. Partial sky view can be found at the background. According to the Approved Kai Tak Outline Zoning Plan No. S/K22/8, this area is intended to preserve the Lung Tsun Stone Bridge remnants for public to appreciate the heritage, the existing construction site will be replaced by the planned Lung Tsun Stone Bridge Preservation Corridor in the future. (ii) Approximate number of viewers: Some (iii) Sources of impact: O1									
4	View from Kai Tak Sports Park	Recreational users of Kai Tak Sports Park / travellers of Shing Kai Road	Fair	Medium	No changes of visual composition are found in the foreground and background views, where the existing Shing Kai Road, North Garden of Kai Tak Sports Park and mountain ridgeline of Lion Rock are not affected. The proposed station near Kai Tak Sports Park and alignment will be in the midst and formed a new visual element in the midground view. The Project would be blended in with the existing building mass and formed part of the urban structures. The Project is considered compatible with the surrounding built environment.	Existing visual resources of mountain ridgeline of Fei Ngo Shan, vegetations at the roof of sewage pumping station and sky view would be affected. Yet, the regional visual corridor towards the Lion Rock would be unaffected.	This viewpoint is at a relatively short-range view (approx. 99m) with a direct visibility to the Project. The Project would form part of the urban infrastructures in the existing built environment with reduced depth of view and obstruction to mountain backdrop. With the implementation of vegetations and landscape treatment and the aesthetic design, the scale of proposed station would be minimized. In view of the above, the magnitude of changes is considered ***slight to moderate***.	Slight to moderate	Slight to Moderate	OM1, OM2	Slight to Moderate
	Description of VP (i) Existing View: This VP is located near Kai Tak Sports Park, which is the largest sports facility in Hong Kong and one of the primary activity nodes in the district. It represents the view from the south at a relatively short-ranged view. The existing view is dominated by the foreground view of Shing Kai Road, mid-ground view of North Garden of Kai Tak Sports Park. The background view is dominated by high-rise residential buildings, partial sky view and mountain ridgeline of Lion Rock and Fei Ngo Shan. According to the Approved Kai Tak Outline Zoning Plan No. S/K22/8, a regional visual corridor towards the Lion Rock shall be preserved. (ii) Approximate number of viewers: Some (iii) Sources of impact: O1									
5	View from Promenade at Ma Tau Kok (adjacent to Hoi Sham Park)	Recreational users	Good	High	No changes of visual composition are found in the foreground and background views, where the existing waterbodies, mountain ridgeline of Fei Ngo Shan	The existing visual resources e.g. natural water, open sky view and mountain ridgeline would not be affected by the Project.	This viewpoint is at a relatively long-range view (approx. 921m) with a partial visibility to the Project. The overall sightline will be mostly unaffected. Proposed station near Shing Fung Road	Negligible	Negligible	OM1, OM2	Negligible

					and open sky view would not be affected by the Project. The Project would be blended in with the existing infrastructure, high-rise development setting in the midground view and considered compatible with the surroundings.		Park and the alignment of KTGTS will be incorporated as part of the cityscape view in the midground. In view of the above, the magnitude of changes is considered ***negligible***.				
	Description of VP (i) Existing View: This viewpoint represents the recreational users of waterfront promenade at Ma Tau Kok and Hoi Sham Park, viewing from the southwest to the Project in long-ranged distance. The existing view is dominated by natural water landscape in the front. To Kwa Wan Typhoon Shelter and fishing boats, Kai Tak Sports Park, cluster of mid to high-rise residential and commercial buildings formulate the mid-ground view. Mountain ridgeline and open sky view can be found in the background. (ii) Approximate number of viewers: Some (iii) Sources of impact: O1										
6	View from Planned Kai Tak Metro Park	Future recreational users of the park	Fair	Medium	The proposed viaduct of the KTGTS would introduce a new visual element in the foreground of the view. It will be at the elevated level of the midground and background view and becomes part of the infrastructure in the urban environment. Compatibility of the surrounding is considered not incompatible.	Existing visual resources of open sky view would be partially blocked, while a portion of mountain ridgeline to the left of Lion Rock would be affected.	This viewpoint is at a relatively short-range view (approx. 2m) with a direct visibility to the Project. The proposed alignment would be incorporated with the surrounding high-rise building structures and forms part of the urban infrastructures in the cityscape view with considerable blockage of sky view, in view of the above, the magnitude of changes is considered ***slight to moderate***.	Slight to moderate	Slight to Moderate	OM1	Slight to Moderate
	Description of VP (i) Existing View: This VP is located in the upper part of the former Kai Tak Airport runway, it is designed as a regional open space for the East Kowloon, a variety of facilities will be provided for different users in the district. According to the Approved Kai Tak Outline Zoning Plan No. S/K22/8, the planned Kai Tak Metro Park is one of the primary activity nodes in the district. This viewpoint represents a close view from the southeast. The existing view is dominated by the foreground view of construction site and Shing Fung Road. The construction site will be partially replaced by park view when Kai Tak Metro Park is completed. Kai Tak Sports Park and mountain ridgelines formulate the mid-ground view. Open sky view and high-rise residential buildings can be found in the background view. (ii) Approximate number of viewers: Some (iii) Sources of impact: O1										
7	View from Kai Tak Sky Garden – Garden Plaza	Recreational users	Good	High	Visual composition would be shaped by the proposed station at Kai Tak Sky Garden and the alignment of KTGTS, where view of the high-rise residential buildings and sky view would be partially replaced. Existing vegetation planting along both sides of Sky Garden would be reallocated to facilitate a smooth and comfortable pedestrian environment.	Existing visual resources of open sky view in the midground at Kai Tak Sky Garden would be partially obstructed by the Project. Although the existing view to Lei Yue Mun would not be observed in this viewpoint, the regional view corridor towards Lei Yue Mun would be obstructed.	This viewpoint is at a relatively short-range view (approx. 8m) with a direct visibility to the Project. There would be moderate blockage of sky view with considerable reduction in depth of view. Design merits including landscape treatments of at-grade planting, aesthetic architectural design of decorative lighting and wall painting, would be proposed to soften the hard structures for the Project. In view of the above, the magnitude of changes is considered ***moderate***.	Moderate	Moderate / Substantial	OM1, OM2	Moderate
	Description of VP (i) Existing View: This VP is located at the former Kai Tak Airport runway, connected to the planned Kai Tak Metro Park, Kai Tak Cruise Terminal and the planned Kai Tak Runway Park. It represents a close view to the Project. The planned and existing residential developments can be seen along both sides of the former runway. It represents a close view from the northwest. The existing view is dominated by the foreground view of urban landscaped area, the planned and existing residential building mass along both sides form the background view at both sides										

