

Particle modelling of pollutant dispersion from the future Kwun Tong nullah – Scenario 1B

1. A 2D particle model is used to model the pollutant dilution and dispersion in Victoria Harbour near the outfall of the future Kwun Tong Nullah. A conservative pollutant, i.e. without the incorporation of decay factor, is discharged at the outfall at an arbitrary rate of 1 kg s^{-1} (equivalent to a pollution load of $86,400 \text{ kg day}^{-1}$). Tidal current will then convey the pollutants and diluting it in the surrounding water. The mean pollutant elevation in Victoria Harbour due to the discharge of the future Kwun Tong nullah is shown in Figures 6C.1–6C.4.
2. From the particle model result, the depth averaged pollutant elevation is reduced rapidly from the maximum of 57 mgL^{-1} down to 5 mgL^{-1} , i.e. more than 10 times dilution, within approximately 500m from the outfall (Figures 6C.1–6C.2). The top 5m layer averaged pollutant elevation revealed a similar trend (Figures 6C.3–6C.4). In particular, the pollutant elevation under the proposed concrete decking at the mouth of YTB is $15 - 20 \text{ mgL}^{-1}$ and less than 5 mgL^{-1} in Victoria Harbour. The maximum pollutant elevations at the potentially reprovisioned Cha Kwo Ling (NCKLSPS) and Yau Tong (NYTSPS) Saltwater Pumping Stations are 24.6 mgL^{-1} and 11 mgL^{-1} respectively.
