

15 CULTURAL HERITAGE

Introduction

- 15.1 The cultural heritage impact assessment (CHIA) shall include i) built heritage impact assessment and ii) marine archaeology impact assessment in accordance with Clause 3.4.9 of the EIA Study Brief (No. ESB-129/2005).
- 15.2 It should be noted that no marine works would be required under this Project, except reconstruction of small part of the seawall (~53m) near the Aberdeen PTW to facilitate the PTW upgrading works. The scope of the seawall reconstruction works as shown in **Figure 2.7b** mainly involves two sections, including
- ~29m long of seawall required modification works due to construction of seawater intake pipeline and other PTW upgrading works (excavation proposed down to ~8m below existing ground level for construction works)
 - ~24m long of seawall required minor modification works due to PTW upgrading (excavation proposed down to ~3m below existing ground level for construction works)
- 15.3 As indicated in the old as-constructed drawings¹ (**Appendix 15.4**), the Aberdeen seawall area was dredged in 1970s and hence the seabed was already disturbed at that time. The current proposed construction works, with maximum 8m in depth for excavation below ground level would only disturb the artificial seawall structure but not down to the level of the existing undisturbed seabed (i.e. ~16m to 18m below ground level). Further, tunnel construction works would also not disturb the seabed as elevation of the tunnels would be proposed deep underground below rockhead with average depth of ~100m below ground (see **Exhibit 2.3** on Chapter 2). Hence, potential impact on marine archaeological deposits from this Project would not be anticipated and no marine archaeology impact assessment on the seabed is therefore required.
- 15.4 In this Section, potential impacts on built heritage resources during construction and operation phases were assessed. Mitigation measures required to ameliorate the potential impacts to acceptable levels have been recommended, where appropriate.

Environmental Legislation, Policies, Plans, Standards and Criteria

- 15.5 Legislation, Standards, Guidelines and Criteria relevant to the consideration of Cultural Heritage impacts under this Project include the following:
- Antiquities and Monuments Ordinance
 - Environmental Impact Assessment Ordinance
 - Hong Kong Planning Standards and Guidelines
 - Technical Memorandum on Environmental Impact Assessment Process
 - Criteria for Cultural Heritage Impact Assessment

Antiquities and Monuments Ordinance

- 15.6 The Antiquities and Monuments Ordinance (the Ordinance) provides the statutory framework to provide for the preservation of objects of historical, archaeological and palaeontological interest. The Ordinance contains the statutory procedures for the Declaration of Monuments. Under the Ordinance, monument means a place, building, site or structure which is declared to be a monument, historical building or archaeological or palaeontological site or structure by reason of its historical, archaeological or palaeontological significance under section 3 of the Ordinance.

¹ The as-constructed drawings provided by Civil Engineering and Development Department. were prepared under the 'Contract no. 454 of 1974 - Construction of Seawall Fronting Aberdeen Sewage Screening Plant' in 1974.

- 15.7 Under section 6 and subject to subsection (4) of the Ordinance, the following acts are prohibited except in accordance with a permit granted by the Antiques Authority (presently the Secretary for Development); Under section 6 and subject to subsection (4) of the Ordinance, the following acts are prohibited in relation to certain monuments, except under permit:
- To excavate, carry out building or other works, plant or fell trees or deposit earth or refuse on or in a proposed monument or monument
 - To demolish, remove, obstruct, deface or interfere with a proposed monument or monument
- 15.8 The discovery of an Antiquity, as defined in the Ordinance must be reported to the Antiquities Authority (the Authority), or a designated person. The Ordinance also provides that, the ownership of every relic discovered in Hong Kong after the commencement of this Ordinance shall vest in the Government from the moment of discovery. The Authority on behalf of the Government may disclaim ownership of the relic.
- 15.9 No archaeological excavation may be carried out by any person, other than the Authority and the designated person, without a license issued by the Authority. A licence will only be issued if the Authority is satisfied that the applicant has sufficient scientific training or experience to enable him to carry out the excavation and search satisfactorily, is able to conduct, or arrange for, a proper scientific study of any antiquities discovered as a result of the excavation and search and has sufficient staff and financial support.

Environmental Impact Assessment Ordinance

- 15.10 The Environmental Impact Assessment Ordinance (EIAO) was implemented on 1 April 1998. Its purpose is to avoid, minimize and control the adverse impact on the environment of designated projects, through the application of the EIA process and the Environmental Permit (EP) system.

Hong Kong Planning Standards and Guidelines

- 15.11 Chapter 10 of the Hong Kong Planning Standards and Guidelines (HKPSG) details the principles of conservation, the conservation of natural landscape and habitats, historic buildings and archaeological sites. It also addresses the issue of enforcement. The appendices list the legislation and administrative controls for conservation, other conservation related measures in Hong Kong, and Government departments involved in conservation.

Technical Memorandum on Environmental Impact Assessment Process

- 15.12 The general criteria and guidelines for evaluating and assessing impacts to cultural heritage are listed in Annexes 10 and 19 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The guidelines state that preservation in totality and measures for the integration of sites of cultural heritage into the proposed project will be a beneficial impact. It also states that destruction of a site of cultural heritage must only be undertaken as a last resort.

Criteria for Cultural Heritage Impact Assessment

- 15.13 This document, as issued by the Antiquities and Monuments Office (AMO), outlines the specific technical requirement for conducting terrestrial archaeological and built heritage impact assessments (BHIA). It includes the parameters and scope for the Baseline Study, specifically desk-based research, field survey and the reporting requirements. Besides, the prerequisite conditions for conducting impact assessment and mitigation measures are presented in detail.

Assessment Methodology

Baseline Study

- 15.14 A desk-based study was undertaken to determine the presence of historical occupation of the Study Area and thus to assess the potential for built heritage resources to be present. Information were

gathered from the following sources; the AMO published and unpublished papers and studies; publications on relevant historical, anthropological and other cultural studies; unpublished archival, papers, records; collections and libraries of tertiary institutions; historical documents which can be found in Public Records Office, Lands Registry, District Lands Office, District Office, Museum of History; cartographic and pictorial documentation.

- 15.15 In addition to the desk-based review, in case where the sources of information proved to be inadequate or where the project area had not been adequately studied before, field survey was conducted to assemble the necessary data.