	of this viewpoint. In addition, this viewpoint is located at the regional view corridor towards Lei Yue Mun to the southeast, yet the existing view of Lei Yue Mun would not be observed in this viewpoint. Partial sky view can be found in mid of the background. (ii) Approximate number of viewers: Some (iii) Sources of impact: O1-O2									
8	View from Kai Tak Sky Garden – Fountain Plaza	Recreational users	Good	High	The visual composition would be shaped by the proposed station at proposed Depot (with Shing King Street below) and proposed alignment. The Project would be compatible with planned high-rise developments along both sides of Kai Tak Sky Garden and form an overall building mass in the surroundings. Landscaped area of Kai Tak Sky Garden in the foreground would be unaffected.	Although the existing open sky view and cityscape view would be affected by the Project, it would form as an extension of building elements of the adjoining sites. Visual resources of soft landscaping along Kai Tak Sky Garden would be unaffected.	This viewpoint is at a relatively short-range view (approx. 30m) with a direct visibility to the Project. The direct sightline would be partially replaced by the Project. The proposed station at proposed Depot (with Shing King Street below) would be accommodated with the planned commercial buildings at Area 4C Site 4, Area 4C Site 5 and formed as a piece of building mass in an overall view. In view of the above, the magnitude of changes is considered ***moderate***.	Moderate	Moderate / Substantial	OM1, OM2	Moderate
	<u>Description of VP</u> (i) Existing View: This VP is located at the former Kai Tak Airport runway, connected to the planned Kai Tak Metro Park, Kai Tak Cruise Terminal and the planned Kai Tak Runway Park. It represents the short-ranged view towards the Project. The planned Tourism Node is located to the southeast of this viewpoint. The planned and existing residential and commercial developments can be seen along both sides of the former runway. This viewpoint is looking towards west, it represents a close view from the southeast. The existing view is dominated by the foreground view of soft and hard urban landscaped area, the planned and existing residential and commercial building mass along both sides of Kai Tak Sky Garden are at the midground view. Open sky view is at the background. (ii) Approximate number of viewers: Some (iii) Sources of impact: O1									
9	View from Southern End of Kai Tak Sky Garden	Recreational users	Good	High	Visual composition of the hard and soft landscaped area of Kai Tak Sky Garden and mountain ridgeline will remain unchanged. The proposed structures of KTGTS and proposed station near Kai Tak Cruise Terminal formulate the additional visual elements in the midground and foreground views. Design merits such as aesthetic design of the proposed structures would be proposed to enhance the compatibility with the surrounding visual context.	Existing visual context of open sky view would be affected by the Project. Yet, other visual resources such as the mountain ridgelines and landscaped plantings are not affected.	This viewpoint is at a relatively short-range view (approx. 24m) with a direct visibility to the Project. The proposed alignment and associated structures would be seen from the foreground to midground view, where part of the existing sky view would be affected with reduced depth of view. Aesthetic design would be proposed to soften the structural edge and reduce the building bulk of the Project. In view of the above, the magnitude of changes is considered ***moderate***.	Moderate	Moderate / Substantial	OM1	Moderate
	<u>Description of VP</u> (i) Existing View: This VP is located at the southern end of Kai Tak Sky Garden along the regional view corridor to Lei Yue Mun, represents the short-ranged view. The existing view is dominated by the foreground view of urban landscaped area with hard paving and water features. Kai Tak Cruise Terminal and Kai Tak Community Isolation Facility are at both sides of this viewpoint. Open sky view occupied the background of this viewpoint. (ii) Approximate number of viewers: Some (iii) Sources of impact: O1									
10	View from Waterfront of Kai Tak Approach Channel – Kai				No changes of visual composition are found in the foreground and background views, where the existing waterbodies and open sky	A portion of mountain and a very limited sky view would be affected by the proposed alignment of KTGTS in the midground. Existing visual	This viewpoint is at a relatively long-range view (approx. 346m) with a partial visibility to the Project. The overall sightline will be mostly unaffected. Proposed	Negligible	Negligible	OM1 – OM2	Negligible

	Tak Bridge Road	Recreational Users / Travellers	Fair	Medium	view are not affected. The proposed station near Shing Fung Road Park and the alignment of KTGTS would partially be seen in the midground, located between the urban infrastructure and high-rise development setting. The Project is considered compatible with the surroundings.	context of waterbodies would not be affected.	station near Shing Fung Road Park and the alignment of KTGTS would be incorporated as part of the cityscape view in the midground. In view of the above, the magnitude of changes is considered ***negligible.***				
	<u>Description of VP</u> (i) Existing View: The existing view is dominated by the pedestrian walkway of Kai Tak Bridge Road and the engineered Kai Tak Approach Channel in the front. High-rise residential building mass, construction sites and Kai Tak Sports Park are in the mid-ground view. Open sky view can be seen in the background (ii) Approximate number of viewers: Few (iii) Sources of impact: O1										
11	View from Promenade along Kai Tak Approach Channel – Hong Kong Children's Hospital	Recreational users	Fair	Medium	No changes of visual composition are found in the foreground and background views, where the existing waterbodies and open sky view are not affected. The proposed Depot (with Shing King Street below) and the alignment of KTGTS would be accommodated with the planned commercial development at Area 4C Site 4 and Area 4C Site 5 and integrate with surrounding high-rise building mass. The Project is considered compatible with the surrounding built environment.	Only limited portion of sky view and mountain in the midground would be affected. Yet, other visual resources such as waterbodies in the foreground, vegetations and planting in the midground are not affected.	This viewpoint is at a relatively long-range view (approx. 341m) with a partial visibility to the Project, the overall sightline will mostly remain unchanged. With the existing high-rise building mass and the planned commercial developments in the surroundings, the proposed Depot (with Shing King Street below) and alignment of KTGTS would be integrated and formed part of the building mass in the midground. In view of the above, the magnitude of changes is considered ***negligible.***	Negligible	Negligible	OM1 – OM2	Negligible
	<u>Description of VP</u> (i) Existing View: The existing view is dominated by the engineered Kai Tak Approach Channel in the foreground, amenity planting and high-rise residential building mass in the midground. Open sky view can be partially seen at the back of this viewpoint. (ii) Approximate number of viewers: Few (iii) Sources of impact: O1										
	Remarks: The Rating of visual impact is based on comparing the view of the Project with the existing condition, taking into account of the planned and committed development in the surrounding.										

