3. AIR QUALITY IMPACT ASSESSMENT

3.1 Introduction

3.1.1 This Section presents the assessment of potential air quality impacts arising from the construction and operation of the proposed Project. The Study Area is generally defined by a distance of 500 m from the boundary of the Project site (Figure 3.1). Representative Air Sensitive Receivers (ASRs) and emission inventories have been identified and an assessment of air quality impacts has been conducted. Mitigation measures and environmental monitoring and audit (EM&A) programme have been proposed if deemed necessary.

3.2 Legislation Requirement & Assessment Criteria

3.2.1 The principal legislation for the management of air quality in Hong Kong is the Air Pollution Control Ordinance (APCO) (Cap. 311). The prevalent AQOs, as presented in **Table 3.1**, stipulate the statutory limits for air pollutants and the maximum allowable number of exceedances over specific periods. This set of AQOs was used as the evaluation criteria for this assessment.

Table 3.1 – Hong Kong Air Quality Objectives

Air Pollutant	Averaging Time	Concentration (μgm^{-3})[(a)]	No. of Exceedances Allowed Per Year
Sulphur Dioxide (SO_2)	10-minute	500	3
	24-hour	125	3
Respirable Suspended Particulates (RSP) [(b)]	24-hour	100	9
	Annual	50	-
Fine Suspended Particulates (FSP) [(c)]	24-hour	75	9
	Annual	35	-
Nitrogen Dioxide (NO_2)	1-hour	200	18
	Annual	40	-
Ozone (O_3)	8-hour	160	9
Carbon Monoxide (CO)	1-hour	30,000	-
	8-hour	10,000	-
Lead	Annual	0.5	-

Notes:

(a) All measurements of the concentration of gaseous air pollutants, i.e., SO_2, NO_2, O_3 and CO, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.

(b) RSP means suspended particles in air with a nominal aerodynamic diameter of 10 μm or less.

(c) FSP means suspended particles in air with a nominal aerodynamic diameter of 2.5 μm or less.

3.2.2 In addition to the APCO, a maximum hourly average of Total Suspended Particulates (TSP) level of 500 μgm^{-3} at ASR is stipulated in *Annex 4 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM)* to address potential construction dust impacts.

3.2.3 The criterion of 5 odour units based on an averaging time of 5 seconds is also stipulated in the EIAO-TM for odour assessment.

3.2.4 The measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* should be followed to ensure that any dust impacts are reduced.

3.2.5 Requirements stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* will be followed to control potential emissions from non-road mobile machinery during construction phase.

3.3 Baseline Condition

In accordance with the EIA Study Brief, the Study Area for the air quality assessment is defined by a distance of 500 m from the boundary of the Project site. The Study Area is shown in Figure 3.1.

The proposed Project is located in Sha Tau Kok Town. The area has a relatively low population density and the local air quality is mainly influenced by vehicle emissions from road network within Sha Tau Kok Chuen. No major odour emission sources have been identified in the Study Area. Within the Study Area, there are several major low-rise residential developments, recreational facilities and governmental or institutional uses.

3.3.1 Existing Air Quality

Existing air quality of the Study Area has been determined through a review of EPD's routine air quality monitoring data collected between 2011 and 2015. The nearest EPD's Air Quality Monitoring Station (AQMS) is located in Tai Po. The latest 5 years annual averaged concentrations (2011 - 2015) of nitrogen dioxide (NO_2), sulphur dioxide (SO_2), respirable suspended particulates (RSP) and fine suspended particulates (FSP) recorded at this AQMS are presented in *Table 3.2*. The 5-year annual averaged concentrations (2011-2015) of these air pollutants give an indication of the existing air quality of the Study Area.