Study Area

- 15.16 The Study Area for the built heritage impact assessment (BHIA) includes all Project Areas as well as areas within 300 metres from the Project Areas' boundaries. Specifically, the projects areas (**Figures 2.1 to 2.10** refer) include:

- i) Proposed deep underground sewage conveyance system (SCS) with 7 tunnel sub-sections, including
 - Tunnel J (from North Point PTW to Wan Chai East PTW)
 - Tunnel K (Wan Chai East PTW to Sai Ying Pun)
 - Tunnel L (from Sai Ying Pun to Stonecutters Island Sewage Treatment Works)
 - Tunnel M (from Sandy Bay PTW to Sai Ying Pun)
 - Tunnel N (from Cyberport PTW to Sandy Bay PTW)
 - Tunnel P (from Aberdeen PTW via Wah Fu PTW to Cyberport PTW)
 - Tunnel Q (from Ap Lei Chau PTW to Aberdeen PTW)
- ii) 18 SCS permanent/temporary works areas mainly for shaft construction and storage/stockpiling purposes.
- iii) 8 Preliminary Treatment Works (PTW) including North Point, Wan Chai East, Central, Sandy Bay, Cyberport, Wah Fu, Aberdeen and Ap Lei Chau.
- iv) Sites within or close to Stonecutters Island Sewage Treatment Works (SCISTW) for expansion works and construction of effluent conveyance system & disinfection facilities; as well as 2 temporary works areas close to SCISTW for storage/stockpiling purposes .

Resources to be covered by Built Heritage Impact Assessment

- 15.17 Resources to be covered in the BHIA field survey shall include, but are not limited to, the followings:

- All pre 1950 structures, which include any built feature (apart from graves and historical land use features, which are dealt with separately), such as domestic structures, ancestral halls, temples, shrines, monasteries and nunneries, village gates, wells, schools, historic walls, bridges and stone tablets;
- Any post 1950 structure deemed to possess features containing architectural or cultural merit;
- All pre-war clan graves; and
- Cultural landscape features, such as fung shui woods and ponds, historical tracks and pathways, stone walls and terraces, ponds and other agricultural features.

Findings of Desk-based Study

Historical Background

North Point and Causeway Bay

- 15.18 Eastern District was an area of scattered rural communities in the 19th Century. Quarry Bay became one of the most important industrial areas on Hong Kong Island in the Late 1880's with the construction of the Taikoo Shipping and Dockyard and sugar refinery. The district opened even further with the introduction of the Tramway in 1904, commercially, industrially and residentially. The area was settled by families from Shanghai and Fujian after the Second World War, adding to the colourful nature of the district (Eastern District Board, 1994).

Wan Chai

- 15.19 Prior to the British arrival in Hong Kong, the coast at Wan Chai was occupied by local fishing families and the Hung Shing Temple on Queen's Road East, shows how reclamation has moved the coastline progressively outward from the original. The map in **Appendix 15.1(1)** shows Wan Chai in 1889 (Empson, 1992). Since the middle of the 19th Century, Wan Chai has a long history as an urban residential and commercial district.

Sheung Wan, Sai Ying Pun and Kennedy Town

- 15.20 Possession Point in Sheung Wan was the landing site of the British Troops in 1841 and the site was used as a defensive position. During the middle to late part of the 19th Century, the areas were developed for commercial and residential purposes (Leung, 1998). After the Second World War, these areas were rapidly developed and today the area contains a mixture of residential, commercial and wholesale businesses.

Sandy Bay and Wah Fu

- 15.21 Sandy Bay contains a large cemetery and numerous medical facility buildings as well as a school and sports ground, all are of modern construction. Wah Fu is a modern housing estate constructed in the 1960's. Mount Davis is located to the North of Sandy Bay. It is the location of two former military sites, the Mount Davis Battery and Western Fire Command Headquarters and Shelters and the Jubilee Battery. The Mount Davis Battery was completed in 1912 and the Western Fire Command Headquarters were set up shortly after this date (Ko and Wordie, 1996). The remains consist of old battery buildings and gun emplacements. The Jubilee Battery was commissioned in the late 1930's as part of the Western Fire Command and installation of the guns started in 1938 and was completed in 1939. The Battery was blown up by its own personnel just prior to Hong Kong's surrender on December 25 1941 (Ko and Wordie 1996). The site is currently located behind a locked gate and it has been noted by the authors cited above that the site is very overgrown and treacherous. One historical housing block, Felix Villa's was also located in the project Study Area, according to the Ratings and Valuation "List of Buildings" the structure dates to pre-1945. It was also noted that a section of the building was used as a temporary Tuberculosis sanatorium after the Second World War as was noted in the proceedings of the Hong Kong Legislative Council in 1946.

Cyberport (Kong Sin Wan/ Telegraph Bay)

- 15.22 Telegraph Bay was the site of an early cable landing dating from the early part of the Twentieth Century. The environment of the bay and valley has been radically altered through reclamation and the construction of the Cyberport development. The old cable house is still located in its original position (although it is now located within the grounds of a school). The area running up the hillside behind the cable house site contained a squatter area that dated back over 100 years. The area has been radically altered by the Cyberport Development. Two residential housing blocks were identified as having been constructed prior to 1945 in the Ratings and Valuations Department "List of Buildings", Point Breeze at 54 Sassoon Road and Villa Ellenbud at 50-52 Sassoon Road.

Aberdeen and Ap Lei Chau

- 15.23 Both of these locations have long historical associations with fishing families. There is an historic Tin Hau temple in Aberdeen and Hung Shing Temple on Ap Lei Chau. However, the project areas were not found in the vicinity of any historical buildings.