7.6 Visual Mitigation Measures

ALTERNATIVE DESIGN

7.6.1 Design considerations that would avoid or reduce the identified visual impacts, or that would make the Project visually more compatible with the surrounding setting shall be thoroughly examined before adopting other proposed mitigation measures to alleviate the impacts. Alternative designs of the above-ground structures have been reviewed to minimize the visual impacts to the surroundings.

7.6.2 The size of supporting structures has been carefully reviewed to minimize the visual blockage to the surroundings. Under the preliminary scheme, the supporting columns have been minimized, alleviating the visual blockage to the public viewers.

PROPOSED MITIGATION MEASURES

7.6.3 Proposed mitigation measures are used to reduce or moderate the potential visual impacts of the Project or enhance the overall visual quality as far as possible. The proposed mitigation measures in the operation phase are summarized in the **Table 7.6** below. The location of proposed mitigation measures based on the preliminary scheme layout design is provided in **Figure 7.2**.

SIGNIFICANCE OF VISUAL IMPACT

7.6.4 By assessing the magnitude of change, sensitivity of VPs and the proposed mitigation measures based on the preliminary design scheme, the degree of significance of the visual impacts are categorised and summarized in **Table 7.5 .**

Table 7.6 Visual Mitigation Measures

ID No.	Visual Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
Operation Phase					
OM1	Aesthetically Pleasing Design of the Project – A compatible design, construction materials and façade for the Project will assist in achieving visual uniformity with the adjacent landscape and visual context. Finishing materials on the form, micro and macro texture, reflectivity / light absorbance and compatibility to the nearby environment shall be considered where practicable. Kai Tak Identity graphics to reflect the core values of "Current of Vitality" will be considered as far as feasible.	Contracted Party of KTGTS	Contractor	Contracted Party of KTGTS	Contracted Party of KTGTS
OM2	Landscape Treatment – Plantings of new trees, shrubs or groundcovers shall be provided on areas within the Site where practicable. They shall be performed as screened planting to soften and enhance the visual interest of the built structures. Evergreen species shall be chosen to compatible with the surrounding environment where possible.	Contracted Party of KTGTS	Contractor	Contracted Party of KTGTS	Contracted Party of KTGTS
OM3	Compensatory and Transplant Trees Planting – Trees affected due to the Project will be compensated or transplanted to a suitable location as far as practicable. The location of compensatory and transplanted trees shall be considered in the landscape design as part of the amenity planting within the Site. The proposed locations, numbers of compensatory and transplanted trees will be formed in the detailed design stage.	Contracted Party of KTGTS	Contractor	LCSD	LCSD

7.7 Environmental Monitoring and Audit

7.7.1 The Contracted Party of KTGTS shall further develop the detailed architectural and landscape design during detailed design stage. Design audit of the architectural and landscape design shall be carried out by the Environmental Team Leader and verified by the Independent Environmental Checker as conforming to the recommendations in **Table 7.6** of this report. Site audit shall be carried out during the implementation and the first year after completion of the proposed design / mitigation measures to ensure its proper implementation and effectiveness to reduce or moderate the visual effects and enhance the overall visual quality.

7.8 Conclusion

7.8.1 The Project will inevitably result in some visual impacts during operational phases. Sources of impact include operation of KTGTS and the above-ground structure and permanent removal of existing trees and other vegetations.

7.8.2 In considering the minimization of visual impacts, alternative layouts of the Project have been considered. Mitigation measures such as aesthetically pleasing design of the Project (OM1), landscape treatment (OM2) and compensatory tree planting (OM3) have been considered to alleviate visual impacts.

7.8.3 Considering the scale and nature of the Project, it would inevitably result in certain levels of residual visual impacts (i.e. VP1, VP2, VP4, VP6, VP7, VP8, VP9). The residual visual impacts are evaluated below in accordance with Section 4.4.3 of EIAO-TM:

(i) Effects on public health and health of biota or risk to life:

The residual visual impacts would not cause adverse effects on public health and the health of biota or pose risk to life.

(ii) The Magnitude of the adverse environmental impacts:

Although the magnitude of visual impacts of VP4 and VP6 are slight to moderate, the proposed development would be incorporated with the surroundings and forms part of the urban infrastructures in the cityscape view. The residual visual impacts on VP1, VP2, VP7, VP8 and VP9 are moderate due to the short viewing distance. Nevertheless, the proposed development incorporating the aesthetic design and landscape treatments would soften the structural edge, reduce the building bulk of the Project and ameliorate the overall visual qualities.

iii) The geographic extent of the adverse environmental impacts:

For VP1, VP2, VP6, VP7 and VP9, the residual visual impacts are confined within the visual envelope. For VP4 (residual visual impact on mountain ridgeline of Fei Ngo Shan) and VP8 (residual visual impact on cityscape view over the sea) are not located within the visual envelope. Regarding VP4, since Fei Ngo Shan is located at a relatively long distance from the proposed development and it is the tallest mountain in Kowloon, which would be easily viewed within Kai Tak District. Nevertheless, the proposed aesthetic design treatment would scale down the proposed structure and the visual impact would be minimized. For VP8, the cityscape view is at the relatively long distance from the proposed development and the proposed station at proposed Depot (with Shing King Street below) would be accommodated with the

planned commercial buildings at Area 4C Site 4, Area 4C Site 5 and formed as a piece of building mass in an overall view, in view of this, residual visual impact would be minimized.

iv) The duration and frequency of the adverse environmental impacts:

The residual visual impacts are long term and permanent due to the introduction of new development in the area. The duration of view on VP1 (travellers), VP2 (travellers) and VP4 (travellers) are short and transient, they pass through Kai Tak Station Square or Shing Kai Road for transportation purpose. Regarding the recreational users of VP1, VP2, VP4, VP6, VP7, VP8 and VP9, they are likely to perform various recreational activities at Kai Tak Station Square, Kai Tak Sports Park, planned Kai Tak Metro Park and Kai Tak Sky Garden, their duration of view would be relatively long. Yet, the provision of aesthetic pleasing design on the proposed development and provision of landscape treatment would alleviate the visual impacts of the area.

v) The likely size of the community or the environment that may be affected by the adverse impacts:

