

4 CONSTRUCTION STAGE STORMWATER MANAGEMENT

Figure 3 presents the conceptual locations for erosion and sediment controls to be utilised on the site during construction. Erosion and sediment controls would generally be constructed and maintained in accordance with the Department of Housing's document "Managing Urban Stormwater – Soils and Construction", March 2004 (*otherwise known as the Blue Book*).

The Erosion and Sediment Control Plan (*ESCP*) has been prepared with the objective of minimising sediment movement off site and therefore minimising contamination of adjacent areas during the construction works. Special measures have been designed to protect the endangered hairy joint grass, littoral rainforest and the coastal fontainea in Amber Drive Reserve.

4.1 SEDIMENT RETENTION PONDS

As the disturbed area will exceed 2,500 m², sediment retention ponds would be required during the construction phase.

Calculations to determine the required size of the sediment retention basins have been undertaken in accordance with the requirements of the NSW Department of Housing's publication Managing Urban Stormwater Soils and Construction, 2004 (*calculations are attached in Appendix A*).

The proposed location of the sediment retention basins are presented on **Figure 3**.

Dispersive type soils occur on this site, therefore a Type D basin (*as described in the Blue Book*) is proposed. It is to be noted that the sediment basins would only be required during the earthworks and road construction stage of development. Upon completion of the roads and stormwater basins, the sediment ponds would no longer be required.

A summary of the sediment retention basin sizing calculations are outlined in the following sections.

4.1.1 Sediment Settling Zone

The sediment settling zone capacity for a Type D basin is based on a volume required to retain all runoff from a design storm event. In this instance the 80th percentile, 5 day rainfall event was adopted as the design storm. It is to be noted that the Blue Book recommends the 75th percentile design storm but because of the sensitive location of the site the 80th percentile storm has been conservatively adopted.

Applying these criteria, the required sediment settling zone for the sediment basins is:

- Sediment Basin 1 – 1103m³; and
- Sediment Basin 2 – 123m³.

4.1.2 Sediment Storage Zone

To determine the required sediment storage zone capacity, a calculation of the predicted soil loss was performed using the Revised Universal Soil Loss Equation (RUSLE) as described in the Blue Book. This calculation estimated that the 3 month soil loss will be approximately 42.1m^3 . This calculation assumed that there will be no mulching of the surface after clearing and that the surface will be left compacted and smooth.

However, the Blue Book recommends that the sediment storage zone capacity for a Type D basin be not less than 30% of the settling zone volume.

The adopted sediment storage zone volume for the basins will therefore be:

- Sediment Basin 1 – 331m^3 ; and
- Sediment Basin 2 – 37m^3 .

4.1.3 Sediment Pond Volumes

These calculations result in the total minimum volume of the basins being:

- Sediment Basin 1 – 1433m^3 ; and
- Sediment Basin 2 – 159m^3 .

Indicative sizes of the basins are presented on **Figure 3**.

4.1.4 Outlet

Since the basins will be Type D, the captured water would be pumped out within a 5 day period following the rainfall after dosing with a chemical flocculant once the turbidity is at an acceptable level. Inflows exceeding the pond capacity would be discharged via an overflow weir and spillway. The weir and spillway will both be sized for the 20 year ARI design flow.

This weir and spillway have not been sized at this stage as they are dependent on the final location of the sediment retention pond. As such, detailed design of the weir and spillway will be completed prior to construction of the basins.

4.2 ADDITIONAL EROSION AND SEDIMENT CONTROLS

4.2.1 Stabilised Site Access

Site access/egress would be controlled through the designated site access points to reduce the likelihood of vehicles tracking soil onto public roads. The stabilised site access would be constructed of aggregate with nominal diameter of 30mm to a minimum depth of 200mm. Details of stabilised site access are presented on standard detail SD 6-14 in the Blue Book (refer **Figure 4**).

4.2.2 Diversion Drains

Clean runoff from areas upstream of the disturbed area would be diverted around the works area using diversion drains. Separate diversion drains would also be used to collect contaminated runoff and direct it to the sediment retention basins. **Figure 3** presents the conceptual diversion drain locations for collecting contaminated runoff, with sheet flow path lengths not exceeding 80m (*in accordance with the Blue Book requirements*).