3. In order to estimate the actual increase in biochemical oxygen demand (BOD_5), SS, Ammoniacal Nitrogen and *E. Coli.*, the ratio between the actual pollution loads of each pollutant and the assumed load of $86,400 \text{ kg day}^{-1}$ is calculated. By assuming the same ratio between the actual and the modelled pollutant elevations in the neighbouring water, the actual pollutant elevation in Victoria Harbour can be estimated.
4. With reference to the modelled pollutant elevation and the effective loading at the future Kwun Tong Nullah outfall, the predicted increase in BOD_5 , SS, Ammoniacal Nitrogen and *E. Coli.* are shown in Table 6C.1.

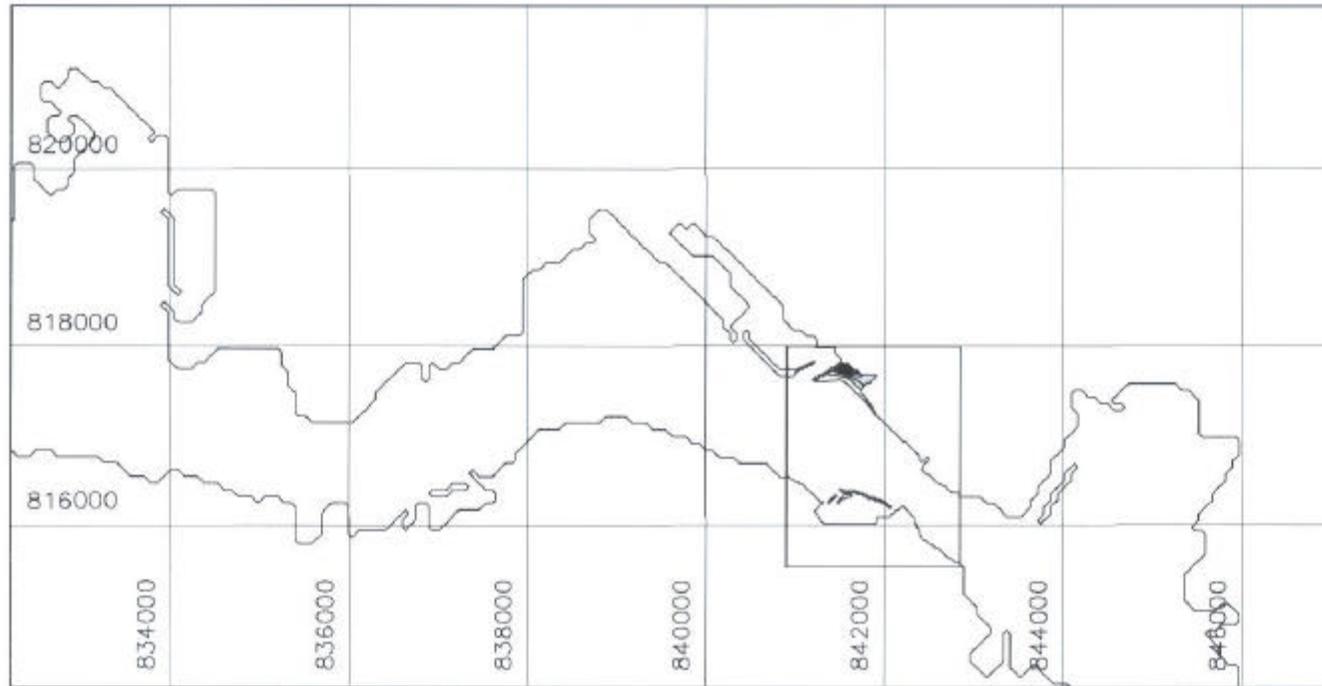
Table 6C.1 Estimated Pollutant Elevation due to the Future Kwun Tong Nullah Discharge

Modelled Pollutant Elevation ⁽¹⁾ [mgL^{-1}]	BOD_5 ⁽²⁾ [mgL^{-1}]	SS ⁽²⁾ [mgL^{-1}]	Ammoniacal Nitrogen ⁽²⁾ [mgL^{-1}]	<i>E. Coli.</i> ⁽²⁾ [count per 100mL]
5	0	0.14	6.71×10^{-4}	11
10	0.01	0.28	1.34×10^{-3}	21
15	0.01	0.42	2.01×10^{-3}	32
20	0.01	0.56	2.68×10^{-3}	43
55	0.04	1.53	7.38×10^{-3}	118

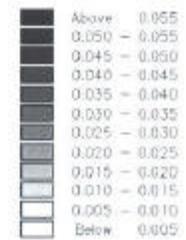
Note:

1. Modelled pollutant elevation corresponds to an arbitrary pollutant discharge rate of 1 kg s^{-1} ($86400 \text{ kg day}^{-1}$) at the outfall of the new Kwun Tong nullah.
