

## **Appendix C**

# **Engineering Audit Of Rock Bank Protection**

## 1 OUTLINE SPECIFICATION

### Task A. Extensive Survey:

- A.1 Confirm or map the location of all areas which have currently or have had past rock bank protection.
- A.2 Identify all breaches or major failures in protection.
- A.3 Identify all areas with erosion extending 4m or more landwards of the rear face of the rock as placed.
- A.4 Identify all other areas where rock has failed so as to result in a failure of the protection layer (eg by slumping, subsidence, undercutting).
- A.5 Prepare plans showing rock protection (A.1) and areas of damage (A.2, A.3, A.4).

### Task B. Detailed Survey and Assessment:

- B.1 For 16 sites, covering all major lengths of rock protection, survey 3 cross sections extending 20 m into the river and 10 m landwards of the 0 m AHD line.
- B.2 For each cross section determine and indicate:
  - rock toe position and elevation,
  - rock crest position and elevation,
  - typical, maximum and minimum rock size,
  - presence or absence of a filter layer (rock of weight about 1/10 of primary armour weight),
  - soil type and grain size (by inspection),
  - presence/absence and extent of scour behind the rock,
  - presence/absence and extent of scour at the rock toe,
  - presence of any rock downslope from the toe.
- B.3 For at least 3 sites, and more as warranted, evaluate slope stability for the rock and bank. Consider the soil to be saturated but tide at mean low water.
- B.4 For each site, assess the potential for future scour of the soil behind the wall from land runoff and groundwater drainage.
- B.5 For each site assess the risk of scour at the toe by tidal and flood currents.
- B.6 For each site assess the risk of scour or leaching of the soil behind the wall by tidal and flood currents.

### Task C. Recommendations:

- C.1 Develop proposals for remediation of the typical sites, briefly considering several options.
- C.2 Recommend remediation procedures for the rock protection. Consider the extent of the protection and the need to tie in or extend that protection.
- C.3 Estimate the cost of remediation, providing a breakdown by region and unit costs.