The residual visual impacts on VP4, VP6, VP7, VP8, VP9 and VP1, VP2 involved “some” and “many” public viewers respectively, these public viewers are mainly recreational users of Kai Tak Station Square, Kai Tak Sports Park, Kai Tak Sky Garden, planned Kai Tak Metro Park and travellers of Kai Tak Station Square and Shing Kai Road. Although, these VPs involved “some” to “many” public viewers, the proposed mitigation measures including aesthetically pleasing design of the Project, planting of new trees, provision of shrubs, groundcover, transplanted trees and compensatory trees, the visual impact would be minimized.

vi) The degree to which the adverse environmental impacts are reversible:

The residual visual impacts are irreversible with the introduction of new development in the area. Nevertheless, the resultant new visual characters would incorporate and form part of the existing urban context of the Kai Tak Development in a wider area. The proposed landscape treatment and aesthetic pleasing design on proposed development would alleviate the visual impacts.

vii) The ecological context:

The residual visual impacts would not occur in ecologically fragile areas such as country park and coastal protection area.

viii) The degree of disruption to sites of cultural heritage:

The residual visual impacts would not disrupt any cultural heritage context.

ix) International and regional importance:

Although the Project may fall within the view from Strategic Viewing Point 4 (SVP4) – Quarry Bay Park in accordance with the website of Planning Department, the Project would be largely hidden among the residential developments and the view towards the ridgelines would be preserved. Visual impact to other key views as detailed in **Section. 7.4.2** would also be minimized.

x) Both the likelihood and degree of uncertainty of adverse environmental impacts:

The residual visual impacts would be foreseeable without uncertainty at the time of EIA preparation.

7.8.4 As discussed above, the impact significance after mitigation measures of VP3, VP5, VP10 & VP11 are negligible, VP4 and VP6 are slight to moderate, VP1, VP2, VP7, VP8 and VP9 are moderate. Although the overall visual impact of the Project to some VPs are considered “slight to moderate” to “moderate”, and the Project would inevitably alter the existing visual context with creation of new visual elements, the Project would form part of the existing urban context of the Kai Tak Development in a wider area at some other VPs. With the full implementation of the proposed mitigation measures, including aesthetically pleasing design of the Project, planting of new trees, provision of shrubs, groundcover, transplanted trees and compensatory trees, residual visual impacts are minimized and acceptable. The design and operation of the Project would also fully comply with relevant ordinances, regulations, standards and guidelines as stated in **Section 7.2**. In view of the above, with full implementation of the recommended mitigation measures, unacceptable adverse residual visual impacts are not expected, as evaluated based on the relevant factors in Section 4.4.3 of the EIAO-TM.

7.8.5 To ensure the mitigation measures to be implemented, a visual mitigation plan is recommended to be updated and submitted in the detailed design stage.

7.8.6 In addition, the proposed KTGTS is in line with Government policy. According to the Policy Address 2023, the smart and green mass transit system was proposed to be implemented in Kai Tak connecting the Kai Tak runway area to the MTR Kai Tak Station to strengthen connectivity among the residential and commercial developments, facilities on tourism, culture and recreation, sports and the community within the area. With the implementation of the above visual mitigation measures and alternative design measures, visual impact on the overall visual context and character would be alleviated.

8 CULTURAL HERITAGE

8.1 INTRODUCTION

8.1.1 This section identifies all heritage sites within the assessment area and assess the possible impact of the Project on the identified items and recommends appropriate protective / monitoring / mitigation measures in accordance with the assessment results and agreed by Antiquities and Monuments Office (AMO).

8.2 ENVIRONMENTAL LEGISLATIONS, STANDARDS AND GUIDELINES

8.2.1 The relevant legislations and associated guidance notes related to cultural heritage impact assessment are identified, including but not limited to the following:

- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), section 2 of Annex 10 and section 2 of Annex 19;
- Antiquities and Monuments Ordinance (A&M Ordinance) (Cap.53); and
- Requirements for Cultural Heritage Impact Assessment (CHIA) from Appendix G of the EIA Study Brief No. ESB-369/2024.

8.2.2 Environmental Impact Assessment Ordinance (Cap. 499)

- Annex 10 of the EIAO-TM outlines the criteria for assessment of impact on sites of cultural heritage. The general presumption is in favour of the protection and conservation of all sites of cultural heritage. In addition, adverse impacts on sites of cultural heritage shall be kept to the absolute minimum.
- Annex 19 of the EIAO-TM outlines the approaches required in investigating and assessing the impacts on sites of cultural heritage. There is no quantitative standard in deciding the relative importance of these sites, but in general, sites of unique archaeological, historical or architectural value will be considered as highly significant. Preservation in totality is preferred. If, due to site constraints and other factors, only preservation in part is possible, this must be fully justified with alternative proposals or layout designs, which confirm the impracticability of total preservation.

8.2.3 Antiquities and Monuments Ordinance (Cap. 53)

- The A&M Ordinance provides statutory protection against the threat of development on Declared Monuments to enable their preservation for posterity. The A&M Ordinance also establishes the statutory procedures to be followed in making such a declaration.
- Any person who discovers an antiquity, or supposed antiquity, is required to report the discovery to the Antiquities Authority.

8.2.4 Requirements for Cultural Heritage Impact Assessment

- Appendix G of the EIA Study Brief No. ESB-369/2024 provides requirements on conducting cultural heritage impact assessment.

8.3 METHODOLOGY

8.3.1 According to Clause 1 (i) and 2 (i) in Appendix G of the EIA Study Brief No. ESB-369/2024, a methodology paper was prepared and agreed with AMO on the scope and methodology of this CHIA and AIA prior to commencement of this assessment. The agreed scope and methodology are discussed below.

ASSESSMENT SCOPE AND AREA

8.3.2 According to Appendix G of the EIA Study Brief No. ESB-369/2024, the Cultural Heritage Impact Assessment (CHIA) shall include a Built Heritage Impact Assessment (BHIA) on items as listed in Clause 3.4.8.2 in the EIA study brief within the assessment area, and an AIA for the construction and operation of the Project.

8.3.3 Items defined in the Clause 3.4.8.2 in the EIA study brief are:

- All declared monuments and proposed monuments;
- All sites and building / structures graded by Antiquities Advisory Board (AAB);
- All sites and building / structures in the list of new items pending for grading assessment by AAB;
- All sites of archaeological interest (SAI); and
- Government historic sites identified by AMO.

8.3.4 In accordance with Clause 3.4.8.2 of the EIA Study Brief, the Assessment Area for CHIA is defined as an area within 300m from the boundary of the Project area (see **Figure 8.1** for the cultural heritage assessment area (CHAA)).