The diversion drains would be of circular, parabolic or trapezoidal cross section rather than V-shaped. Details of diversion drains are presented on the standard detail SD 5-5 in the Blue Book and on **Figure 4**.

4.2.3 Sediment Fences

Sediment fences would be constructed to the general conceptual layout shown on **Figure 3**. Generally the sediment fences would be positioned parallel to the site contours at the downstream interface between disturbed and undisturbed areas. Details of sediment fences are presented on standard detail SD 6-13 in the Blue Book and on **Figure 4**.

4.2.4 Stockpile Protection

Stockpile protection would be required for excavated sediment, topsoil and other landscaping materials. The location of the designated stockpile sites are conceptually shown on **Figure 3**. The stockpiles would be constructed and protected in accordance with the standard detail SD 4-1 in the Blue Book. Stockpiled materials would be placed no closer than 2m from major drainage paths. Conceptual details of stockpile treatments are shown on **Figure 4**.

4.2.5 Mesh and Gravel Inlet Filters

Mesh and gravel inlet filters will be provided around any stormwater inlet pits on the site. These filters will be constructed in accordance with standard detail SD 6-11 in the Blue Book.

4.2.6 Maintenance of sediment and erosion control measures

The following outlines the proposed maintenance activities to maintain the effectiveness of the sediment and erosion control devices.

- sediment and erosion control devices would be regularly maintained and accumulated sediment removed before 50% of the capacity is used. Accumulated sediment would be re-used or disposed of in an acceptable manner off-site.
- sediment fences would be checked regularly for rips, excessive build up of sediment behind the fence, and breaches by construction activities. Damage to the fences would be repaired immediately on detection.
- surface water flows would be diverted around the designated site access to prevent sediment trapped within the access being re-suspended and transported offsite. Sediment

that bypasses the stabilised site access, and is deposited on the nearby public streets would be cleaned up promptly by means other than washing into the drainage system.

- sediment and erosion control devices would be maintained until the disturbed areas have been adequately reinstated or new vegetation is sufficiently established.

5 WASTE MANAGEMENT PLAN

It is proposed to employ best management minimisation, recycling and reuse strategies for waste associated with the construction of the works described in the previous sections of this report.

The excavated soil in construction of the roads and stormwater basins would be reused where possible within the site as engineered fill. It is also intended to maximise the amount of recycled material used in the construction of the roads.

The majority of the material expected to leave the site as a result of the works described in the previous sections is clay and green waste including grasses, topsoil with high organic material content and trees. Materials from existing roads on site will be reused where possible as road base material. Excess material would be disposed to an appropriate landfill site.

Other miscellaneous waste materials such as wire, timber fences and drainage pipes would be recycled where possible.

All waste leaving the site would be disposed of at an approved waste disposal facility.

6 DIRECTOR GENERAL REQUIREMENTS

The Director General's requirements with respect to the subdivision construction are presented in item 15 under the key issues heading and in the listed technical and policy guidelines.

Item 15 under the key issues heading reads:

- **Construction Management:**
A Construction Management Plan addressing proposed staging and potential impacts of the proposal on adjoining residential properties including dust and noise will be required in the Statements of Commitments.

The construction management plan is detailed in this report. There would be no staging as the subdivision is relatively small. The sequence or steps in the construction process are described in **Section 2.1**. The measures proposed to mitigate dust and noise impacts on adjoining residences are presented in **Sections 3.3** and **3.6** respectively. For dust control, the proposed measures would be the erosion and sediment control measures as well as watering of disturbed areas. The proposed measures for noise control would be to have authorised mufflers on all equipment and regulated construction times.

The technical and policy guidelines listed in the DG's requirements which are relevant to construction activities include the "Blue Book" and the 1988 EPA Managing Urban Stormwater: Construction Activities. This EPA guideline has been superseded by the "Blue Book". The erosion and sediment control measures proposed have been design in conformance with the "Blue Book". In fact, the design adopts a higher standard in terms of sizing the sediment basins which leads to larger basins than required by the "Blue Book". This will provide even better protection to the site and downstream waterways. The details of the erosion and sediment control measures are presented in **Section 4**.