Stonecutters Island

- 15.24 Stonecutters Island or Ngong Shuen Chau was originally 1.5 miles long and half a mile in width; its highest point was at +40mPD. Its name in Chinese refers to the fact that it looked like an upside down junk. It is now connected to the mainland through reclamation carried out for container terminals in the 1990's.
- 15.25 A Chinese map dating to 1730 indicates the location of the Island and an 1810 European map (Empson 1992) refers to the island as Won Chun Chau. An 1841 map refers to it as Stonecutters Island (Empson 1992). The lattermost is reproduced in **Appendix 15.1(2)**.
- 15.26 Stonecutters Island was noted for its strategic value as a defense position by Captain W.K. Hall of the H.M.S. Calcutta as early as 1858, although it was not ceded to the British until 1861. Before this it was said to have only been inhabited by a small number of fishermen, who resided on the eastern side of the island.
- 15.27 In the past the island has been used as the site of a prison, contagious diseases quarantine area, and for military usage, containing military barracks, armament depots, batteries and underground magazines and tunnels.
- 15.28 During the 1920's and 30's, an ammunition depot and transmitting station were constructed and used by the Royal Navy and there were also some coastal artillery batteries constructed before the World War II (WWII). The island and its facilities were seized by the Japanese during WWII and they built additional ammunition depots, a series of tunnels, gun emplacements, batteries, administration centres, residences, parade grounds and firing ranges (AMO Files). The island went back under the control of the Royal Navy and remained so until it was handed over to the British Army in 1957 (Ko and Wordie 1996). The site was handed over to the Hong Kong Garrison of the People's Liberation Army (PLA) in July 1997 and named as Ngong Shuen Chau Barracks. The Barracks is one of the military closed areas declared under the Military Installations Closed Areas Order (Cap. 245B).
- 15.29 A list of historical sites in the project study area, as contained in AMO files on Stonecutters Island is provided below:
- (i) Old Prison Area (1863 – 1866) - The prison was constructed in reaction to a crime wave in the early 1860's, but it was never used as a prison as there were not enough prisoners by the time it was finished. In 1871, the government announced that it would be used as a smallpox quarantine area and the prison hospital and chapel were used to house the patients. Most of the prison was destroyed by a typhoon in 1875. However, two watch towers, the gate house and parts of the enclosing wall survived (AMO Files).
 - (ii) Albion Battery (Demolished) (1904) - 2X12 pdr QF guns were mounted in August 1905. In 1906, 2X6 Mark VII guns were proposed but were never installed. It has been demolished and no ruins remained (AMO Files).
 - (iii) Stonecutters Central Battery (1891 – 1893) - Located on top of a hill in the centre of the island. Only one gun remained in the armaments list until 1919 as 'mounted in reserve'. The battery consists of one circular concrete gun position and associated underground magazines. Magazines are loop-holed masonry and brickwork and have very fine arched entrances. Front of battery has a defensive loop-holed masonry rubble wall topped with spiked iron railings (AMO Files).

- (iv) Stonecutters West Battery (1884-1890) - Originally, the battery contained two gun positions, which were later increased to four. It was severely bombarded by the Japanese in 1941. The battery was constructed on two levels. The lower level had several large engine rooms and associated stores for accumulators and diesel oil. The masonry structures were found to be in derelict condition during a previously undertaken survey. There is also a flight of steps leading down to coastal searchlight positions. Access to the upper level is by a sunken road cut into the rock which leads over a drawbridge and into a short tunnel. At the end, the road leads down into a sunken courtyard.. Separate steps lead up from the keep to the gun platform or “terreplein” under which are the magazines (AMO Files).

Declared Monuments

- 15.30 One Declared Monument - Western Market was identified in Sheung Wan. The location is shown in **Appendix 15.1(3)**.

Graded Buildings

- 15.31 Graded Buildings in the Study Area were identified on Hong Kong Island. Details are shown in **Table 15.1**:

Table 15.1 Graded Buildings Identified on Hong Kong Island

Graded Building	Location	Grade	Map Reference
Former Clubhouse of the Royal Hong Kong Yacht Club	12 Oil Street	II	Appendix 15.1 (4)
Queen’s Pier*	Central	I	Appendix 15.1 (5)
Lo Pan Temple	15 Ching Ling Terrace in Kennedy Town	I	Appendix 15.1 (6)
Ex-Western Fire Station	12 Belcher Street	III	Appendix 15.1 (22)

* The present status of Queen’s Pier is that it has been dismantled pending reconstruction

- 15.32 According to the desk-based study, there are some graded buildings and structures in the Old Prison Area and Battery sites within the Ngong Shuen Chau Barracks. With the permission and escort of the Garrison, field surveys were conducted on 23 January 2007 and 1 March 2007 at the graded buildings and structures which are listed in **Table 15.2**.

Table 15.2 List of Graded Buildings/Structures in Ngong Shuen Chau Barracks with field survey

Resource*	Grade
Old Prison Area, Block 318	I
Old Prison Area, Block 319	I
Old Prison Area, Block 322	III
Old Prison Area, Block A	II
Old Stonecutters Central Battery, Gun Emplacement Associated with Underground Magazines	II

Resource*	Grade
Old Stonecutters West Battery, Block 29	III
Old Stonecutters West Battery, Block 35	III
Old Stonecutters West Battery, Block 36	III
Old Stonecutters West Battery, Block 37	II
Old Stonecutters West Battery, Block 41	II
Old Stonecutters West Battery, Block 43	III
Old Stonecutters West Battery, Ruins of Generator House	III
Old Stonecutters West Battery, Ruins of West Battery	II

* Access to the Old Prison Area, Block H (Grade II) and Old Stonecutters West Battery Block 25 A-D (Grade III) was not available.

Findings of Field Survey

15.33 Field surveys were conducted from November 2006 to November 2007 at the project areas of 8 PTW, SCS works areas, SCS alignments, SCISTW expansion areas as well as areas of 300 metres away from the project area boundary. The results of the field surveys are presented below. All catalogue reference numbers (*HATS-#*) detailing the historical building information as stated below should be referred to **Appendix 15.3**.

15.34 The non-graded built heritage resources as listed in **Table 15.3** were identified in the field survey.

Table 15.3 List of Non-Graded Built Heritage Resources Identified in the Project Study Area

Resource	Location	Reference No. in Appendix 15.3	Map Reference
Ngo Wong Temple	Fortress Hill	HATS-02	Appendix 15.1 (8)
Shophouse	Sai Ying Pun	HATS-03	Appendix 15.1 (9)
Shophouses	Western District	HATS-04	Appendix 15.1 (10)
Mount Davis Battery	Mount Davis	HATS-07	Appendix 15.1 (11)
Noonday Gun	Causeway Bay	HATS-29	Appendix 15.1 (24)
Felix Villas	Mount Davis	HATS-23	Appendix 15.1 (20)
Jubilee Battery	Mount Davis	HATS-24	Appendix 15.1 (21)
47 Victoria Road	Kennedy Town	HATS-26	Appendix 15.1 (23)
Arch and Foundation Stone of the Tung Wah Small Pox Hospital	Near Kennedy Town	HATS-27	Appendix 15.1 (23)
Buddhist Temple (To Che Fat She)	Near Kennedy Town	HATS-28	Appendix 15.1 (23)
Fok Hing Tong	Kennedy Town	HATS-31	Appendix 15.1 (6)
54 Sassoon Road	Southern District	N/A	Appendix 15.1(25)
50-52 Sassoon Road	Southern District	N/A	Appendix 15.1 (25)
City of Victoria Boundary Stone	Sai Ning Street	HATS-30	Appendix 15.1 (26)

Note: N/A = Access was not granted to the private properties. Therefore, no catalogue form is available in Appendix 15.3.

