

Appendix 9.1 Key Assessment Assumptions and Methodologies

Assessment Methodologies	Assessment Assumptions	Limitation of Assessment Methodologies / Assumptions	Prior Agreements with EPD/Other Authorities	
			EIA Study Brief Clause Reference	Relevant Documentation
Water Quality Impact (Construction Stage)				
<p>The assessment of potential water quality impacts for the Project follows those presented in Annex 6 and Annex 14 of the EIAO-TM.</p> <p>To assess the potential water quality impacts due to the Project, the sources and natures of water pollution to be generated have been identified and their impacts have been quantified using mathematical model.</p> <p>Appropriate mitigation measures have been recommended to minimize any adverse water quality impacts.</p> <p>Hydrodynamic Model: Delft3D-FLOW model</p> <p>Sediment Plume Model: Delft3D-PART model</p> <p>Dilution Tracer for Computation of Contaminant Release: Delft3D-WAQ model</p> <p>Parameters for Sediment Plume Model: <u>Horizontal Dispersion Coefficient D_H (m^2/s)</u> $a = 0.003$ $b = 0.4$ Reference: $D_H = a t^b$, Where t is the age of particle from the instant of discharge in seconds <u>Vertical Dispersion Coefficient D_V</u></p>	<p>Concurrent Marine Works: The modelling scenario assumed that the following marine works would take place concurrently:</p> <ul style="list-style-type: none"> • Dredging for Temporary Reclamation within the CBTS for the SCL Protection Works; • Dredging Works for Proposed Cruise Terminal at Kai Tak (CT Dredging) Stage 1 • Laying of Western Cross Harbour Water Mains and Associated Land Mains (Western Harbour Main) • Dredging for Cross Harbour Water Mains under the WDII project; and • Dredging for North Point Reclamation (NPR) under the CWB project. <p>The assumed dredging rates for these Project works are summarized in Table 3.8 and Figure No. NEX2213/C/331/ENS/M59/505.</p>	<p>Key model uncertainties and limitations are:</p> <ul style="list-style-type: none"> • All the predictions made in this EIA were based on the latest available construction information and assumptions. If there are any major changes to the key assumptions during the actual implementation of the Project in the future, the prediction and assessment findings presented in this EIA report should be reviewed accordingly. <p>The following approach was adopted to enhance the model performance:</p> <ul style="list-style-type: none"> • The computational grid of the detailed Victoria Harbour (VH) Model was refined along the coastline of Wan Chai, Causeway Bay and North Point to represent the coastal features under the interim construction scenario; • The performance of the detailed VH Model was checked against the results of a fully calibrated model adopted under the approved WDII & CWB EIA to ensure that reliable predictions of hydrodynamics are provided for the Study area; 	<p>Appendix A – Hydrodynamic and Water Quality Modelling Requirements</p> <p>3.4.1.6(g)</p>	<p>See Annex A</p> <p>See Appendix 6.3</p>

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<p>(m²/s)</p> <p>5x10⁻³ Dry Season 1x10⁻⁵ Wet Season</p> <p><u>Particle Settling Velocity</u> 0.0001m/s (Constant) Grain size diameter of 10 μm</p> <p><u>Critical Shear Stress</u> 0.05 Pa Sedimentation 0.15 Pa Erosion</p> <p>Simulation Periods: 15-day full spring-neap cycles (excluding spin-up period) for dry and wet seasons</p> <p>Bathymetry: Based on latest marine charts from Marine Department</p> <p>Coastline Configuration: <u>Included the following key planned reclamation projects:</u> WDII & CWB Reclamation; Sunny Bay Reclamation; Tuen Mun - Chek Lap Kok Link; Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities; Further Development of Tseung Kwan O.</p>		<ul style="list-style-type: none"> The simulation comprises a sufficient spin up period so that the initial conditions do not affect the results. 		
Noise Impact (Construction Stage)				
To assess the potential noise impacts due to the Project, the noise sources were identified and the impacts were quantified. The assessment methodology follows Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM).	Construction noise impact assessment was carried out on a monthly basis and assessed on existing NSRs from the commencement of the Project. Cumulative noise impact was considered within 300m of the NSRs from the construction tasks of the Project taking place concurrently. Noise sources from the areas greater than this	The prediction of construction noise impact was based on the methodology described in the GW-TM under the NCO. There would be limitations of the methodology such as the accuracy of the predictive base data for future (e.g. plant inventory for proposed construction works).	3.4.3.2 (i) – Assessment area 3.4.3.2 (iii)(b) – Noise assessment points 3.4.3.2 (iv) – Plant inventory	See Annex B