8.3.5 This CHIA included the following tasks:

8.3.6 A desktop review will be conducted based on best available information such as relevant previous studies and background of the site held by Government departments, public libraries and the Hong Kong Heritage Discovery Centre Reference Library to identify the heritage sites items including declared monuments, proposed monuments, Sites/Buildings/Structures graded and in the list of new items pending for grading assessment by the AAB, sites of archaeological interest or Government historic sites identified by AMO within the CHAA. An archaeological desktop review will be conducted to evaluate the potential area affected by the Project and recommend the need and scope of archaeological survey for the Project.

8.3.7 Built Heritage Impact Assessment – The CHAA is mainly located in modern and newly developed area on reclaimed land. Preliminary baseline review identified no declared or proposed monuments, graded historic sites/buildings/structures, Government historic sites are located within the project boundary.

8.3.8 Archaeological Survey – The Lung Tsun Stone Bridge SAI (see **Figure 8.1**) is currently under construction and to be developed as the Lung Tsun Stone Bridge Preservation Corridor at Kai Tak as open space for public enjoyment. The work is scheduled to complete in 2025-26. Therefore, archaeological survey at the SAI for this EIA Study is considered not necessary. The proposed works for this Project are within modern and newly developed area on reclaimed land without archaeological potential. Archaeological survey is also considered not necessary.

8.3.9 Cultural Heritage Impact Assessment - Based on the findings and analysis from desktop review and latest design of the Project, a CHIA including an AIA and BHIA for the construction and operation of the Project was conducted. A checklist including all the affected archaeological resources, impacts identified, recommended measures as

well as the implementation agent and period will be included in the implementation schedule of the EM&A for the Project. The CHIA was conducted according to Annexes 10 and 19 of the TM and the requirements for CHIA in Appendix G of the EIA Study Brief No. ESB-369/2024.

8.4 BASELINE CONDITION

8.4.1 The CHAA is situated on the Kai Tak area and the Kai Tak runway area in Kowloon. The topography of the CHAA is characterized by its flat terrain, which has been significantly changed due to extensive land reclamation and urban development. The elevation is generally low (below +10mPD), with most of the area lying close to sea level.

Geological Background

8.4.2 The majority of the CHAA and the entire works area consist of the Holocene Hang Hau (HHH) formation, characterized by dark grey marine mud. This includes both the Kai Tak area and the Kai Tak runway area. Small areas with superficial geology of alluvium and marine sand are found near Prince Edward Road East. (Details of geology condition refer to **Figure 8.2**)

HISTORICAL BACKGROUND

8.4.3 The Kai Tak area and the Kai Tak Runway area have undergone significant transformations and phases of reclamation over the decades, transitioning from a coastal area with farmland and scattered houses to reclamation and residential development, and then to the Old Kai Tak Airport, and eventually to a mixed-use development zone that includes residential and recreational facilities.

Kai Tak Bund Residential Development

8.4.4 Prior to around 1924, the area southeast of current Prince Edward Road East by Kai Tak was mainly the sea. Along the Prince Edward Road East was the coast (known as Kowloon Bay). The land area was mainly occupied by farmlands with scattered houses. The Kowloon Bay area was reclaimed in 1910-1920s for the Kai Tak Bund residential development (ERM, 2020).

Old Kai Tak Airport and Runway

8.4.5 Along with the Kai Tak Bund residential development, initial reclamation began as part of the development for Kai Tak Airport, which opened in 1925. During the Japanese occupation, they extended the Kai Tak Airport by demolition of the buildings and streets established in the 1920 to 1930s in the adjacent area and a drainage nullah (i.e. Kai Tak Nullah) was built. **Figure 8.3a** shows the nullah alignment at the Kai Tak area in the west of the airport in a 1954 historical map. The construction of the nullah made use of stones taken from the walls of Kowloon Walled City and stones cut from the former Sacred Hill. In 1943, a ritual was conducted for the removal of the Sung Wong Toi inscription stone to make way for stone cutting for the construction of the nullah (吳灞陵 1960: 105). The construction of the Kai Tak Runway involved extensive land reclamation, particularly before 1963. According to information obtained from the Civil Aviation Department (CAD) website, CAD states that, "*The Hong Kong Government approved a master plan for airport development in 1954. In 1958, a new runway was constructed on a promontory into Kowloon Bay. The name 'Hong Kong International Airport' was officially adopted for Kai Tak Airport. In 1962, a passenger terminal building was built*." (CAD website). **Figure 8.3b** shows the Kai Tak area of 1964 where the Japanese built nullah along the Prince Edward Road and Sung Wong Toi Road (as shown in the map) was filled. Later on further reclamation took place at

the Kai Tak area during the mid-1960 to 1970s for Kai Tak development. (see **Figure 8.3c** and **Figure 8.3d**).

8.4.6 After the new airport (Chek Lap Kok Airport) officially opened on July 6, 1998, Kai Tak Airport was subsequently closed. The passenger terminal of the Old Kai Tak Airport was later repurposed for various uses, including government offices, automobile dealerships and showrooms, car parks, a sand depot, a concrete plant, a go-kart racecourse, a bowling alley, a snooker hall, a golf range, and other recreational facilities.

Lung Tsun Stone Bridge

8.4.7 Another historical site is the Lung Tsun Stone Bridge, which is located in the northwest of the CHAA. The Bridge was built between 1873 and 1875 with a total length of about 200m. At the landward end of the Bridge, there was a two-storey pavilion known as the "Pavilion for Greeting Officials" (the Pavilion). A wooden extension of about 80 metres was added in 1892. The Lok Sin Tong played a leading role in raising fund for the bridge extension. In 1910, the timber extension of the Bridge was replaced by a concrete structure. (CEDD website)

8.4.8 The landward portion of the Bridge, including the Pavilion was buried during the Kai Tak reclamation in 1924. The surviving seaward portion of the Bridge continued in use until 1930s providing ferry services running among Hong Kong Island, Hung Hom and Kowloon City. Subsequently both the Bridge and the Pier were demolished and buried under the new reclamation for Kai Tak Airport in 1942 during the Japanese occupation in World War II. (CEDD website)

Changes in the landscape

8.4.9 The changes in the landscape of the CHAA are illustrated in **Figures 8.3a** through **Figure 8.3d**. According to the 1954 map in **Figure 8.3a**, most of the CHAA was situated at sea, with the exception of the northern part, which consisted of reclaimed land from the initial reclamation for the Kai Tak Airport. The construction of the Kai Tak Runway is depicted in the 1964 map in **Figure 8.3b**. The 1972 map in **Figure 8.3c** shows that the Kai Tak Runway was extended southeastward, with additional reclaimed land identified in Kowloon Bay. The 2023 map in **Figure 8.3d** highlights significant transformations that have occurred since the closure of Kai Tak Airport, indicating further reclamation, large-scale construction work, and urbanization within the Kai Tak area.

