

17. WATER QUALITY

17.1 Introduction

This section provides a qualitative assessment of potential water quality impacts associated with the EAR.

The key issue addressed in this section is the generation of construction runoff which may cause adverse water quality impacts on water sensitive receivers if not properly controlled. Where appropriate, mitigation measures have been described to control potential water quality impacts so that discharges meet the *Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems. Inland and Coastal Waters (TM)* standards and EPD's "zero discharge" policy for the Deep Bay catchment.

17.2 Potential Sources of Impact

17.2.1 Construction Phase

Construction activities in areas currently occupied by fish/duck ponds and streams may cause disturbance to these water bodies. Potential sources of impacts to water quality from the construction of the EAR could include the following:

- Construction runoff and drainage including dewatering operations;
- Runoff from general construction activities; and
- Sewage effluents generated from the construction workforce.

17.2.2 Construction Runoff and Drainage

17.2.2.1 Construction Runoff and Drainage

Runoff from construction sites may contain increased loads of suspended solids (SS) and contaminants. Potential sources of water pollution from site runoff include:

- Runoff and erosion from site surfaces, drainage channels, earth working areas and stockpiles;
- Wash water from dust suppression sprays and wheel washing facilities; and
- Fuel, oil and lubricants from maintenance of construction vehicles and equipment.

Construction runoff and drainage may cause physical, chemical and biological impacts. In view of the scale of the works, the impact associated with construction runoff would be minimal, provided that good construction practices are observed to ensure that litter, fuels and solvents are managed, stored and handled properly.

17.2.2.2 Runoff from General Construction Activities

General construction activities have the potential to cause water pollution from debris and rubbish, such as packaging and used construction materials, which may enter the water column, resulting in floating refuse in the vicinity of the site that reduces the aesthetic quality of any receiving water body. Spillages of liquids stored on site, such as oil, diesel and solvents could also result in water quality impacts if they enter surrounding water bodies and soils.

17.2.2.3 Sewage Effluents

Sewage effluents will be generated by the on-site construction workforce for the EAR, and these have the potential to cause water pollution if uncontrolled. Sewage is characterised by high levels of biochemical oxygen demand (BOD), ammonia and *E. coli* counts. Sewerage is expected to be connected to the existing Kam Tim sewerage system, which connects to the public foul sewerage and treatment systems. However, construction workers are likely to be dispersed along the road alignment so that the installation of portable toilets and the proper disposal of sewage may be necessary to ensure that discharge standards are met.

17.2.3 Mitigation Measures

It is important that appropriate measures are implemented to control runoff and drainage to prevent SS loadings from entering the drainage system or water courses and impacting on downstream WSRs. Proper site management is essential to minimise surface water runoff, soil erosion and sewage effluents.

Construction site runoff and drainage should be controlled in accordance with the guidelines stipulated in the EPD's *Practice Note for Professional Persons, Construction Site Drainage* (ProPECC PN 1/94). Good housekeeping and stormwater best management practices should be implemented to ensure that runoff from construction areas and any stored excavated material comply with the WPCO and that no unacceptable impacts occur at the identified WSRs due to construction works. All discharges from the construction site should be controlled to comply with the TM standards and the "zero discharge" policy.

The following are measures to further improve the environmental performance of the works in order to minimise water quality problems.

17.2.3.1 Construction Runoff and Drainage

The extent of exposed soil areas should be minimised to reduce the potential for increased siltation, contamination by runoff, and erosion. Runoff-related impacts associated with above ground construction activities can be readily controlled through the use of appropriate mitigation measures, which include:

- The use of sediment traps; and

- The regular maintenance of on-site drainage schemes to remove accumulated sediment and prevent flooding and overflow.

The boundaries of critical areas of earthworks should be marked and surrounded by dykes or embankments for flood protection. Temporary ditches should be provided to facilitate runoff discharge via silt retention facilities. Permanent drainage channels should incorporate sediment basins or traps and baffles to enhance deposition rates. The design should be based on the guidelines in *Appendix A1* of ProPECC PN 1/94.