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	<p>300m distance were excluded from this assessment.</p> <p>In accordance with the EIAO, the methodology outlined in the GW-TM has been used for this construction noise assessment (excluding percussive piling). Sound power level (SWL) of the equipment was taken from Table 3 of GW-TM and BS5228 was referenced for those without information provided.</p> <p>It was assumed that all PME items required for a particular construction activity would be located at the notional or probable source position of the segment where such activity is to be performed. The assessment was based on the cumulative SWL of PME likely to be used for each location, taking into account the construction period in the vicinity of the receiver location. To predict the noise level, PME was divided into groups required for each discrete construction task. The objective was to identify the worst case scenario representing those items of PME that would be in use concurrently at any given time. The sound pressure level of each construction task was calculated, depending on the number of plant and distance from receivers. The noise levels at NSRs were then predicted by adding up the SWLs of all concurrent construction tasks.</p>	<p>Quantitative uncertainties in this assessment of impacts should be considered when drawing conclusions from the assessment.</p> <p>In carrying out the assessment, realistic worst case assumptions have been made in order to provide a conservative assessment of noise impacts. The construction noise impact was assessed based on conservative estimates for the types and quantities of plant and construction methods.</p>		
Construction Dust Impact				
The major potential sources of construction dust impact associated	Dusty construction activities and programme were based on information	It is difficult to obtain the detailed information for estimation of	3.4.4.2 (iii)	Not Applicable - The assessment was

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<p>with the Project would include construction of temporary seawall and fill works during reclamation, and excavation, materials handling, wind erosion and truck haulage on unpaved roads during cut-and-cover tunnel construction.</p> <p>Quantitative assessment was conducted for determination of construction dust impact due to the Project. Fugitive Dust Model (FDM) (1993 version) was adopted to assess potential dust impact from the construction. The 1-hour, 24-hour and annual average TSP concentrations at representative discrete ASRs were at 1.5m and 5m above ground.</p> <p>The emission rates for different construction activities considered in the model were based on the USEPA Compilation of Air Pollutant Emission Factors (AP-42), 5th edition.</p> <p>The concurrent works with WDII and CWB projects were taken into account in assessing the dust impact.</p>	<p>provided by the Engineer. As a conservative assumption, all construction activities were assumed to be carried out at the same time.</p> <p>As a conservative assessment approach, heavy construction emission rate was adopted for all types of construction activities in the assessment.</p> <p>Confirmed with the Project Proponent, the working period at the construction site would be 10 hours (08:00 – 18:00). As a conservative approach, 100% of work area would be active during construction and wind erosion of the whole works site was assumed to take place over the night time in the model. These assumptions have been considered in the assessment.</p> <p>The requirement of the Air Pollution Control (Construction Dust) Regulation such as watering once every working hour on active construction areas was considered in the assessment and 91.7% reduction of dust emission was assumed in the model with the implementation of this dust suppression measure in accordance with USEPA guideline.</p> <p>Worst case meteorological condition was adopted to predict the maximum hourly and daily average TSP concentrations:</p> <ul style="list-style-type: none"> • Wind speed: 1 m/s • Wind direction: 360 wind directions • Wind direction resolution: 1° 	<p>emission rates for different dusty construction activities, heavy construction emission rate which is the highest emission rate was therefore adopted in the model run as a conservative approach. The predicted dust concentrations at the ASRs may be higher than the actual situation.</p>		<p>conducted in accordance with Appendices B-1 to B-3 of the EIA Study Brief (ESB-213/2010)</p>

