

Appendix 2**Hydrodynamic and Water Quality Modeling Requirements****Modeling software general**

1. The assessment and modelling tool for fuel spillage events should be quantitative with proven applications locally or overseas.
2. The modelling software shall be fully 3-dimensional capable of accurately simulating the stratified condition, salinity transport, and effect of wind and tide within the model area.
3. The modelling software shall consist of hydrodynamic, water quality and particle dispersion modules. The hydrodynamic and water quality modules shall have been proven with successful applications locally and overseas.
4. The hydrodynamic and water quality modules shall be strictly mass conserved at all levels.

Model details – Calibration & Validation

1. No field data collection is required for model calibration for this study. However, the models shall be properly calibrated and validated before its use in this study in the marine waters in the area including Western Buffer and Victoria Harbour Water Control Zones defined under the Water Pollution Control Ordinance and the East and West Lamme Channels with the field data collected by:
 - * Hydraulic and Water Quality Studies in Victoria Harbour (1987)
 - * Port and Airport Development Strategy - Enhancement of WAHMO Mathematical Models (1990)
 - * Strategic Sewage Disposal Scheme Stage II - Oceanic Outfall, Oceanographic Surveys and Modeling (1992)
 - * Update on Cumulative Water Quality and Hydrological Effect of Coastal Developments and Upgrading of Assessment Tool (1998)
 - * EPD's routine monitoring data
 - * Tidal data from HK Observatory, Macau and relevant Mainland Authorities.

The above model calibration area is subject to review when the marine transportation route of the fuels for use at the refuelling facilities is available. The Applicant shall provide such information for EPD agreement on the model calibration area during the course of EIA study.

2. Tidal data shall be calibrated and validated in both frequency and time domain manner.
3. For the purpose of calibration and validation, the model shall run for not less than 15 days of real sequence of tide (excluding model spin up) in both dry and wet seasons with due consideration of the time required to establish initial conditions.

4. In general the hydrodynamic models shall be calibrated to the following criteria:

	<u>Criteria</u>	<u>Level of fitness with field data</u>
?	tidal elevation (rms)	< 8 %
?	maxi. phase error at HW and LW	< 20 minutes
?	maxi. current speed deviation	< 30 %
?	maximum phase error at peak speed	< 20 minutes
?	maximum direction error at peak speed	< 15 degrees
?	maximum salinity deviation	< 2.5 ppt

Model details – Simulation

2. The fuel spill model should cover combinations of different tides, wind, season conditions, rate, quantity and spill location to predict the degree of impact at affected sensitive receivers.
3. A fine grid model shall be used for detailed assessment of this study. It shall cover at least the Victoria Harbour, Western Harbour, Tathong Channel, East and West Lamma Channels. It shall either be dynamically linked to a far field model or form part of a larger model by gradual grid refinement. The outer model shall at least cover the Hong Kong waters, the Pearl Estuary and the Lema Channel to incorporate all major influences on hydrodynamic and water quality.
3. The above model coverage area is subject to review when the marine transportation route of the fuels for use at the refuelling facilities is available. The Applicant shall provide such information for EPD agreement on the model coverage area during the course of EIA study.
4. 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 schematisation shall be agreed with EPD.

Modeling assessment

1. Scenarios to be assessed shall cover all possible fuel spillage events. The Applicant shall propose such scenarios for EPD agreement.
2. Hydrodynamic model shall be run for (with proper model spin up) at least a real sequence of 15 days spring-neap tidal cycle in both dry season and wet season.
3. The predicted impacts on all sensitive receivers shall be assessed.
4. Cumulative impacts due to other projects, activities or pollution sources within a boundary, subject to the agreement of EPD, shall also be predicted and quantified.
5. All modelling input data and results shall be submitted in digital media to EPD.

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