2. Calculations were based on the effective loading at the outfall of the new Kwun Tong nullahas shown in Table 6.9 in Section 6 of the Engineering Feasibility Study for the Comprehensive Development at Yau Tong Bay, Final EIA report, assuming 5% residual flows remain in the storm system from expedient connections.
3. The results presented are based on the Full Reclamation option for YTB.

5. The distribution of averaged pollutant age in Victoria Harbour are shown in Figures 6C.5–6C.8. The result showed that the pollutants, discharging from the future Kwun Tong nullah, will take an average time of 2 to 4 hours to be flushed out of the proposed concrete decking at YTB and into Victoria Harbour. This suggests that tidal flushing prevents the accumulation of pollutants under the proposed concrete decking at YTB and thus, unacceptable water quality is not expected.



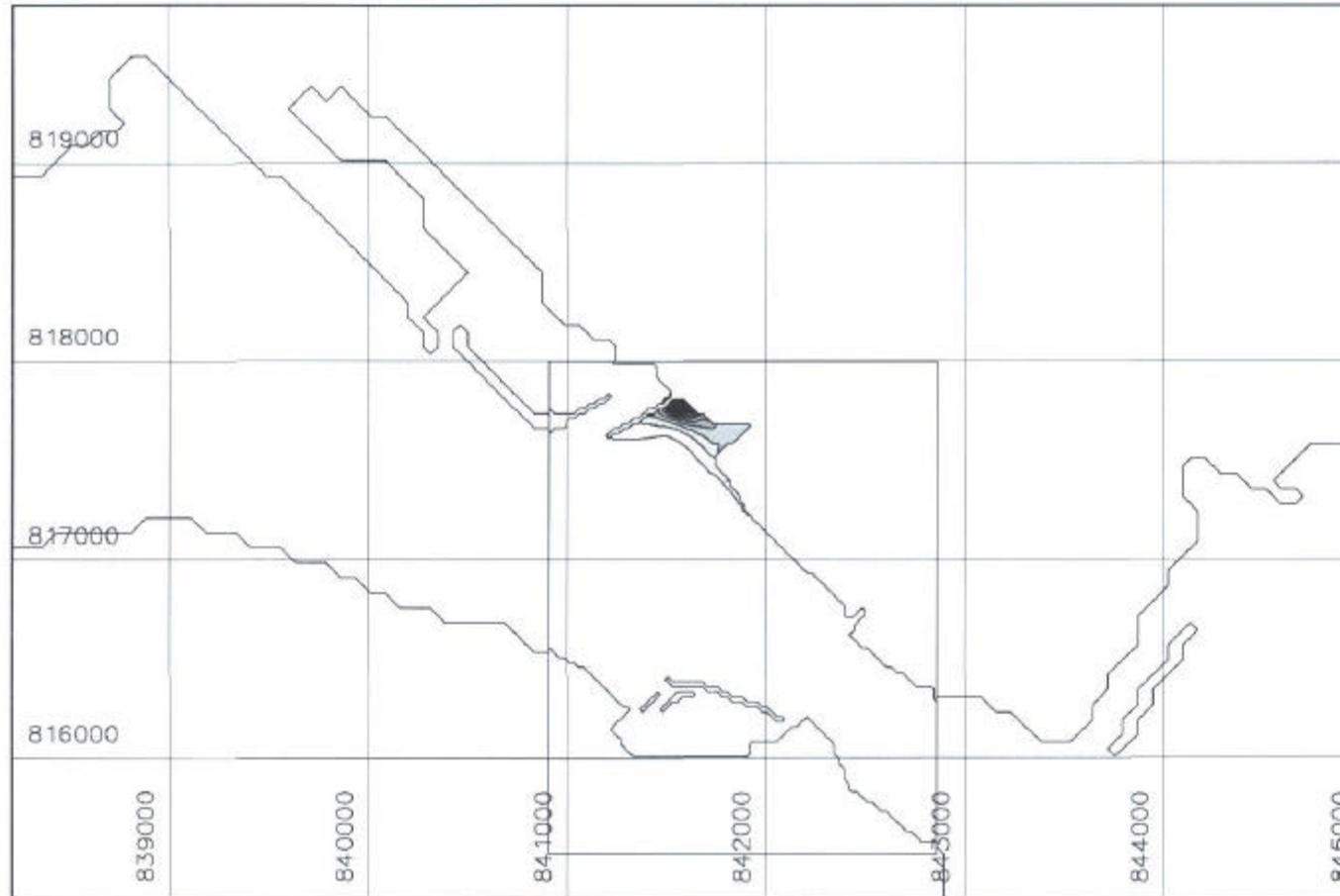
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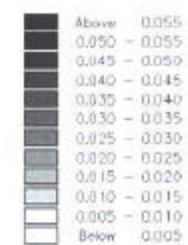
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YAU TONG BAY DEVELOPMENT
ENVIRONMENTAL IMPACT ASSESSMENT STUDY
IMPACT OF THE NEW KWUN TONG NULLAH (SCENARIO 1B), DEPTH AVERAGED
POLLUTANT CONCENTRATION IN DRY SEASON, SPRING AND NEAP TIDES