Preliminary Treatment Works and Sewage Conveyance System Works Areas

North Point

- 15.35 Construction works (including construction of a drop shaft, a seawater pumping station and other associated upgrading works) would be conducted inside the existing PTW. A production shaft would be constructed at a temporary works area (NP-viii) next to the existing PTW which is currently a parking area for Towngas. No built heritage resources were identified in the Study Area in North Point. **Appendix 15.2 (Plate 1)** displays photograph of the North Point PTW.

Wan Chai East

- 15.36 Construction works (including construction of a drop/riser shaft, a transfer pumping station and other sewage treatment upgrading works) would be conducted inside the PTW site. The photograph in **Appendix 15.2 (Plate 2)** shows the Wan Chai East PTW. A production shaft would be constructed at a temporary works area (WCE-i) immediately adjacent to the existing PTW site. The PTW site lies next to a sport ground and is adjacent to the Wan Chai interchange. There are also two nearby temporary works areas (WCE-vi and WCE-v) associated with the project and they would be mainly for storage purpose. No built heritage resources were identified in the Study Area of Wan Chai East.

Central

- 15.37 Construction works (including construction of drop shaft and other sewage treatment upgrading works) would be conducted within the Central PTW site which is located on reclaimed land. There are three temporary works areas in the close vicinity, including CTL –ii, CTL-iii and CTL-iv. **Appendix 15.2 (Plate 3)** shows a photograph of the Central PTW. Western Market (*HATS-05*) which is a Declared Monument is located approximately 280 metres away from the PTW. The location of the Western Market is shown in **Appendix 15.1(3)**.

Fung Mat Road Site in Sai Ying Pun

- 15.38 The Fung Mat Road site is located on reclaimed land and it is used for construction of production shafts which will be converted to riser shaft and drop shaft after tunnel construction. The site is on a paved area near the Wholesale Food Market and is currently used for vehicle parking. The Fung Mat Road Site (SYP-SCC) and a temporary works area (SYP-I) are joined together. No built heritage resources were identified in the Study Area of Sai Ying Pun. **Appendix 15.2 (Plate 4)** shows a photograph of the Fung Mat Road Site.

Sandy Bay

- 15.39 The PTW site is situated between a sports ground and medical facility buildings. A temporary works area (SB-i) and a permanent works area (SB-PS) with construction of transfer pumping station, shafts and other upgrading works are located just to the North of the PTW site on vacant land. No built heritage resources were identified in the Study Area of Sandy Bay. The photograph in **Appendix 15.2 (Plate 5)** shows the location of the Sandy Bay PTW and the works areas.

Cyberport

- 15.40 Construction of a shaft and a transfer pumping station would be conducted at the existing PTW. **Appendix 15.2 (Plate 6)** shows a photograph of the Cyberport PTW. One built heritage resource was identified in the Study Area of Cyberport which is the old cable house in Kong Sin Wan (Telegraph Bay) (*HATS-09*). It is located approximately 300 metres away from the PTW. The location of the old cable house is shown on the map in **Appendix 15.1(7)**.

Wah Fu

- 15.41 The Wah Fu PTW is located on Waterfall Bay Road next to the Wah Fu Estate. Sewage facilities upgrading works and construction of a drop shaft would be proposed within the PTW. No built heritage resources were identified in the Study Area of Wah Fu. **Appendix 15.2 (Plate 7)** shows a photograph of the Wah Fu PTW.

Aberdeen

- 15.42 Aberdeen PTW site located on Tin Wan Praya Road involves construction of a drop shaft, a seawater pumping station, a new administration building/workshop/spare parts store as well as other associated upgrading works. Construction of a production shaft would be at a temporary works area (Abd-iii) close to the PTW. Another temporary works area (Abd-i) would be also occupied under this Project but no construction works would be involved. No built heritage resources were identified in the Study Area of Aberdeen. **Appendix 15.2 (Plate 8)** shows a photograph of the Aberdeen PTW.

Ap Lei Chau

- 15.43 Construction of a transfer pumping station, a drop shaft and other associated PTW upgrading works would be within the existing Ap Lei Chau PTW on Lee Nam Road. There are also 3 temporary works areas (ALC-i, ALC-iii & ALC-iv) proposed to support PTW and SCS construction works. No built heritage resources were identified in the Study Area of Ap Lei Chau. **Appendix 15.2 (Plate 9)** shows a photograph of the Ap Lei Chau PTW and the adjacent Works Area (ALC-i).

Sewage Conveyance System

Tunnel J

- 15.44 This tunnel runs from the North Point PTW to the Wan Chai East PTW. The following resources were identified in the Study Area: the former clubhouse of the Royal Hong Kong Yacht Club (*HATS-01*), the Noonday Gun (*HATS-29*) and the Ngo Wong Temple (*HATS-02*). The map showing the location of the former clubhouse of the Royal Hong Kong Yacht Club and Ngo Wong temple on Electric Road in relationship to the alignment can be found in **Appendix 15.1(12)** and the map showing the respective locations of the Noonday Gun and the alignment can also be found in **Appendix 15.1 (31)**

Tunnel K

- 15.45 This tunnel runs from the Wan Chai East PTW to the Fung Mat Road site. The following resources were identified in the Study Area: i) an old shophouse located at 207 Des Voeux Road (*HATS-03*) as shown in **Appendix 15.1(13)**; ii) two old shophouses at 67 & 69 Des Voeux Road (*HATS-04*) and Western Market (*HATS-05*) identified within the 300 metres study area as shown in **Appendix 15.1(14)** and iii) Queen's Pier in Central (*HATS-06*) as shown in **Appendix 15.1(15)**.

Tunnel L

- 15.46 This tunnel runs from the Fung Mat Road site to the SCISTW. It runs approximately 300 metres from the Old Prison Area in Ngong Shuen Chau Barracks, as shown in **Appendix 15.1 (16)**. Five graded historical structures are located in this Old Prison Area, including: i) Block 318, an old watchtower (*HATS-10*), ii) Block 319, another old watchtower (*HATS-11*), iii) Block A, part of the old prison (*HATS-12*), iv) Block 322, an old barracks building (*HATS-13*) and v) Block H.