Table 3.2 – Summary of Background Air Quality at Tai Po AQMS (2011-2015)

Air Pollutant	Annual Averaged Concentration (μg m^{-3}) in the Recent 5 Years						
	2015	2014	2013	2012	2011	5-year average	Annual AQOs
SO_2	6	4	9	7	8	6.8	- (b)
NO_2	37	45	53	51	45	46.2	40
RSP	36	41	-- (d)	41	46	41.0	50
FSP (c)	23	27	-- (d)	28	--	26.0	35

Notes:

(a) 5 years annual average concentrations (2011 - 2015) of air pollutants measured at EPD's AQMS in Tai Po. (http://www.aqhi.gov.hk/en/download/air-quality-reportse469.html?showall=&start=1)

(b) No annual AQO for SO_2 Concentration.

(c) FSP monitoring data at the EPD Tai Po AQMS are publicly available since 2012.

(d) Annual average is not published for non-compliance with the representative requirement of no less than 2/3 representative period in a quarter.

The monitoring results as presented in Table 3.2 are indicative of the prevailing background air quality at the Project Site. The 5-year averages of RSP and FSP concentrations in 2011 - 2015 are below their respective AQOs (ie 50 μg m^{-3} and 35 μg m^{-3}, respectively), while the 5-year average of NO_2 concentration (46.2 μg m^{-3}) has exceeded the AQO (i.e. 40 μg m^{-3}).

3.4 Air Sensitive Receivers

Air Sensitive Receivers (ASRs) were identified within the Study Area in accordance with *Annex 12* of *EIAO-TM*. Latest Outline Zoning Plans (OZP), Outline Development Plan (ODP) and relevant land use plans published by Lands Department were also reviewed to identify future or committed ASRs. Representative ASRs within the Study Area are summarized in *Table 3.3* and shown in *Figure 3.1*. The representative ASRs have been identified on the basis that they are close to the Project site and are likely to receive the worst possible impact arising from the Project. Assessment

undertaken at these representative ASRs are considered representative of the 500m Study Area from the Project.

Table 3.3 – Representative Air Sensitive Receivers

ASR	Location	Type of Use	Approximate Separation Distance from the Nearest Site Boundary (m)	Status (existing/ planned)	Approximate Maximum Height (m above ground)
A1	Sha Tau Kok Playground	Residential	75	Existing	-
A2	Tin Hau Temple	Temple	60	Existing	3
A3 (b)	Sha Tau Kok Chuen Block 42 – 44	Residential	160	Existing	12
A4	Sun Yin Lau	Residential	180	Existing	9
A5	Operation Base – Sha Tau Kok Division Border District	G/IC	130	Existing	6
A6	Sha Tau Kok Fire Station	G/IC	170	Existing	12
A7 (c)	Ha Tam Shui Hang	Residential	190	Existing	9
A8	Police Operation Base	G/IC	20	Existing	12

Notes:

(a) G/IC – Government, Institution or Community

(b) A3 has been identified as the representative ASR of Shau Tau Kok Chuen.

(c) A7 has been identified as representative ASR as it is more representative of the actual location of Ha Tam Shui Hang.

3.5 Potential Sources of Impact

3.5.1 Construction Phase

The key construction activities for the Project are listed below:

(a) Construction of a temporary sewage treatment plant (TSTP) to cope with the sewage flow during the expansion works of the STKSTW;

(b) Expansion works for the upgrading of the STKSTW to increase its treatment capacity to 10,000m^3/day at ADWF;

(c) Decommissioning of the existing Sha Tau Kok Sewage Pumping Station (STKSPS), the rising main between STKSPS and STKSTW, and the existing submarine outfall;

(d) Construction of gravity sewer;

(e) Construction of a new submarine outfall; and

(f) Associated ancillary works.

No major earthworks or site formation works associated with the construction of the Project will be required.

Soil excavation, materials handling, truck movements on unpaved roads and wind erosion from open stockpiling of dusty materials within the Project Site are identified to be the potential dust generating activities.

Dust in terms of TSP, RSP and FSP and odour are the key air pollutants during construction and decommissioning works.