Ideally, construction should be programmed to minimise surface excavation and earth works during the rainy season (April to September). All exposed earth areas should be fully restored as soon as possible after earth works have been completed. Exposed slopes or stockpiles should be covered by tarpaulins or similar fabrics during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.

Sediment tanks of sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m² shall be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources including applications where the influent may be pumped.

All temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge should be adequately designed for the controlled release of storm flows. All sediment traps should be regularly maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited sand and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas.

All vehicles and plant should be cleared before leaving a construction site to ensure no earth, mud, debris is deposited outside the site boundaries. An adequately designed and sited wheel washing bay should be provided at every site exit and wash-water should have sand and silt settled out and removed before discharging into storm drains. The section of haul road between the entry/exit point of the site and the wheelwash should be paved with backfill to prevent wash water or other site runoff from entering public road drains.

Kerbside inlet pits shall be covered during construction so as to prevent silt, construction materials or debris being washed into the drainage system.

Oil interceptors should be provided in the downstream drainage for any oil/fuel storage areas or plant maintenance workshops established for the EAR to prevent any oils or grease from entering the storm water drainage system. These facilities should be emptied regularly and provided with a bypass to prevent flushing during periods of heavy rain.

17.2.3.2 General Construction Activities

Debris and rubbish on site should be collected, handled and disposed of properly to avoid entering the water column and cause water quality impacts. The solid waste management

practices to prevent such materials from entering the water bodies is detailed in *Section 19* of this report.

All fuel tanks and storage areas should be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank, to prevent spilled fuels from reaching receiving water bodies.

17.2.3.3 Sewage Effluent

Construction workforce sewage is expected to be connected to the existing trunk sewer or sewage treatment facilities, although precise information on the size of the on-site workforce is not available at this stage. Construction sewage may need to be handled by portable chemical toilets and sewage holding tanks if the construction workers are likely to be dispersed along the alignment. Appropriate types and adequate numbers of portable toilets should be provided by a licensed contractor who will be responsible for ensuring correct disposal and maintenance activities.

17.2.4 Residual Impacts

It is anticipated that there will be no unacceptable water quality and drainage impacts during the construction phase of the proposed road development, provided;

- all recommended mitigation measures, including appropriate drainage, silty runoff collection facilities, and local flood prevention measures during heavy rainfall are implemented;
- any diversion of drainage pipes or channels is constructed to allow flow to the discharge point without overflow or washout;
- all the site sewerage is dealt with by adequate temporary sewerage collection and disposal facilities, as well as temporary facilities; and
- and all construction site discharges comply with the TM. standards of the WPCO.

17.3 Operational Phase

With the improvements in the Kam Tin River Channel (*Stage III of the Yuen Long and Kam Yin Sewerage Master Plan*) which are scheduled to commence in 1999, it is anticipated that there will be no water quality impacts during the operational phase of the EAR.

17.4 Conclusion

The water quality assessment has determined that no insurmountable water quality impacts should result from the construction and operation of the EAR, provided that the recommended mitigation measures, as outlined in *Table 17.4a* are implemented.

Table 17.4a - Summary of Recommended Mitigation Measures During Construction and Operation of the Project

Phase	Recommended Mitigation Measures
Construction Phase	<p>Appropriate mitigation measures are required to control construction runoff and drainage to prevent SS loadings from entering nearby water courses and impacting downstream WSRs. Proper site management will be essential to minimise surface water runoff, soil erosion and sewage effluents, for example, oil interceptors, silt traps, and drainage ditches around the site.</p> <p>Construction site runoff and drainage should be controlled in accordance with the guidelines stipulated in the EPD's <i>Practice Note for Professional Persons, Construction Site Drainage</i> (ProPECC PN 1/94). Good housekeeping and storm water best management practices should be implemented to ensure that runoff from construction areas and any stored excavated material comply with the WPCO and no unacceptable impact on the WSRs arises due to the construction of EAR. All discharges from the construction site should be controlled to comply with the TM standards and the "zero discharge" policy.</p>
Operation Phase	None required.