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	<ul style="list-style-type: none"> Stability class: D (daytime, 8:00-18:00) & F (night time, 18:00-8:00) Surface roughness: 1m Mixing height: 500 m <p>Hourly meteorological data from Hong Kong Observation for year 2008 were adopted to predict annual TSP concentration.</p> <p>Background TSP concentration, based on latest EM&A data recorded at the Chinese People's Liberation Army Force Hong Kong Building under the Central Reclamation Phase III project, was adopted as an indication of the future TSP background concentration.</p>			
Waste Management Implications				
<p>The method for assessing potential waste management impacts for the Project follow those presented in Annex 7 and Annex 15 of the EIAO-TM.</p> <p>A marine site investigation (SI) was completed to determine the level of contamination in the sediments within the proposed dredging area. The sediment sampling proposal for the marine SI and laboratory testing was prepared in accordance with ETWB TC(W) No. 34/2002 Management of Dredged/Excavated Sediment.</p> <p>Appropriate mitigation measures have been recommended to minimize any adverse waste impacts.</p>	<p>The waste quantities to be generated from the Project were estimated based on the engineering assessment and the information provided in the Construction and Demolition Material Management Plan (C&DMMP) prepared for the Project.</p>	<p>The waste quantities estimated under this EIA are subject to further detailed site survey. However, further refinement of the estimated waste quantities would not affect the assessment conclusion provided that all the recommended mitigation measures are implemented properly.</p>	<p>3.4.2.2 (iii)(a) – Sediment sampling and testing proposal</p>	<p>See Appendix 6.3</p>

Annex A

本署檔號
 OUR REF: (25) in AX(5) to EP2/G/A/124
 來函檔號
 YOUR REF: NEX2213-COR-HSD-ENV-040174
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7 July 2010

MTR Corporation Limited
 MTR Headquarters Buildings, Telford Plaza,
 Kowloon Bay, Hong Kong.
 GPO Box 9916, Hong Kong
 (Attn: Ms. Lisa POON, Senior Environmental Engineer)

To Tom &f.

Dear Ms. Poon,

Environmental Impact Assessment (EIA) Ordinance (Cap. 499)
Project Title: Shatin to Central Link Protection Works at Causeway Bay Typhoon Shelter
EIA Study Brief No. ESB-213/2010

Water Quality Modelling Methodology

I refer to your letter under reference dated 23 June 2010 submitting the captioned Water Quality Modelling Methodology for our agreement under the requirements stipulated in Appendix A of the EIA Study Brief No. ESB-213/2010.

Please be informed that after taking into the advice from our water quality assessment team, the submitted Water Quality Modelling Methodology is considered as acceptable. As such, agreement is hereby given under the following requirements of the captioned EIA Study Brief:

Reference in the Study Brief Stipulating the Requirements	Key Description
Appendix A, Item 1 under heading "Model details – Calibration & Validation"	The models shall be properly calibrated and validated against applicable existing and/or newly collected field data before their use in this study in the Hong Kong waters, the Pearl Estuary and the Dangan (Lema) Channel. The field data set for calibration and validation shall be agreed with EPD.
Appendix A, Item 2 under heading "Model details – Simulation"	The sediment transport module for assessing impacts of sediment loss due to marine works shall include the processes of settling, deposition and re-erosion. The values of the modelling parameters shall be agreed with EPD. Contaminants release and DO depletion during dredging and dumping shall be simulated by the model.
Appendix A, Item 4&5 under heading "Model details – Simulation"	The models shall at least cover the Hong Kong waters, the Pearl Estuary and the Dangan Channel to incorporate all major influences on hydrodynamic and water quality. A fine grid model may be used for detailed assessment of this study. It shall either be linked to a far field model or form part of a larger model by gradual grid refinement.