Tunnel M

- 15.47 This tunnel runs from the Fung Mat Road site to the Sandy Bay PTW. The built heritage resources identified in the Study Area for this section of tunnel are i) the ruins associated with the old Mount Davis Battery (*HATS-07*) as shown in **Appendix 15.1(17a and 17b)**, ii) ruins associated with the Jubilee Battery (*HATS-24*) as shown in **Appendix 15.1 (28)**, iii) the Lo Pan Temple in Kennedy Town (*HATS-08*) as shown in **Appendix 15.1(18)**, iv) the Ex-Western Fire Station in Kennedy Town (*HATS-25*) as shown in **Appendix 15.1(29)**, v) Felix Villas on Victoria Road (*HATS-23*) as shown in **Appendix 15.1(27)**, vi) 47 Victoria Road (*HATS-26*) as shown in **Appendix 15.1(30)**, vi) Arch and foundation stone of Tung Wah Smallpox Hospital at Sai Ling Street Bus Terminal (*HATS-27*) as shown in **Appendix 15.1(30)**, the To Chi Fat She Temple near Kai Wai Man Street (*HATS-28*) as shown in **Appendix 15.1(30)** and the Fok Hing Tong on Tai Pak Terrace (*HATS-31*) as shown in **Appendix 15.1 (18)**. A City of Victoria Boundary Stone is also located in the Study Area in the

current sports ground on Sai Ning Street (*HATS-30*) as shown in **Appendix 15.1 (33)**.

Tunnel N

- 15.48 This tunnel runs from Cyberport PTW to Sandy Bay PTW. Two built heritage resources were identified in the desk-based survey, Pre-1945 residential buildings at 50-52 Sassoon Road and 54 Sassoon Road. The buildings are private residential buildings and access was not possible. Catalogue forms have not been included in the **Appendix 15.3**. The locations of the buildings can be seen in **Appendix 15.1 (32)**.

Tunnel P

- 15.49 This tunnel runs from Aberdeen PTW via Wah Fu PTW to Cyberport PTW. One built heritage resource, the old cable house at Kong Sin Wan (*HATS-09*), was identified during the field survey and the location is shown in **Appendix 15.1(19)**.

Tunnel Q

- 15.50 This tunnel runs from Ap Lei Chau PTW to Aberdeen PTW. No built heritage resources were identified in the field survey.

Stonecutters Island Sewage Treatment Works and Associated Disinfection Facilities

- 15.51 Construction works would be conducted at the existing SCISTW and the nearby area for proposed disinfection facilities and effluent conveyance system, as shown in **Appendix 15.2 (Plate 10)**. Historical sites of Ruins of the West Battery, Ruins of the Generator House, Old West Battery and the Old Central Battery, as shown in **Appendix 15.1(16)** were identified within 300 metres of the proposed facilities during the field survey.

Identification of Environmental Impacts

Construction Phase

Works associated with Preliminary Treatment Works

- 15.52 Three built heritage resources, including Western Market, Old Cable House and Noonday Gun, were identified 280m, 300m and 280m from the Central PTW, Cyberport PTW and Wan Chai East PTW respectively. The works associated with these PTW upgrading works generally consist of the following: demolition of existing buildings, ground excavation of maximum depth of 4 metres for treatment plant buildings and 5 to 8 metres for manholes, pits and grit traps, construction of new buildings and associated sewage treatment facilities, installation of electrical & mechanical equipment as well as laying of drainage pipes, sewers and utility lines. Conventional construction plant and equipment and non-percussive piling methods would be used. There is a potential of vibration impact due to these above-ground construction activities on the heritage resources.

Works associated with Sewage Conveyance System

- 15.53 As mentioned in Section 2, other than Horizontal Directional Drilling (HDD) to be used for construction of Tunnel Q from Aberdeen to Ap Lei Chau, there would be either 'drill and blast' or 'tunnel boring machine' (TBM) adopted for tunnel and shaft construction (when reaching rock layer) in other locations. The construction method has not been determined at the time of preparation of this EIA Report. However, in terms of the effect to built heritage resources, drill and blast would give rise to stronger vibration effect and hence this method would be assessed in relation to impacts to heritage resources as the worst case scenario in this section.
- 15.54 Construction of SCS would comprise the components of vertical shaft & horizontal tunnel. Blasting at shafts would be at variable depths depending on the rockhead level at each location. In general,

the range of rockhead would be ranging from 10m to 80m below ground. The level of proposed sewage tunnels would be from 75m to 160m below ground. As such, the levels of ground vibration due to blasting works are expected to be higher during construction of shafts than that of sewage tunnels.

- 15.55 In order to prevent potential damage to historical buildings and structures, maximum limits for safe vibration levels have been set at 25 mm/s. This vibration limit has been applied in controlling vibrations due to blasting operations in Hong Kong by CEDD and MTRC.

Expansion Works on SCISTW

- 15.56 On Stonecutters Island, construction of the new structures, including deep excavation and bore piling works within the existing SCISTW, the proposed areas for disinfection facilities on the northwestern side of the SCISTW, and the effluent tunnel as part of the effluent conveyance system connecting the SCISTW via the disinfection facilities to the outfall, may have potential to cause structural damage to any remaining historical features through vibration damage.

Operational Phase

- 15.57 Operation of HATS Stage 2A would have no impact on the built heritage resources based upon the fact that proposed construction works on Stonecutters Island (e.g. expansion of the SCISTW and construction of disinfection facilities adjacent to Container Port Road) would be within or close to the existing facilities and such works would not create any adverse visual impacts to the existing environmental setting of the identified heritage resources.

Prediction and Evaluation of Environmental Impacts

- 15.58 According to the latest engineering design for PTWs, SCISTW and SCS, no declared monuments, graded or non-graded historic buildings were found within the project boundary. Hence, It is envisaged that there would not be any direct impact (e.g. demolition) on the identified heritage resources. Any heritage resources located in close proximity to the project areas may be impacted through indirect vibration impact induced by the activities e.g. tunnel boring or drill and blast activities during construction phase.

Construction phase

Preliminary Treatment Works

- 15.59 Two of the PTW sites, including Central PTW and Cyberport PTW, were found to have historical structures within the 300m Study Area. Details of the assessment are presented in **Table 15.4**.