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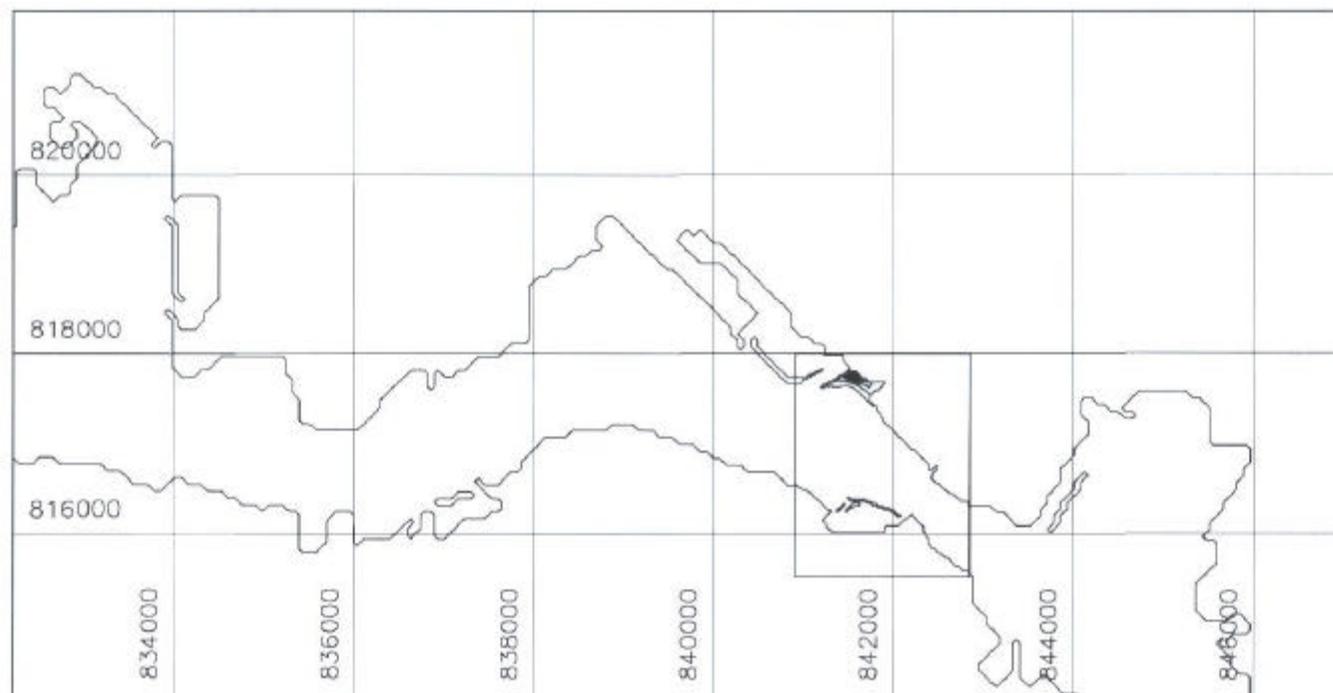
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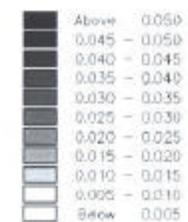
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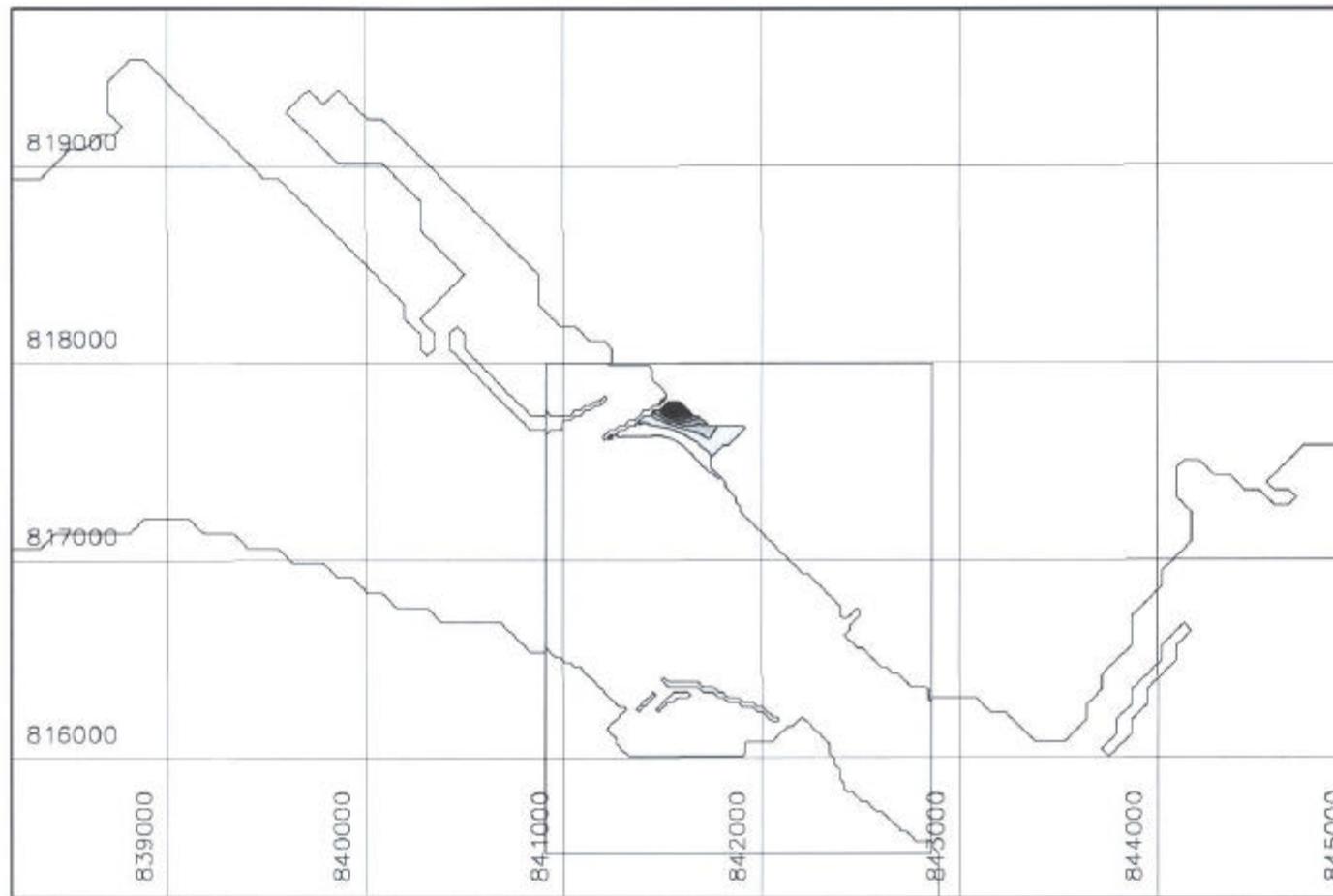
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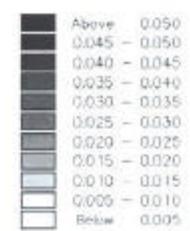
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IMPACT OF THE NEW KWUN TONG NULLAH (SCENARIO 1B), TOP 5m LAYER AVERAGED
POLLUTANT CONCENTRATION IN DRY SEASON, SPRING AND NEAP TIDES

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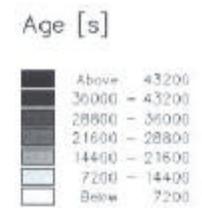