Tentatively, the construction of the Project will last for about 49 months and is scheduled to commence in 3rd quarter of 2017. The normal working hours will be between 0700 and 1900 hrs from Monday to Saturday (except public holidays).

3.5.2 Operation Phase

Potential odour emission is expected from the exhaust pipe of the TSTP and the STKSTW during operation. Potential odour nuisance may also result from the transportation, storage and handling of sludge produced during the sewage treatment process. The potential odour nuisance during transportation of sludge is considered to be minor as the sludge will be transported by enclosed type tankers.

3.6 Impact Assessment

3.6.1 Construction Phase

(a) Construction of TSTP and Expanded STKSTW

Construction of the TSTP and the expanded STKSTW, which will take approximately 15 and 32 months, respectively, would primarily involve site clearance, excavation, backfilling, construction of substructure and superstructure and other civil works.

Vegetation if any and debris will be removed during site clearance and fugitive dust emission is considered to be limited.

Only small-scale excavation works are expected during site formation as the site has been formed and no major site formation work is required. It is estimated that a total of about 400 m^3 and 40,500 m^3 of excavated soils will be generated from the construction of the TSTP and the expanded STKSTW, respectively throughout the construction period. The excavated materials will be disposed of at fill bank as public fill. In view of such small amount of excavated materials generated throughout the construction period, the potential fugitive dust emission is expected to be minimal with the implementation of dust control/ suppression measures stipulated under the Air Pollution Control (Construction Dust) Regulation and those recommended in Section 3.7.1 during excavation and backfilling, together with proper site management and good housekeeping.

No fugitive dust emission is expected from construction of substructure and superstructure as they will involve mainly concreting and steel-reinforcement works.

Due to small construction works area and scale of construction works, the number of construction plants employed in the construction of TSTP and STW would be very limited. Also, requirements as stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* will be followed to control potential emissions from non-road mobile machinery. Therefore, gaseous emission from diesel-fuelled construction equipment would be minor and would not cause any adverse air quality impact.

(b) Construction of Sewerage

A sewerage scheme has been proposed which involves the decommissioning of the STKSPS after the expansion of STKSTW. The scheme includes the removal of existing rising main and construction of new sewer such that sewage from Sha Tau Kok town will be conveyed via new sewer to the expanded STKSTW by gravity. The construction of the gravity sewer will be carried out for about 12 months. The gravity sewer will be constructed in small sections using open cut methods and trenchless method using pipe jacking. The open cut method involves soil excavation

works and backfilling, which may have the potential to cause fugitive dust emissions, and negligible dust emissions are expected from the trenchless method. As the gravity sewer is constructed in small sections, the excavated materials generated will be limited (about 4,620 m^3) and potential dust impact due to open cut method is expected to be low. Also, there will be limited number of construction plant to be deployed in the works since the construction works areas would be small. With the implementation of dust control measures recommended in *Section 3.7.1*, potential dust emissions from the decommissioning of the STKSPS and associated rising main and the construction of new gravity sewer are expected to be minimal. Hence, no adverse dust impact associated with the aforementioned works on nearby ASRs is anticipated.

(c) Construction of Submarine Outfall

Trenchless construction technique by Horizontal Direction Drilling (HDD) is proposed for the construction of the new submarine outfall beneath Starling Inlet. The construction of the new submarine outfall will take approximately 39 months. Cofferdam will be constructed and dried, followed by the removal of sediments for the installation of diffuser at the outfall location. Any sediment removed will be disposed of properly at off-site locations. In view of high moisture of the sediment, no fugitive dust emission is expected.

(d) Odour Impact from Decommissioning Works

The existing sewage pumping station and rising mains will be clean and flushed out properly to clear away any remaining potential sources of odour emission, such as sewage sludge from the facilities. The decommissioning including removal of the pumping station and rising mains will take place after the cleaning and flushing out. No unacceptable odour emission is anticipated during the construction phase. Hence, no adverse odour impact is anticipated from the decommissioning of the STKSTW.