Table 15.4 Assessment of the Impacts to Resources within 300m of PTW Sites

Resource	Nearest PTW Site	Minimum Distance to Project Area	Map Reference	Impact Assessment
Western Market (HATS-05)	Central PTW	280m	Appendix 15.1 (3 & 14)	Conventional construction plant/ equipment and non-percussive piling methods would be used for construction of PTW upgrading works. Adverse impact on the resource is therefore not expected. The shaft at the PTW may be conducted by blasting at rock layer. This structure has been identified as sensitive to damage from blasting.
Old Cable House (HATS-09)	Cyberport PTW	300m	Appendix 15.1 (7 & 19)	Conventional construction plant/ equipment and non-percussive piling methods would be used for construction of PTW upgrading works. Adverse

Resource	Nearest PTW Site	Minimum Distance to Project Area	Map Reference	Impact Assessment
				<p>impact on the resource is not expected.</p> <p>The shaft at the PTW may be conducted by blasting at rock layer. This structure has been identified as sensitive to damage from blasting.</p>

Sewage Conveyance System

- 15.60 Construction of riser shaft and production shaft would be within the existing SCISTW. The riser shaft would be connected to the deep SCS (140 metres below sea level) under the harbour skirting the rest of Stonecutters Island until reaching Sai Ying Pun.
- 15.61 The tunnel at Sai Ying Pun would then run both i) to the east until reaching the North Point PTW and ii) to the west until reaching the Ap Lei Chau PTW. Construction of the tunnel may have potential impacts on the nearby heritage resources on the Hong Kong Island. Details of the assessment are presented in **Table 15.5**.

Table 15.5 Assessment of the Impacts to Resources within 300m of SCS

Resource	Nearest SCS Section	Minimum Distance to SCS	Map Reference	Impact Assessment
Former Clubhouse of the Royal Hong Kong Yacht Club at 12 Oil Street (HATS-01)	Tunnel J	300m	Appendix 15.1 (4 & 12)	The structure is historical and as such is susceptible to vibration damage from blasting.
Ngo Wong Temple at 150-160 Electric Road (HATS-02)	Tunnel J	300m	Appendix 15.1 (8 & 12)	The structure is not historical and is not especially susceptible to vibration damage from blasting.
Noonday Gun (HATS-29)	Tunnel J	10m	Appendix 15.1 (24 & 31)	The noonday gun is a non structural heritage resource and would not be impacted by the proposed works.
Old Shophouse at 207 Des Voeux Road (HATS-03)	Tunnel K	100m	Appendix 15.1 (9 & 13)	The structure is historical and as such is susceptible to vibration damage from blasting.
Two old Shophouses at 67 & 69 Des Voeux Road (HATS-04)	Tunnel K	100m	Appendix 15.1 (10 & 14)	The structures are historical and as such are susceptible to vibration damage from blasting.
Western Market (HATS-05)	Tunnel K	160m	Appendix 15.1 (3 & 14)	The structure is historical and as such has been identified as sensitive to vibration damage from blasting.
Queen's Pier (HATS-06)	Tunnel K	100m	Appendix 15.1 (5 & 15)	Queen's pier has been dismantled subsequent to the original survey for this project and will not be impacted by the proposed works.
Mount Davis Battery (HATS-07)	Tunnel M	155m	Appendix 15.1 (11 & 17a) for northern section & (17b) for southern section	The structure is historical and as such is susceptible to vibration damage from blasting.
Lo Pan Temple at 15 Ching Lin Terrace (HATS-08)	Tunnel M	280m	Appendix 15.1 (6 & 18)	The structure is historical and as such is susceptible to vibration damage from blasting.

Resource	Nearest SCS Section	Minimum Distance to SCS	Map Reference	Impact Assessment
Old Cable House at Kong Sin Wan (HATS-09)	Tunnel M	250m	Appendix 15.1 (7 & 19)	The structure is historical and as such is susceptible to vibration damage from blasting.
Felix Villas (HATS-23)	Tunnel M	110m	Appendix 15.1 (20 & 27)	The structure is historical and as such is susceptible to vibration damage from blasting.
Jubilee Battery (HATS-24)	Tunnel M	20m	Appendix 15.1 (21 & 28)	The structures are historical and as such are susceptible to vibration damage from blasting.
Ex-Western Fire Station (HATS-25)	Tunnel M	160m	Appendix 15.1 (22 & 29)	The structure is historical and as such is susceptible to vibration damage from blasting.
47 Victoria Road (HATS-26)	Tunnel M	35m	Appendix 15.1 (23 & 30)	The structure is historical and as such is susceptible to vibration damage from blasting.
Arch and Foundation Stone of the Tung Wah Small Pox Hospital (HATS-27)	Tunnel M	10m	Appendix 15.1 (23 & 30)	The structure is historical and as such is susceptible to vibration damage from blasting.
Buddhist Temple (To Chi Fat She) (HATS-28)	Tunnel M	20m	Appendix 15.1 (23 & 30)	The structure is not historical and is not especially susceptible to vibration damage from blasting.
City of Victoria Boundary Stone (HATS-30)	Tunnel M	180m	Appendix 15.1 (26 & 33)	The stone is a single piece of granite and is not especially susceptible to vibration damage from blasting.
Fok Hing Tong (HATS-31)	Tunnel M	240m	Appendix 15.1 (6 & 18)	The structures are historical and as such are susceptible to vibration damage from blasting.
50-52 Sassoon Rd#	Tunnel M	115 m	Appendix 15.1 (25 & 32)	
54 Sassoon Road#	Tunnel M	75 m	Appendix 15.1 (25 & 32)	
Old Prison Area, Block 318 (HATS-10)	Tunnel L	~300m	Appendix 15.1 (16)	
Old Prison Area, Block 319(HATS-11)	Tunnel L			
Old Prison Area, Block A (HATS-12)	Tunnel L			
Old Prison Area, Block 322 (HATS-13)	Tunnel L			
Old Prison Area, Block H	Tunnel L			

Stonecutters Island Sewage Treatment Works

Existing SCISTW

15.62 The works proposed for the existing SCISTW site involve deep excavation for influent pumping station and construction of other facilities e.g. additional sedimentation tanks and sludge processing facilities. Construction would involve piling to form foundations. These may have potential to cause structural damage to any remaining historical features through vibration damage. Details of the assessment are presented in **Table 15.6**.

Table 15.6 Assessment of the Impacts from Existing SCISTW to Graded Buildings on Stonecutters Island

Resource	Minimum Distance to Project Area	Map Reference	Impact Assessment
Old Central Battery, Gun Emplacement Associated with Underground Magazines (HATS-22)	215m	Appendix 15.1 (16)	The structure is historical and as such is susceptible to vibration damage due to drill & blast for effluent conveyance system connecting from distribution chamber at existing SCISTW to the chlorine contact tank.