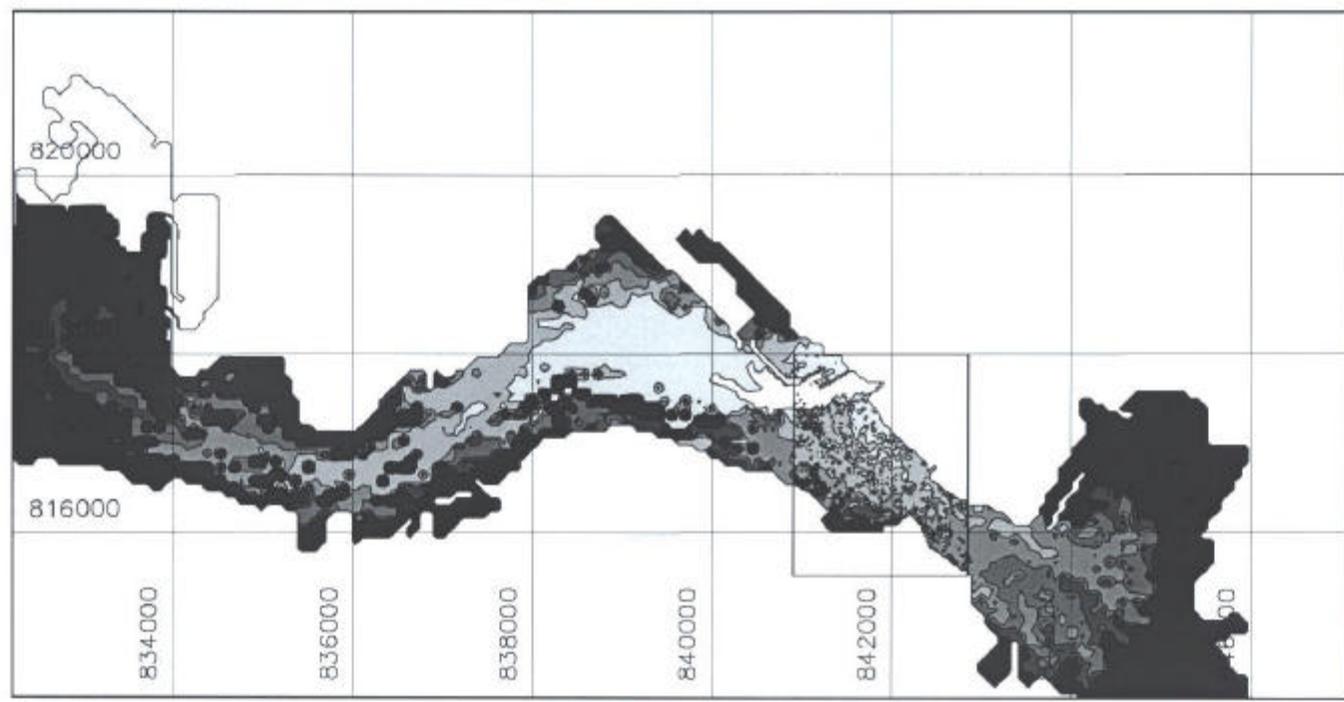
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POLLUTANT CONCENTRATION IN DRY SEASON, SPRING AND NEAP TIDES (ENLARGED)

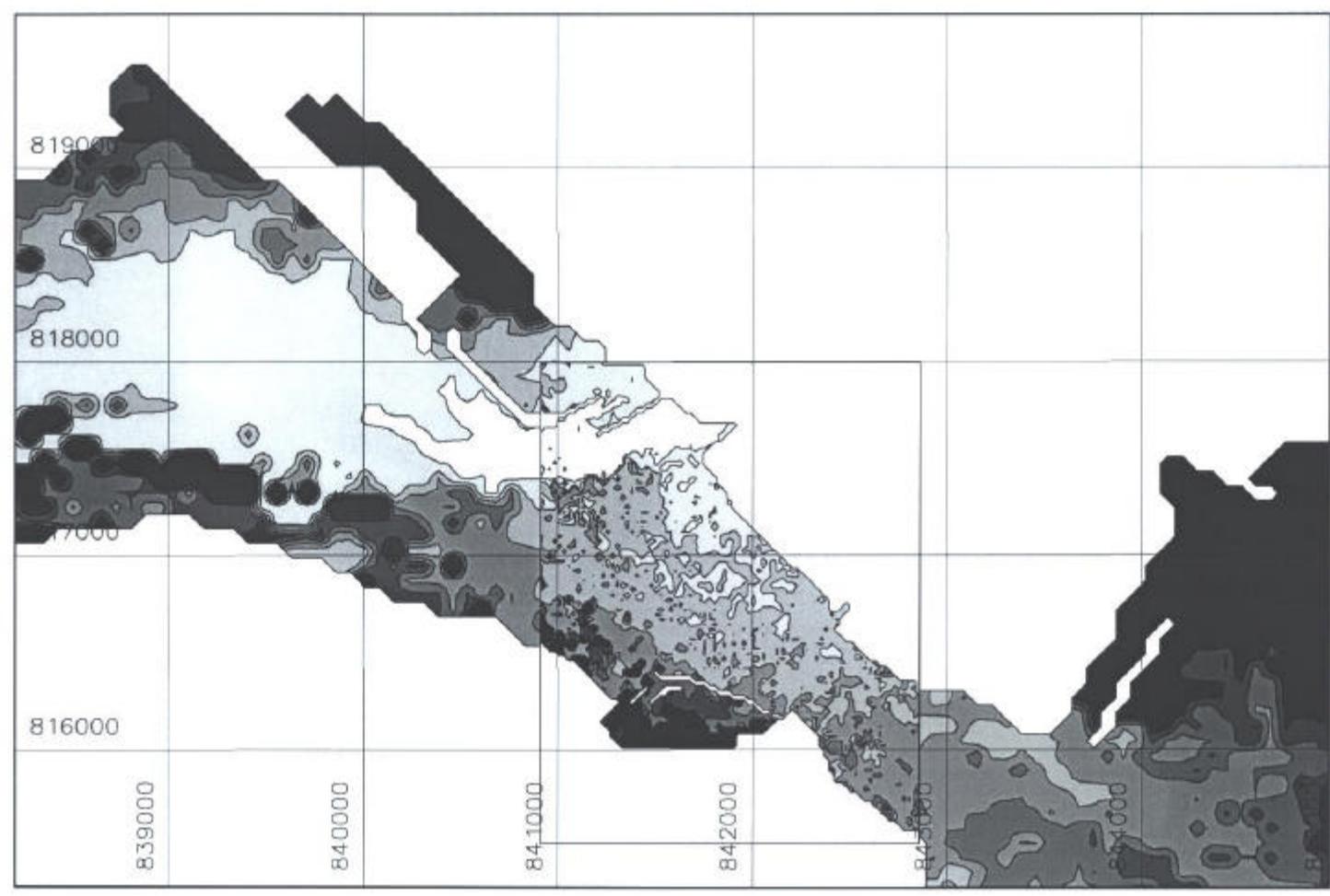
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IMPACT OF THE NEW KWUN TONG NULLAH (SCENARIO 1B), DEPTH AVERAGED
POLLUTANT AGE IN DRY SEASON, SPRING AND NEAP TIDES

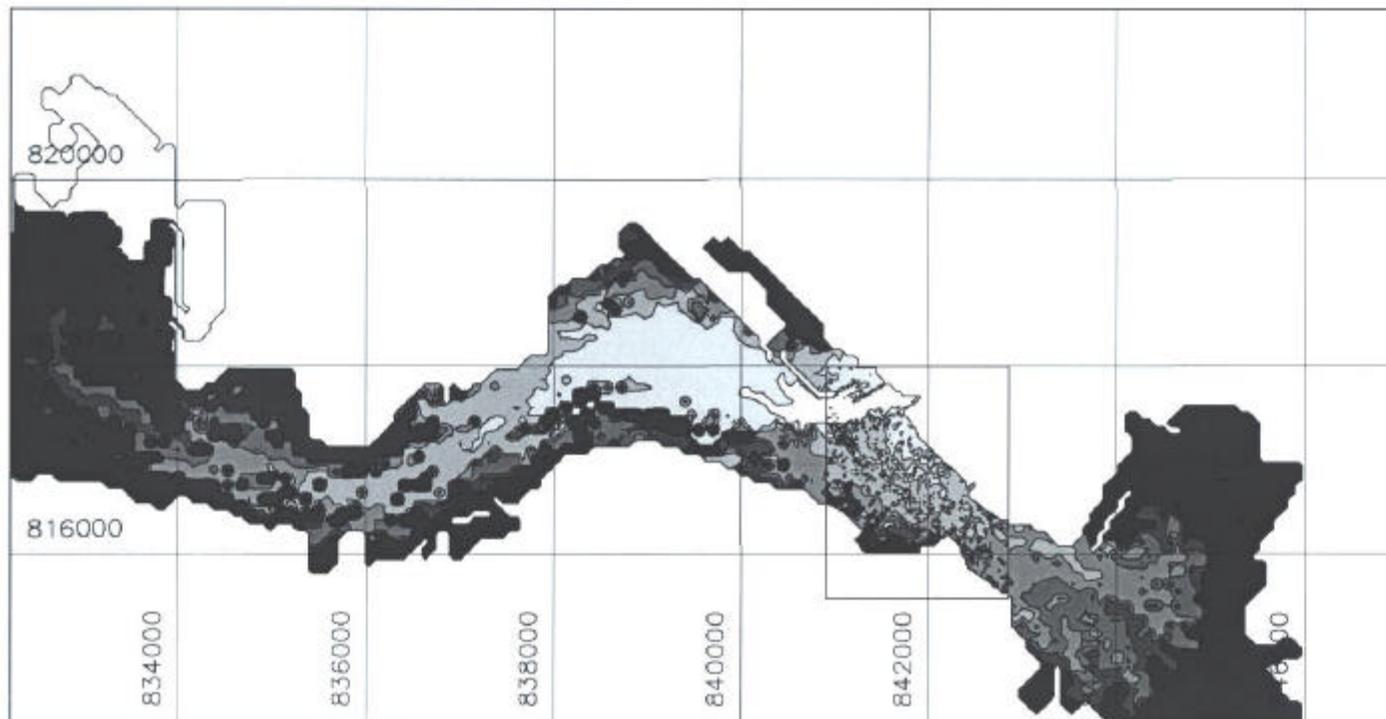
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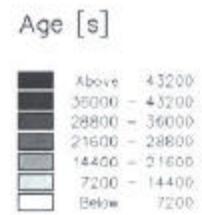
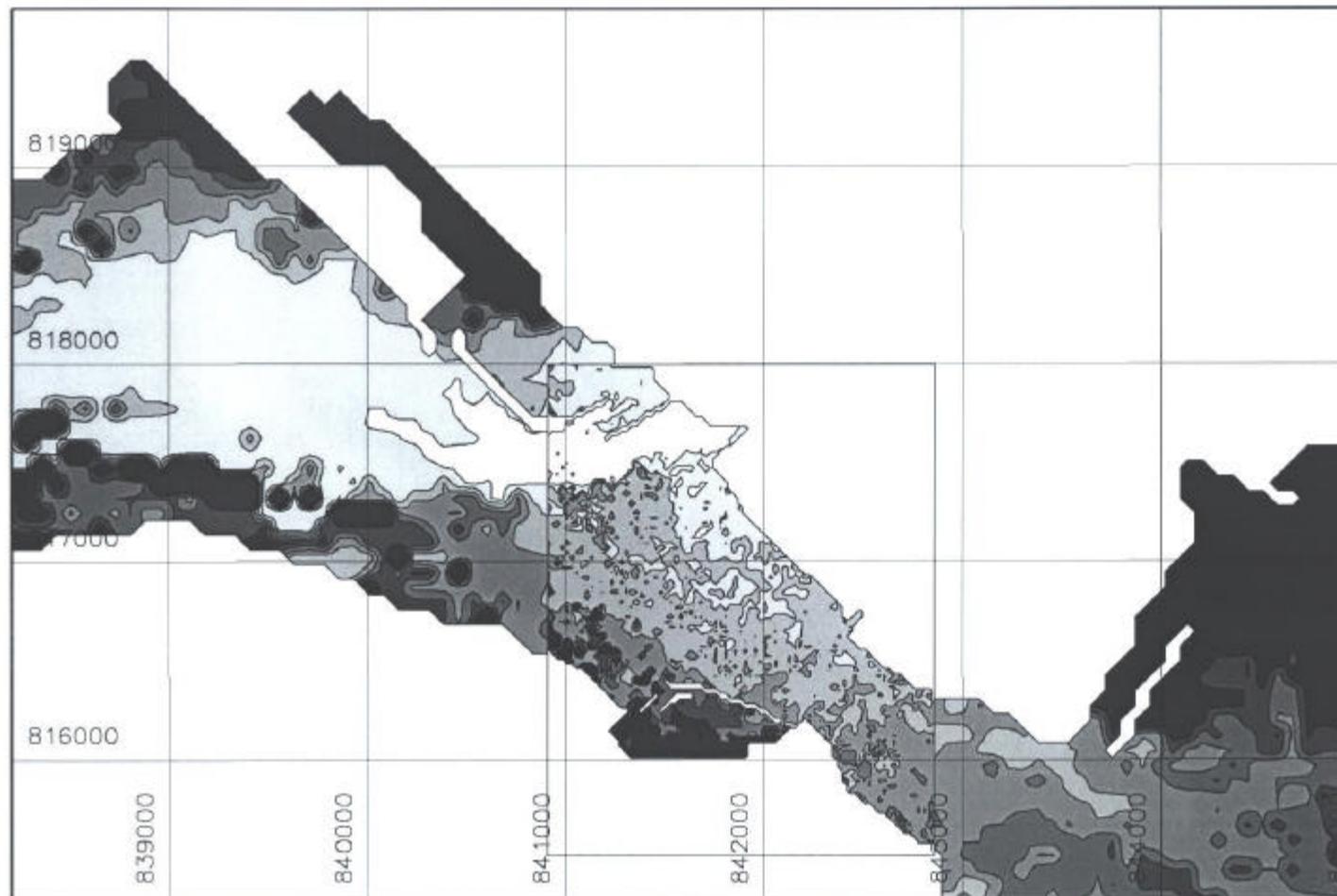
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Fig No. 6C.8