3.6.2 Operation Phase

As discussed in *Section 3.5.2*, odour impact associated with the operation of TSTP and STKSTW may potentially affect the nearby ASRs and hence a quantitative assessment using computational modelling has been carried out to evaluate the potential odour impact. No other major odour emission sources have been identified nearby.

(a) Design of Exhaust and Odour Emission Rate Estimation

The exhausts of the TSTP and STKSTW will be located at the side of roof top of the structure which is located away from the nearby ASRs as far as possible. Before the STKSTW expansion, the TSTP will be in operation, therefore, both TSTP and STKSTW will not be in operation concurrently. The design parameters of exhaust stacks and the odour emission rates of the TSTP and STW are summarized in *Table 3.4*. Detailed calculations of odour emission rates, which have made reference to the approved EIA report of Upgrading Cheung Chau Sewage Collection, Treatment and Disposal Facilities project and Harbour Area Treatment project, are presented in *Annex 3A*.

Table 3.4 – Design Parameter of Exhaust Stack and Odour Emission Rates of TSTP and STKSTW

Design Parameter	Unit	STKSTW		TSTP	
Location	-	STKSTW No.1	STKSTW No.2	TSTP No.1	TSTP No.2
No. of emission points	-	1 (a)		2	
Building height	m above ground	15.65		14.3	14.3
Stack height	m above ground	17.65		16.3	16.3
Equivalent stack diameter	m	1.69		0.15	0.25
Exit temperature	-	ambient		ambient	ambient
Total flowrate @ exit temp.	m^3hr^{-1}	70,279	46,722	3,952	9,293
	m^3s^{-1}	19.52	12.98	1.10	2.58
Exit velocity	ms^{-1}	14.44		15.53	13.15
Odour emission rate at inlet	OUs^{-1}	17600	16300	3500	160
% of odour removal	%	99.5	99.5	99.5	99.5
Odour emission rate at exhaust	OUs^{-1}	169.5 (b)		17.5	0.8

Notes:
(a) Same emission point for STKSTW No.1 and STKSTW No.2.
(b) Combined emission rate for STKSTW No.1 and STKSTW No.2.

(b) Assessment Methodology and Assumptions

The Industrial Sources Complex Short Term 3 (ISCST3) model, which is an EPD's accepted air dispersion model, has been employed for the prediction of the odour impact at the ASRs and in the vicinity. The TSTP and STKSTW are assumed to be operating 24 hours a day, 7 days a week. As described above, the TSTP and STKSTW will not be in operation concurrently at any time, two modelling scenarios have been setup, ie, (a) one scenario considering odour emission from STKSTW only, and (b) the other scenario considering odour emission from TSTP only. The design parameters of exhaust stack and the odour emission rates, as presented in *Table 3.4*, have been inputted for the model run. 0 degree K for stack exit temperature was inputted for the model run to represent ambient exit temperature.

As the site area is classified as "rural" in accordance with the EPD's *Guidelines on Choice of Models and Model Parameter*, a "rural" dispersion mode was used in the model. In addition, the local terrain within Study Area has been incorporated into the model to account for terrain-induced impacts to dispersion.

Depending on the actual heights of the ASRs as identified in *Table 3.3*, assessment heights were selected at 1.5m, 4.5m, 7.5m and 10.5m above ground to assess the odour impact at relevant levels at the ASRs.

Hourly MM5 data predicted by the PATH (Pollutants in the Atmosphere and their Transport over Hong Kong) model in 2010 have been adopted for meteorological data in this assessment. The Study Area covers four PATH grids, (31,45), (31,46), (32,45) and (32,46). All identified representative ASRs falls within the PATH grid (32,46). Stability class of the PATH MM5 data was calculated by PCRAMMET (version 99169). Mixing heights in MM5 which are lower than the lowest recorded mixing height by the Hong Kong Observatory (HKO) (i.e. 121m) in 2010 were adjusted to 121m.