	<p>The coverage of the fine grid model shall be properly designed such that it is remote enough so that the boundary conditions would not be affected by the project. The model coverage area shall be agreed with EPD.</p> <p>In general, grid size at the area affected by the project shall be less than 400 m in open waters and less than 75 m around sensitive receivers. The grid shall also be able to reasonably represent coastal features existing and proposed in the project. The grid schematization shall be agreed with EPD.</p>
<p>Appendix A, Item 5 under heading "Modelling assessment"</p>	<p>Cumulative impacts due to other projects, activities or pollution sources within a boundary to the agreement of EPD shall also be predicted and quantified.</p>

Nevertheless, your company and the consultant should note that according to Section 3.4 of the Technical Memorandum of the EIA Ordinance, the assessment shall be based on the best available information at the time of the assessment. The above agreement is only for the concerned requirements under the EIA Study Brief to facilitate the EIA study. It shall not prejudice the Director of Environmental Protection's future decisions on any application for approval of the EIA report under the EIA Ordinance. If there is any significant change in circumstances, project design/details or assessment methodology/ assumptions, etc., your company and the consultant should review the situations; carry out necessary updating/revisions; and seek our advice whether further agreements under the EIA Study Brief are necessary.

You are also reminded that the requirements on documentations of key assessment assumptions, limitations of assessment methodologies and related prior agreement(s) with the Director of Environmental Protection as stipulated under Section 3.4.5 of the EIA Study Brief shall be followed.

Yours faithfully,



(Billy Ma)

Environmental Protection Officer
for Director of Environmental Protection

c.c.
RDO/HyD (Attn: Mr. Michael TF Leung)
AECOM (Attn: Mr. Freeman CHEUNG)

Fax: 2761 1508
Fax: 2317 7609

c.c. internal: S(MA)5, S(MA)2, E(WP)34

Annex B

本署檔號
OUR REF: (23) in AX(5) to EP2/G/A/124
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30 June 2010

MTR Corporation Limited
MTR Headquarters Buildings, Telford Plaza,
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GPO Box 9916, Hong Kong
(Attn: Ms. Lisa POON, Senior Environmental Engineer) *FOTom 84*

Dear Ms. Poon,

Environmental Impact Assessment (EIA) Ordinance (Cap. 499)
Project Title: Shatin to Central Link Protection Works at Causeway Bay Typhoon Shelter
EIA Study Brief No. ESB-213/2010

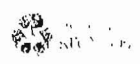
Noise Impact Assessment

I refer to your letter under reference dated 23 June 2010 enclosing a set of maps indicating construction noise assessment points for captioned Noise Impact Assessment (NIA) for our agreement under Section 3.4.3.2(iii)(b) of the EIA Study Brief No. ESB-213/2010.

Please be informed that after taking into the advice from our noise assessment team, the submitted documents for NIA are considered as acceptable. As such, agreement is hereby given under the following requirements of the captioned EIA Study:

Reference in the Study Brief Stipulating the Requirements	Key Description
Section 3.4.3.2(iii)(b)	The Applicant shall select assessment points to represent all identified NSRs for carrying out quantitative noise assessment as described below. The assessment points shall be agreed with the Director prior to the quantitative noise assessment and may be varied subject to the best and latest information available during the course of the EIA study. A map shall be given showing the location of each and every selected assessment points.

Nevertheless, your company and the consultant should note that according to Section 3.4 of the Technical Memorandum of the EIA Ordinance, the assessment shall be based on the best available information at the time of the assessment. The above agreement is only for the concerned requirements under the EIA Study Brief to facilitate the EIA study. It shall not prejudice the Director of Environmental Protection's future decisions on any application for approval of the EIA report under the EIA Ordinance. If there is any significant change in circumstances, project design/details or assessment methodology/ assumptions, etc., your



company and the consultant should review the situations; carry out necessary updating/revisions; and seek our advice whether further agreements under the EIA Study Brief are necessary.

You are also reminded that the requirements on documentations of key assessment assumptions, limitations of assessment methodologies and related prior agreement(s) with the Director of Environmental Protection as stipulated under Section 3.4.5 of the EIA Study Brief shall be followed.

Yours faithfully,



(Billy Ma)

Environmental Protection Officer
for Director of Environmental Protection

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