Area for Disinfection Facilities

15.63 On the proposed areas for disinfection facilities to the northwestern side of the SCISTW, construction of effluent tunnel & associated chambers as well as other disinfection facilities which involve excavation, bore piling works and possibly drill and blast may have potential to cause structural damage to any remaining historical features through vibration damage. Details of the assessment are presented in **Table 15.7**.

Table 15.7 Assessment of the Impacts from works within the Proposed Area for Disinfection Facilities to Graded Buildings on Stonecutters Island

Resource	Minimum Distance to Project Area	Map Reference	Impact Assessment
Old West Battery *Block 25 A-D Block 29 (HATS-14) Block 35 (HATS-15) Block 36 (HATS-16) Block 37 (HATS-17) Block 41 (HATS-18) Block 43 (HATS-19)	100m to 190m	Appendix 15.1 (16)	The structures are historical and as such are susceptible to damage from vibration during blasting for disinfection facilities.
Ruins of the Generator House(HATS-20)	240m	Appendix 15.1 (16)	
Ruins of the West Battery (HATS-21)	140m	Appendix 15.1 (16)	

* Access was not available to Block 25 A-D and therefore they were not included in the field survey.

Temporary Works Areas on Stonecutters Island

15.64 Two temporary works areas (SCI-i and SCI-ii) are located some 500 metres to the northeast of SCISTW (**Figure 2.9 – sheet 19 of 19** refers). As the works areas would not involve any construction activities (mainly for stockpiling/storage purpose) and hence no adverse impact on the historical structures on the island from these two works areas would be expected.

Acceptability of the Vibration Impact on Heritage Resources

15.65 The peak particle velocity (ppv) levels predicted at the Arch and Foundation Stone of the Tung Wah Small Pox Hospital during the construction are shown in **Table 15.7a**, which are based on the latest information provided by the design consultant of the sewage conveyance system for Stage 2A. The Arch and Foundation Stone of the Tung Wah Small Pox Hospital represents the built heritage site that would be closest to the blasting operation. Only the blasting impact was assessed as it represents the worst case in terms of the peak ppv level generated from the construction activities. As indicated in the table, the calculated peak ppv levels complied well with the assessment criterion of 25 mm/s with large safety margin. Based on the ppv results, exceedance of the vibration limit would not be expected at all the identified heritage resources.

Table 15.7a Calculated Peak Particle Velocity for Selected Heritage Resources

Resource	Nearest SCS Tunnel	Minimum Distance to Project Area	Calculated ppv (mm/s)
Case 1 - Allowable Charge Weight Per Delay for Heritage with Shallow Foundation founded on soil *			
Arch and Foundation Stone of the Tung Wah Small Pox Hospital	Tunnel M	10m	5.1
Case 2 - Allowable Charge Weight Per Delay for Heritage assumed with Deep Foundation founded on rock**			
Arch and Foundation Stone of the Tung Wah Small Pox Hospital	Tunnel M	10m	6.8

*: Assume the heritage structure to be founded on shallow foundation near to ground surface.

** : Assume the heritage structure to be founded with deep foundation on rockhead.

Mitigation Measures of Environmental Impacts

Construction Phase

15.66 In order to prevent potential damage to historical buildings and structures, maximum limits for safe vibration levels have been set at 25 mm/s. This vibration limit has been applied in controlling vibrations due to blasting operations in Hong Kong by CEDD and MTRC. Details of the mitigation measures are presented in **Tables 15.8 to 15.11**.

15.67 Given that all proposed mitigation measures (that is monitoring of vibration levels to ensure that they do not exceed the set limits) are properly implemented, there would be no adverse impacts associated with the project works anticipated (as the monitoring will ensure that limits are not exceeded.)

Preliminary Treatment Works

Table 15.8 Mitigation Recommended for Resources near PTW Sites

Resource	Nearest PTW Site	Recommended Mitigation Measures
Western Market (HATS-05)	Central PTW	It has been determined that the maximum vibration level

Resource	Nearest PTW Site	Recommended Mitigation Measures
Old Cable House (HATS-09)	Cyberport PTW	<p>should be limited to a peak particle velocity (ppv) limit of 25mm/s.</p> <p>During the blasting for shaft construction at the nearest PTW (as listed in the second column of this table), monitoring of the vibration levels should be undertaken through the use of measures such as fixing approved tell tales and tilting monitoring points to the historic buildings and structures on a weekly basis. The proposed monitoring points shall be submitted to AMO for agreement before commencement of the construction work. If vibration levels are found to exceed the limit of 25 mm/s, the Project Proponent shall take immediate corrective action by reducing the rate of forward progress, as necessary, to bring PPV levels within compliance.</p> <p>Monitoring results should be submitted to the engineer in an agreed format within two days of each monitoring undertaken.</p> <p>A permit under section 6 of the Antiquities & Monuments Ordinance (Cap. 53) is required before installation work of monitoring instruments may commence at Western Market, a Declared Monument. The location of the monitoring points must be agreed with the relevant authorities before installation. Should any irregularities arise during construction phase, the RSE shall alert relevant authorities and implement proper mitigation measures accordingly, subject to the agreement of relevant authorities</p>

Sewage Conveyance System

Table 15.9 Mitigation Recommended for Resources near Sewage Conveyance System

Resource	Nearest Tunnel Section	Recommended Mitigation Measures
Former Clubhouse of the Royal Hong Kong Yacht Club at 12 Oil Street (HATS-01)	Tunnel J	<p>It has been determined that the maximum vibration level should be limited to a peak particle velocity (ppv) limit of 25mm/s.</p> <p>During the blasting for construction of Tunnel J, monitoring of the vibration levels should be undertaken through the use of measures such as fixing approved tell tales and tilting monitoring points to the historic buildings and structures on a weekly basis. The proposed monitoring points shall be submitted to AMO for agreement before commencement of the construction work. If vibration levels are found to exceed the limit of 25 mm/s, the Project Proponent shall take immediate corrective action by reducing the rate of forward progress, as necessary, to bring PPV levels within compliance.</p> <p>Monitoring results should be submitted to the engineer in an agreed format within two days of each monitoring undertaken.</p>
Old Shophouse at 207 Des Voeux Road (HATS-03)	Tunnel K	It has been determined that the maximum vibration level should be limited to a peak particle velocity (ppv) limit of 25mm/s.
Two old Shophouses at 67 & 69 Des Voeux Road (HATS-04)	Tunnel K	During the blasting for construction of the nearest tunnel (as listed in the second column of this table), monitoring of the vibration levels should be undertaken through the use of
Western Market (HATS-05)		

