
4.0 DRAINAGE MANAGEMENT PLAN

Objectives

To retain all turbid run-off from areas disturbed during excavation, within the exhausted clay pits. To divert 'clean' run-off from peripheral areas away from the operational area to join with natural drainage downstream of the excavations.

4.1 Containment of Run-off

4.1.1 Basis

All drainage waters from the eastern side of Great Northern Highway were required to be diverted from entering the tortoise habitat area at the ENBR within 2 years of the Minister's approval.

For the first three years of operation (or until the above-mentioned drainage diversion is satisfactorily completed) all turbid water generated from the operational areas were to be retained on site to avoid deleterious effects on the tortoise habitat.

4.1.2 Run-off Management

- Containment of turbid run-off is achieved within the pits created during the excavation campaigns.
- Run-off from disturbed ground adjacent to the pit is 'captured' in exhausted pits by strategic formation and placement of bunds of overburden.
- Each excavation cell is completely bunded on the 'uphill' (eastern) side; the overburden has been placed by scrapers approximately 800mm high and two scraper widths wide. The upper surface of the bund is graded to shed water towards the pit.
- Run-off from the Darling Scarp (which can be significant) is diverted around the pit and working areas to a depression in the north western corner of the former Lot 11 where it is allowed to settle before entering the road side drain along Great Northern Highway (which connects to the ENBR Drainage Diversion – see Section 4.1.3) once

the storage capacity of this area is reached. As excavation progresses through the former Lot 11 this drainage system will require modification. The DEC will be advised of any revised drainage layout plans prior to implementation.

- To avoid the necessity for dewatering of run-off which collects in the pits, i.e. prior to commencement of excavation campaigns, the initial pit will be left as a discrete cell until eventually rehabilitated.

4.1.3 Drainage Diversion

Originally surface drainage waters from the roadside drain adjacent to the site flowed towards and eventually into (at least to some degree) the fenced habitat area of the EBNR. The EPA and the then CALM were satisfied that the main habitat area in the EBNR could be maintained primarily by direct rainfall, and that the tortoise's survival would benefit by the elimination of the risk of contaminated drainage waters entering the reserve.

With the construction of diversion bunds, clean drainage waters from undisturbed non-operational areas of the site now enter the roadside drain located on the eastern side of Great Northern Highway, which flows north to Ellen Brook.

4.2 **Monitoring and Remedial Action**

4.2.1 Monitoring

The objective of monitoring was to ensure the success of turbid run-off containment during the initial years of operation. Monitoring of drainage continued after the drainage diversion was completed. The EPA has acknowledged that this is no longer required, and cleared the Condition in June 2000.

4.2.2 Remedial Action

Remedial action will be dependent on the nature and extent of the identified problem, and may include:

- repairs to bunds;
- diversion of additional run-off into the clay pit for containment;

- use of hay bales in areas of sheet run-off to reduce water velocities and filter sediment loads; and
- hydro-mulching of disturbed ground to prevent water erosion.

4.3 Reporting

If remedial action is considered necessary the EPA will be advised at the time.