The assessment has been conducted based on the assumed reasonably worst case scenario under normal operating condition of the Project. The modelled hourly averaged odour concentrations at the ASRs by the ISCST3 were converted into 5-second averaged odour concentrations for comparison with the odour assessment's criterion stipulated in the *EIAO-TM*. A set of conversion factors stipulated in *"Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales"* published by the Department of Environment and Conservation, New South Wales, Australia were adopted in this assessment. As the stacks (i.e. about 2 m high) will be located at the roof top of the structure of the STKSTW or TSTP which is less than 2.5 times of building height of STKSTW or TSTP, building wake effect is expected. Building dimensions and locations obtained from latest site layout were inputted into the model to take into account the building wake effect. The conversion factors stated in this method are for converting 1-hour averaged concentrations to 1-second averaged concentration for near field regions. In this assessment, the conversion factors were directly adopted for converting 1-hour averaged concentrations to 5-second averaged concentration as a conservative approach. The conversion factors adopted in this assessment for different stability classes are shown in *Table 3.5.*

Table 3.5 – Conversion Factors from 1-hour to 5-second Mean Concentrations for Wake-affected Point Source [(a)]

Pasquill Stability Class	Conversion Factors (1-hour to 5-second averages)
A	2.3
B	2.3
C	2.3
D	2.3
E	2.3
F	2.3

Note:

(a) Reference to *Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales* published by the Department of Environment and Conservation, New South Wales, Australia. The derivation of the peak-to-mean ratios stated in the method was based on experimental and theoretical analyses and had assumed a 0.1% exceedance level (With reference to *"Statistical Elements of Predicting Water Science and Technology, Australia, 44:0 pp 157-164, 2001"*).

(c) Assessment Results

The predicted maximum 5-second odour concentrations at relevant levels above ground at the representative ASRs during the operation of TSTP or STKSTW are presented in *Table 3.6* and *Table 3.7*, respectively. Contours at ground level and height above ground where the highest predicted odour concentrations occur were plotted.

Table 3.6 – Predicted Maximum 5-second Odour Level at ASRs during the Operation of TSTP

ASR	Predicted Maximum 5-second Odour Level (OU/m^3)			
	1.5m above ground	4.5 m above ground	7.5m above ground	10.5 m above ground
A1	0.06	-	-	-
A2	0.06	-	-	-
A3	0.03	0.03	0.03	0.03
A4	0.04	0.04	0.04	-
A5	0.05	0.05	-	-
A6	0.04	0.04	0.04	0.04

ASR	Predicted Maximum 5-second Odour Level (OU/m³)			
	1.5m above ground	4.5 m above ground	7.5m above ground	10.5 m above ground
A7	0.03	0.03	0.03	-
A8	0.06	0.07	0.09	0.12
Odour Criterion	**5**	**5**	**5**	**5**

Table 3.7 – Predicted Maximum 5-second Odour Level at ASRs during the Operation of STKSTW

ASR	Predicted Maximum 5-second Odour Level (OU/m³)			
	1.5m above ground	4.5 m above ground	7.5m above ground	10.5 m above ground
A1	0.04	-	-	-
A2	0.04	-	-	-
A3	0.03	0.03	0.04	0.05
A4	0.03	0.03	0.04	-
A5	0.04	0.04	-	-
A6	0.04	0.04	0.04	0.05
A7	0.04	0.04	0.06	-
A8	0.03	0.04	0.08	0.13
Odour Criterion	**5**	**5**	**5**	**5**