ARCHAEOLOGICAL BACKGROUND

8.4.10 The Lung Tsun Stone Bridge is listed as the Lung Tsun Stone Bridge SAI by the AMO and is located within CHAA but outside the proposed works area of the Project. (see **Figure 8.1**)

8.4.11 Several archaeological surveys have been conducted in the SAI. The archaeological work carried out in 2003 for the Kai Tak Development did not uncover the bridge. However, a further archaeological investigation in 2008 revealed parts of the Bridge as well as the Former Kowloon City Pier. Based on the findings from this investigation, three components have been identified: the Lung Tsun Stone Bridge, the 1924 reclamation seawall connected to the bridge, and the landing steps of the 1924 reclamation seawall, along with the Former Kowloon City Pier and its associated causeway/seawall from the 1930s. Additionally, two supporting concrete pillars of the Former Kowloon City Pier were exposed during the 2008 investigation. (Arup 2011)

8.4.12 According to the Conservation Management Plan for the Site of Lung Tsun Stone Bridge prepared by AMO in 2009, the remains of the Lung Tsun Stone Bridge are classified as archaeological features of high significance. The broken concrete

supporting pillars and landing steps of the Former Kowloon City Pier are classified as archaeological features of medium significance. (Arup 2011) After public consultation and further study, in-situ preservation of the Bridge was recommended. Accordingly, a 30m-wide corridor of open space for preservation of the Bridge was designated in the amendment to Kai Tak Outline Zoning Plan (S/K22/2) in 2011. (HFC website)

8.4.13 In 2011-2012, a Full Archaeological Excavation for Defining the Preservation Approach of Lung Tsun Stone Bridge Remnants at the North Apron area of the Former Kai Tak International Airport site was conducted. The excavation aimed to unearth the remnants of the Lung Tsun Stone Bridge (LTSB), expose all the uppermost surfaces, and record their conditions as thoroughly as possible. The archaeological excavation uncovered the remnants of the Pavilion for Greeting Officials, solid mass section, 20 supporting pillars, partial concrete decking, and the landing platform of the LTSB, as well as the 1924 seawall and 1933 causeway. Most of the top five tiers of the LTSB remnants had suffered varying degrees of destruction, except for supporting pillar SP13 and the landing platform. The decking remains between SP12, SP13, and SP14 were the only surviving original granite decking, while broken concrete decking was found between SP18 and SP20. At the northern portion, the exposed solid mass section was truncated into eight sections by the pile caps and concrete beams of Kai Tak Airport, causing significant damage to most of the top tiers. All remnants were backfilled after the excavation. (AGC, 2017)

8.4.14 In 2019, a preliminary archaeological survey for Lung Tsun Stone Bridge Preservation Corridor at Kai Tak Development was conducted by Archaeological Assessments Limited (AAL). The survey confirmed no major archaeological remains between Supporting Pillars (SPs) along the LTSB alignment, though the Solid Mass Section (SMS) likely exists near the Pavilion. Excavations showed SP foundations limit space, requiring careful support during construction to ensure stability. Significant former Kai Tak International Airport (KTIA) concrete structures must be removed with controlled vibration to protect remains. Heavier machinery use is restricted, while lighter equipment can be used with precautions and buffer zones. Core drilling proved effective and minimally disruptive, guiding safe construction and mitigation measures within the Preservation Corridor. (AAL, 2020)

8.4.15 The Lung Tsun Stone Bridge SAI is currently under construction and to be developed as the Lung Tsun Stone Bridge Preservation Corridor at Kai Tak. The project is scheduled for completion in 2025-2026. An Archaeological Watching Brief (AWB) and an Archaeological Excavation for Lung Tsun Stone Bridge Preservation Corridor Project have been conducted since 2022 at the SAI.

ARCHAEOLOGICAL POTENTIAL EVALUATION

8.4.16 The scope of the proposed works includes the following:

- Construction and operation of about 3.5km long elevated smart and green mass transit system and six associated stations are located at / near:
  - Kai Tak Cruise Terminal (KTCT)
  - Shing King Street (SKS)
  - Kai Tak Sky Garden (KTSG)
  - Shing Fung Road Park (SFRP)
  - Kai Tak Sports Park (KTSP)
  - Kai Tak Station Square (KTSS)

- Construction and operation of an elevated transit depot, at two commercial development sites, namely Kai Tak Area 4C Sites 4 and 5 and spanning across the existing Shing King Street, and system-wide facilities, such as signaling system, operation control and maintenance facilities, station's passenger facilities and off-board fare collection system etc.; and
- Implementation of associated civil, geotechnical, road and drainage works, waterworks, pedestrian connection facilities, advance works, electrical and mechanical installation and environmental mitigating measures.

8.4.17 The CHAA is primarily situated on reclaimed land consisting of marine mud and marine sand. These geological conditions are not conducive to the accumulation of cultural deposits, which indicates that these areas have no archaeological potential. In the small area of the alluvial area near Prince Edward Road East, development including the construction of existing roads, have significantly reduced the archaeological potential. Additionally, the CHAA has undergone substantial modern development, transitioning from reclaimed land to an airport and then to a mixed-use development zone that includes residential and recreational facilities, further diminishing its archaeological potential. Therefore, apart from the Lung Tsun Stone Bridge SAI, it is concluded that the rest of the CHAA holds no archaeological potential, thus no archaeological survey is necessary. For the SAI, as it is currently under construction and is to be developed as the Lung Tsun Stone Bridge Preservation Corridor at Kai Tak, which is scheduled to complete in 2025-26, an archaeological survey at the SAI for this EIA Study is considered unnecessary.

IDENTIFIED ITEMS

8.4.18 Desktop review identified no declared monuments, proposed monuments, graded historic sites/buildings/structures graded or, sites/buildings/structures in the list of new Items for pending grading assessment by AAB, or government historic sites identified by AMO within the CHAA. Additionally, no Other Identified Items were found within the CHAA.