Resource	Nearest Tunnel Section	Recommended Mitigation Measures
	Tunnel K	<p>measures such as fixing approved tell tales and tilting monitoring points to the historic buildings and structures on a weekly basis. The proposed monitoring points shall be submitted to AMO for agreement before commencement of the construction work. If vibration levels are found to exceed the limit of 25 mm/s, the Project Proponent shall take immediate corrective action by reducing the rate of forward progress, as necessary, to bring PPV levels within compliance.</p> <p>Monitoring results should be submitted to the engineer in an agreed format within two days of each monitoring undertaken.</p> <p>A permit under section 6 of the Antiquities & Monuments Ordinance (Cap. 53) is required before installation work of monitoring instruments may commence at Western Market, a Declared Monument. The location of the monitoring points must be agreed with the relevant authorities before installation. Should any irregularities arise during construction phase, the RSE shall alert relevant authorities and implement proper mitigation measures accordingly, subject to the agreement of relevant authorities</p>
Mount Davis Battery (HATS-07)	Tunnel M	
Lo Pan Temple at 15 Ching Lin Terrace (HATS-08)	Tunnel M	
Old Cable House in Kong Sin Wan (Telegraph Bay) (HATS-09)	Tunnel M	
Felix Villas (HATS-23)	Tunnel M	
Jubilee Battery (HATS-24)	Tunnel M	
Ex-Western Fire Station (HATS-25)	Tunnel M	
47 Victoria Road (HATS-26)	Tunnel M	
Arch and Foundation Stone of the Tung Wah Small Pox Hospital (HATS-27)	Tunnel M	
Fok Hing Tong (HATS-31)	Tunnel M	
50 – 52 Sassoon Road	Tunnel M	
54 Sassoon Road	Tunnel M	
Ngong Shuen Chau Barracks, Old Prison Area	Tunnel L	
Block 318 (HATS-10)		
Block 319 (HATS-11)		
Block A (HATS-12)		
Block 322 (HATS-13) Block H		

Stonecutters Island Sewage Treatment Works

Table 15.10 Mitigation Recommended for Resources near existing SCISTW

Resource	Recommended Mitigation Measures
Old Central Battery, Gun Emplacement Associated with Underground Magazines (HATS-22)	<p>It has been determined that the maximum vibration level should be limited to a peak particle velocity (ppv) limit of 25mm/s.</p> <p>During the blasting for construction of the effluent conveyance system, monitoring of the vibration levels should be undertaken through the use of measures such as fixing approved tell tales and tilting monitoring points to the historic buildings and structures on a weekly basis. The proposed monitoring points shall be submitted to AMO for agreement before commencement of the construction work. If vibration levels are found to exceed the limit of 25 mm/s,</p>

Resource	Recommended Mitigation Measures
	<p>the Project Proponent shall take immediate corrective action by reducing the rate of forward progress, as necessary, to bring PPV levels within compliance.</p> <p>Monitoring results should be submitted to the engineer in an agreed format within two days of each monitoring undertaken.</p>

Area for Disinfection Facilities

Table 15.11 Mitigation Recommended for Resources near Area for Disinfection Facilities

Resource	Recommended Mitigation Measures
<p>Old West Battery Block 25 A-D Block 29 (HATS-14) Block 35 (HATS-15) Block 36 (HATS-16) Block 37 (HATS-17) Block 41 (HATS-18) Block 43 (HATS-19)</p> <p>Ruins of the Generator House (HATS-20)</p> <p>Ruins of the West Battery (HATS-21)</p>	<p>It has been determined that the maximum vibration level should be limited to a peak particle velocity (ppv) limit of 25mm/s.</p> <p>During the proposed blasting work at the area for disinfection facilities, monitoring of the vibration levels should be undertaken through the use of measures such as fixing approved tell tales and tilting monitoring points to the historic buildings and structures on a weekly basis. The proposed monitoring points shall be submitted to AMO for agreement before commencement of the construction work. If vibration levels are found to exceed the limit of 25 mm/s, the Project Proponent shall take immediate corrective action by reducing the rate of forward progress, as necessary, to bring PPV levels within compliance.</p> <p>Monitoring results should be submitted to the engineer in an agreed format within two days of each monitoring undertaken.</p>

Operational Phase

- 15.68 There would be no adverse impacts associated with the operational phase of the Project and no mitigation measures would be required.

Evaluation of Residual Impacts

- 15.69 With the implementation of the proposed mitigation measures, no residual impacts on the heritage buildings/structures are expected during construction and operation phases of the Project.

Environmental Monitoring and Audit

- 15.70 During blasting for tunnel, shafts, effluent conveyance system and disinfection facilities in the vicinity of the buildings/structures, the Project Proponent must design the method of construction and undertake vibration monitoring at the identified sensitive historical structures as a requirement of EM&A programme in such a way that a maximum vibration level of 25 mm/s is not exceeded. To ensure that this maximum limit is not exceeded, the Project Proponent must implement a monitoring schedule. The monitoring should be undertaken through the use of measures such as tell tales and tilting monitoring points to the historic buildings and structures on a weekly basis. If vibration levels are found to exceed the maximum limit of 25 mm/s, the Project Proponent shall take immediate corrective action by reducing the rate of forward progress, as necessary, to bring PPV levels within compliance. Monitoring results should be submitted to the engineer in an agreed format within two

days of each monitoring undertaken.

Conclusions

- 15.71 Based on the desk-based study and field survey findings, none of the heritage resources would be directly impacted by the proposed project. The impacts that have been identified would arise from blasting for tunnel, shafts, effluent conveyance system and disinfection facilities. Impact assessment results indicated that exceedance of the vibration limit of 25 mm/s would not be expected at all the identified cultural heritage sites. An environmental monitoring and audit programme will be implemented by the Project Proponent to ensure that the vibration levels are kept within acceptable limits during blasting for tunnel, shafts, effluent conveyance system and disinfection facilities in the vicinity of the buildings/structures.
- 15.72 In all, the HATS Stage 2A Project would not cause any insurmountable impacts to heritage resources in the Study Area during construction phase if the recommended mitigation measures are properly implemented. There will be no impact to the heritage during operation phase.

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