The predicted maximum 5-second averaged odour levels at relevant heights at the identified ASRs are very low and comply with the odour criterion (i.e. 5 OU/m³ in 5-second averaging time). During the operation of TSTP, the highest predicted odour concentration (i.e. 0.12 OU/m³) is predicted at ASR 8 (Police Operation Base) at 10.5 m above ground. During the operation of STKSTW, the highest predicted odour concentration (i.e. 0.13 OU/m³) is also predicted at ASR 8 at 10.5 m above ground. Contour plots of the predicted maximum 5-second averaged odour concentrations at 1.5 m and 10.5 m above ground, for the operation of TSTP and STKSTW are shown in *Figure 3.2* to *Figure 3.5*. A7 has been selected as representative ASR of Ha Tam Shui Hang as it is more representative of the actual location of Ha Tam Shui Hang. As shown in *Figure 3.2* to *Figure 3.5*, the odour impact at other village houses in Ha Tam Shui Hang (NSR1 and NSR2) (see *Figure 4.1*) are well within the odour criterion. The potential worst odour impact has been addressed at A8 which is the closest to the Project.

A3 has been selected as the representative ASR of Sha Tau Kok Chuen. The odour impact at other locations in Shau Tau Kok Chuen (NSR4 and NSR6) (see *Figure 4.1*) is very minor as shown in *Figure 3.2* to *Figure 3.5*.

Sha Tau Kok Central Primary School (NSR3) and building along Shun Lung Street (NSR 8) (see *Figure 4.1*) are relatively distant from the Project site. The odour impact at the locations of NSR3 and NSR8 is very minor. Higher odour impact in the similar direction has been addressed at the identified representative ASR A1 to A6, which are closer to the Project site and well comply with the odour criterion. Similarly, the location of NSR7 (see *Figure 4.1*) is relatively distant from the Project site. The odour impact at the location of NSR7 is very minor. Higher odour impact has been addressed at the identified representative ASR A1 to A4, which are closer to the Project site and well comply with the odour criterion.

Therefore, for operation of TSTP or STKSTW, isopleths show that the predicted maximum 5-second odour concentrations at both 1.5 m and 10.5 m above ground within the Study Area are in compliance with the odour criterion. Thus, adverse odour impact due to the operation of TSTP or STKSTW is not anticipated.

3.7 Mitigation Measures

3.7.1 Construction Phase

Dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* will be implemented during the construction of the Project to control potential fugitive dust emissions. Standard construction practices for dust minimisation, including a number of practical measures such as regular water spraying, provision of vehicle wheel-washing and body washing facilities and shielding or covering with impervious sheet of stockpiled materials or exposed area when it is not use, will be implemented to reduce dust nuisance. For open trench construction of the gravity sewers, each work front should be around 20m to 30m in length to control potential dust emission.

In order to avoid potential odour emissions from the decommissioning activities, the existing sewage pumping station and rising main will be flushed out and sludge will be pumped away before the start of decommissioning works.

Site practices such as regular maintenance and checking of the diesel-driven PMEs will be adopted to avoid any black smoke emissions and to reduce gaseous emissions.

3.7.2 Operation Phase

The major process equipment of the TSTP and STKSTW will be confined inside the substructure/superstructure as far as possible to minimize odour nuisance to the surrounding air sensitive receivers. Hydrogen sulphide (H_2S) in the exhaust air is the major odour source. Deodourizing facility using activated carbon filters and/or bio-trickling filters will be equipped for both TSTP and STKSTW, attaining the required odour removal efficiency at exhaust, as presented in *Table 3.4*. The deodorization system would undergo maintenance annually or when the average odour removal efficiency of deodorization facility is smaller than the required odour removal efficiency. Ventilation system will also be provided inside the TSTP and STKSTW to ensure adequate air exchange within the plants. In accordance with the *Waste Disposal Ordinance (WDO)*, the sludge produced will be thickened and dewatered to 30% dry solids prior to disposal at the landfill. The sludge produced should be removed off-site regularly to avoid accumulation of odourous materials on site. Trucks transporting the sludge to landfill would be fully enclosed to minimise any potential odour impact during the transportation process. With the implementation of these mitigation measures, adverse odour impact associated with the operation of the TSTP or STKSTW is not expected.

No secondary impact is expected from the mitigation measures for both construction and operation phase of the Project proposed in the EIA report.