8.4.19 The Lung Tsun Stone Bridge SAI is identified within the CHAA, but is located 42m away from the proposed works area.

8.5 CULTURAL HERITAGE IMPACT ASSESSMENT

ARCHAEOLOGICAL IMPACT ASSESSMENT

Construction Phase

8.5.1 Although the Lung Tsun Stone Bridge SAI is located with the CHAA, it is located 42m away from the proposed works area. As no excavation works will be proposed in the SAI for the Project, no direct archaeological impact is anticipated in the construction phase. Additionally, as it is 42m away from the proposed works area, potential vibration impact from ground borne vibration work is not anticipated.

Operational Phase

8.5.2 As no excavation works is anticipated for the Project no archaeological impact is anticipated in the operational phase.

BUILT HERITAGE IMPACT ASSESSMENT

Construction Phase

8.5.3 No declared monuments, proposed monuments, graded historic sites/buildings/structures graded or sites/buildings/structures in the list of new Items

for pending grading assessment by the AAB, or government historic sites identified by AMO are identified within the CHAA. Additionally, no Other Identified Items were found within the CHAA. Therefore, no adverse impact is anticipated during the construction phase.

Operational Phase

8.5.4 No adverse impact is anticipated in operational phase.

8.6 MITIGATION MEASURES

ARCHAEOLOGICAL MITIGATION MEASURES

8.6.1 As no archaeological impact is anticipated, no mitigation measure is required in construction and operational phase.

8.6.2 As a precautionary measure and pursuant to the Antiquities and Monuments Ordinance (Cap. 53), the project proponent is required to inform the Antiquities and Monuments Office (AMO) immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with and to the satisfaction of AMO.

BUILT HERITAGE MITIGATION MEASURES

Construction Phase

8.6.3 As no adverse impact is anticipated, no mitigation measure is required in construction phase.

Operational Phase

8.6.4 As no adverse impact is anticipated, no mitigation measure is required in operational phase.

8.7 RESIDUAL AND CUMULATIVE IMPACTS

8.7.1 No adverse residual or cumulative cultural heritage impact is anticipated.

8.8 CONCLUSION

8.8.1 Apart from the Lung Tsun Stone Bridge SAI, it is concluded that the rest of the CHAA holds no archaeological potential as the CHAA is generally situated on reclaimed land and in newly developed areas, thus no archaeological survey is necessary. For the SAI, as it is currently under construction and is to be developed as the Lung Tsun Stone Bridge Preservation Corridor at Kai Tak, which is scheduled to complete in 2025-26, an archaeological survey at the SAI for this EIA Study is considered unnecessary.

8.8.2 As no excavation works will be proposed in the Lung Tsun Stone Bridge SAI, and as it is 42m away from the proposed works area, direct archaeological impact and potential vibration impact from ground borne vibration work is not anticipated. As no archaeological impact is anticipated, no mitigation measure is required in construction and operational phase. As a precautionary measure and pursuant to the A&M Ordinance, the project proponent is required to inform the Antiquities and Monuments Office (AMO) immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with and to the satisfaction of AMO.

8.8.3 No declared monuments, proposed monuments, graded historic sites/buildings/structures graded or sites/buildings/structures in the list of new Items for pending grading assessment by the AAB, or government historic sites identified by AMO are identified within the CHAA. Additionally, no Other Identified Items were found within the CHAA. In construction and operational phase, no adverse impact is anticipated and no mitigation measure is required.

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Map

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1954-11-02 Photo Number :V81A_547-0011

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9 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

9.1 INTRODUCTION

9.1.1 This section further elaborates the requirements of environmental monitoring and audit (EM&A) for the construction and operation of the Project, based on the assessment results of various environmental issues.

9.1.2 The following sections summarise the recommended EM&A requirements with the Project Implementation Schedule presented in **Appendix 9.1**. Details of the EM&A programme and the specific monitoring requirements are presented in a stand-alone EM&A Manual.

9.2 AIR QUALITY IMPACT

Construction Phase

9.2.1 With the implementation of sufficient dust suppression measures as stipulated under Air Pollution Control (Construction Dust) Regulation, Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, Air Pollution Control (Fuel Restriction) Regulations as well as Recommended Pollution Control Clauses for Construction Contracts, good site practices and proposed mitigation measures, no adverse air quality impacts would be anticipated. Dust monitoring requirements are recommended in the stand-alone EM&A Manual to ensure the efficacy of the control measures. Details of the EM&A programme are provided in the stand-alone EM&A Manual.

9.3 NOISE IMPACT

Construction Phase

9.3.1 Appropriate mitigation measures are recommended to alleviate the impacts to meet the EIAO-TM criteria. Noise monitoring during construction phase would be implemented to check the noise compliance with EIAO-TM criteria and the effectiveness of mitigation measures. Details of the EM&A programme are provided in the stand-alone EM&A Manual. CNMP, which contain detailed quantitative construction noise assessment, noise mitigation measures, and construction noise monitoring and auditing programme, should be prepared and submitted to the Director of EPD before commencement of construction of this Project.

Operational Phase

Transit Noise

9.3.2 Compliance check on transit noise against NCO criteria should be conducted before commencement of operation of the Project. Transit Noise Management Plan (TNMP) should be prepared and submitted to the Director of EPD for approval during the detailed design stage. Details of the EM&A programme are provided in a stand-alone EM&A Manual.

Fixed Noise

9.3.3 Adverse fixed noise impact arising from the operation phase of the Project is not anticipated based on the latest design of the stations and depot. FNMP should be prepared and submitted to the Director of EPD for approval during the detailed design

stage. With reference to the FNMP, verification of the noise performance of the fixed plants should be conducted before commencement of operation of the Project.

9.4 WATER QUALITY IMPACT

Construction Phase

9.4.1 With the implementation of the recommended water quality mitigation measures, no adverse water quality impact would be expected at the WSRs located in the vicinity of the works sites/areas. Regular site inspections should be undertaken to inspect the construction activities and works sites/areas in order to ensure the recommended mitigation measures are properly implemented. Details of the audit requirements are provided in the stand-alone EM&A Manual.

Operation Phase

9.4.2 With proper design of drainage and sewerage systems and implementation of the recommended mitigation measures, no adverse water quality impacts associated with the operation of the Project are expected. Therefore, no specific EM&A requirement would be required.

9.5 WASTE MANAGEMENT IMPLICATIONS

Construction Phase

9.5.1 The Contractor is responsible for ensuring all waste generated are stored, handled and disposed of in accordance with good waste management practices, relevant guidelines and legislations during the construction period.