3.8 Residual Impacts

3.8.1 Construction Phase

No residual air quality impact is anticipated from the construction of the Project with the implementation of the recommended mitigation measures and good construction site practices.

3.8.2 Operation Phase

With the implementation of the recommended odour control measures and proper site management practices, no residual air quality impact is envisaged at all identified ASRs.

No residual impact is identified in the EIA report. Hence, no additional study is required.

3.9 Environmental Monitoring & Audit

3.9.1 Construction Phase

No adverse fugitive dust impact or odour impact is anticipated during the construction period, dust monitoring and odour monitoring are considered not necessary. However, it is recommended to conduct regular environmental site audit, for example, on weekly basis, to ensure the implementation of the dust control measures and good site practices throughout the construction period.

3.9.2 Operation Phase

During the operation phase, a commissioning test for the TSTP is recommended to be performed prior to the operation of the TSTP to ascertain the effectiveness of the deodorization systems at the TSTP. Similarly, a commissioning test for the STKSTW should also be performed prior to the operation of the STKSTW. Exhaust air flow rate, temperature of exhaust, odour emission rate of the deodorization systems should be monitored during the commissioning test. The exhaust air flow rate, temperature of exhaust, odour emission rate presented in *Table 3.4* should be maintained. Weekly monitoring of odour emission at the exhausts at TSTP and STKSTW by taking odour samples is recommended to be conducted in the first two months of the first year of the operation. The monitoring parameter will include exhaust flow rate, temperature of exhaust and odour emission rate and the monitoring results should be compared with that presented in *Table 3.4*. Provided that the monitoring results show no non-compliance on a weekly basis during the first two months, it is recommended to reduce the frequency to monthly in the subsequent four months and further reduce to quarterly in the remaining six months of the first year if no non-compliance is found. If there is any non-compliance, the operator should inspect the deodorization unit. Frequency of odour monitoring should not be reduced unless no non-compliance is found. Quarterly odour monitoring is also recommended to continue in the second year of the operation. If monitoring in the first two years of operation shows that compliance can be achieved consistently, the Project Proponent may propose and seek approval with EPD to reduce monitoring frequency to every six-month or yearly basis for subsequent years of operation.

Odour patrol is proposed during the period of maintenance or cleaning of the deodorization system for TSTP or STKSTW. It is generally defined as Level 0 to Level 4 in which Level 0 means no odour and Level 4 means unacceptable odour. If Level 3 – 4 is reported and the source of odour is confirmed to be originated from the exhaust of TSTP or STKSTW, the operator should be notified immediately and should investigate and rectify the problem of the cleaning or maintenance works within 24 hours in order to restore the level to below Level 2.

3.10 Conclusions

This Section of the EIA has described the potential air quality impacts associated with the construction and operation of the proposed expansion of the Sha Tau Kok Sewage Treatment Works. The purpose of the assessment is to evaluate the acceptability of predicted impacts to air quality.

Potential air quality impacts arising from construction activities have been considered. With implementation of standard construction practices and mitigation measures, no unacceptable impact on ASRs during the construction phase is anticipated.

Potential odour impacts from the operation of the TSTP or STKSTW have been quantitatively assessed. With the proper implementation of the proposed plant design, provision of adequate ventilation and appropriate deodorization systems, the

predicted maximum 5-second odour concentrations at the identified ASRs would comply with the odour criterion stipulated in the *EIAO-TM*. Hence, adverse air quality impact arising from the operation phase of the Project is not anticipated.

Notwithstanding the above, regular site inspections will be carried out during the construction phase in order to confirm that the mitigation and control measures are properly implemented and are working effectively. During the operation phase, commissioning test for the TSTP and STKSTW is recommended to be conducted prior to their operation to ascertain the effectiveness of the odour control measures at the TSTP and STKSTW during their operation. Odour patrol is also proposed during the period of maintenance of the deodorization system for TSTP or STKSTW.