9.5.2 Waste materials generated during construction activities, such as C&D materials, are recommended to be audited at regular intervals to ensure that proper storage, transportation and disposal practices are being implemented. This would ensure the waste generated would be properly disposed of. The Contractor should be responsible for the implementation of any mitigation measures to minimise waste or mitigate problems arisen from waste materials.

9.5.3 The Contractor shall prepare and submit a Waste Management Plan (WMP) to the Contracted Party for approval. The recommended mitigation measures in this EIA Report should form the basis of the WMP.

Operation Phase

9.5.4 With the implementation of recommended mitigation measures for the handling, transportation and disposal of the wastes generated from operation activities, adverse residual waste management implications are not anticipated. Monitoring and audit programme for the operation phase of the Project would not be required.

9.6 VISUAL IMPACT

Operation Phase

9.6.1 The detailed architectural and landscape design developed by the Contracted Party of KTGTS shall be audited by the Environmental Team Leader and verified by the Independent Environmental Checker as conforming to the recommended mitigation measures. Site audit shall be carried out during the implementation and the first year after completion of the proposed design / mitigation measures to ensure its proper

implementation and effectiveness to reduce or moderate the visual effects and enhance the overall visual quality.

9.7 CULTURAL HERITAGE

Construction Phase

9.7.1 The Contractor should inform the AMO in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO.

Operation Phase

9.7.2 There would be no impacts to archaeological and built heritage resources during operation phase, and therefore no specific EM&A requirement is required.

10 SUMMARY OF ENVIRONMENTAL OUTCOMES

10.1 SUMMARY OF ENVIRONMENTAL OUTCOMES

10.1.1 This section summarises the overall environmental outcomes due to construction and operation of the proposed KTGTS in accordance with Section 3.6 of the Environmental Impact Assessment (EIA) Study Brief No.: ESB-369/2024. As stated in Chapters 1 and 2, environmental considerations have been the key considerations throughout the development of the Project. Alternative options for designs and construction methodologies have been duly considered. Besides, all the options considered have ensured that environmental impacts could be avoided or minimised where practicable and mitigated by implementation of suitable mitigation measures to fulfill all the statutory requirements. The technical assessments conducted (Section 3 to Section 8) have demonstrated that the requirements in the EIA Study Brief (ESB-369/2024) and Technical Memorandum of the Environmental Impact Assessment Ordinance (EIAO-TM) have been met.

10.1.2 **Table 10.1** summarises the key environmental outcomes arising from the EIA study.

Table 10.1 Summary of Key Environmental Outcomes

Environmental Outcomes	Elaboration
Minimization of air quality impacts and noise impacts	• The KTGTS adopts electric and battery-powered vehicles, without vehicular air emissions. • Lightweight and equipped with rubber tyres to minimise noise impact. • The system reduces reliance on conventional road transport, lowering roadside pollutants, carbon emissions and road traffic noise.
Environmental friendly mode of transportation	• Stations are designed with natural ventilation, open architecture, and green elements to enhance sustainability and passenger comfort. • Use of low-carbon materials and innovative construction methods like MiC and DfMA reduces the project's carbon footprint. • Promotes green commuting habits by offering a reliable, frequent, and eco-friendly alternative to private vehicles. • Enhances quality of life and community well-being through improved air quality and reduced traffic congestion.
Supporting sustainable urban development through public transport	• The 3.5-km elevated smart and green mass transit system is separated from the

Environmental Outcomes	Elaboration
	at-grade traffic which will not interfere with road traffic. • The system is designed to be traffic-independent, ensuring punctual service while minimising disruption to surrounding areas. • Lighter design with a smaller footprint to suit local environment with space constraints. • Real-time monitoring enables responsive service adjustments, reducing overcrowding and environmental strain.

11 CONCLUSION

11.1.1 The Project aims to strengthen connections among the residential and commercial developments, facilities focused on tourism, culture and recreation, sports and the community within the area, as well as the connection with the railway network, serving visitors and a living and working population of around 50,000. It addresses anticipated traffic congestion and environmental concerns by reducing reliance on road-based vehicles, thereby improving air quality, minimising noise pollution, and enhancing overall community livability.

11.1.2 Careful evaluation of various horizontal and vertical alignments options, in terms of environmental, engineering, and social factors, were conducted to select the most suitable horizontal and vertical alignment. Of the vertical alignment options explored, the elevated viaduct was chosen as it would be separated from the at-grade traffic which will not interfere with road traffic, minimize disruption to existing facilities, optimise construction cost and duration, generate lower amount of excavated materials, and allow manageable mitigation of visual impacts. Among horizontal alignment options, the alignment running along the Shing Fung Road atop KTSG was preferred due to its optimal travelling distance for the residents and visitors to the KTGTS stations, better environmental performance without seawall modification / reclamation, construction efficiency and providing sheltered pedestrian access along a portion of the KTSG .

11.1.3 Given the patronage demand in the Kai Tak area and site constraints , traditional heavy rail was considered unsuitable; instead, a light and energy-efficient smart and green mass transit system was selected for its better environmental performance, ability to suit local environment with site constraints, faster deployment, operational flexibility and lower capital investment, making it the optimal solution for meeting transport demand while minimizing impacts.

11.1.4 This EIA Study has examined the potential environmental impacts stemming from both the construction and operation phases, in accordance with the Study Brief (ESB-369/2024) and the EIAO-TM. Relevant assessments have been conducted in accordance with EIAO-TM, based on the engineering design information available during the course of EIA study, covering the following environmental issues:

- Air Quality Impact;
- Noise Impact;
- Water Quality Impact;
- Waste Management Implications;
- Visual Impact; and
- Impact on Cultural Heritage.

11.1.5 The summary of environmental impacts and the summary of key assessment assumptions, limitation of assessment methodologies etc. are presented in **Appendix 11.1** and **Appendix 11.2**, respectively.

11.2 OVERALL CONCLUSION

11.2.1 Overall, the EIA Study has predicted that the Project, with the implementation of the recommended mitigation measures during both the construction and operation phases, is expected to meet the relevant environmental standards and would be environmentally acceptable with no adverse residual impacts on the environmentally sensitive receivers and resources.

11.2.2 Environmental monitoring and audit (EM&A) requirements have been recommended, where necessary, to check on project compliance with environmental legislations and standards. They are presented in a separate, stand-alone EM&A manual.