1. Coffer dam design

1.1. General

The cofferdam is required to provide flood protection to the works areas during the construction period. The height of the cofferdam was calculated with a DN1200 temporary outlet conduit passing through the embankment that discharges into the base of the outlet tower and permanent outlet works. A flood capacity design criteria of 1 in 10 Annual Exceedance Probability (AEP) was adopted for construction.

The hydrological modelling undertaken as part of the consequence assessment (SMEC reference: 30012127_R06_V02) indicated that the characteristics detailed in Table 1-1 would be required for the cofferdam. As designed, the cofferdam can pass the 1 in 50 AEP flood at EL 29.91 metres with a freeboard of greater than 300 millimetres to the top of the core at EL 30.25 metres.

The cofferdam provides approximately 32 Megalitres of storage below the invert of the outlet conduit. This storage will be available to the Contractor for use during construction (e.g. for dust suppression and material conditioning).

Table 1-1 Cofferdam design characteristics

Characteristic	Value
Outlet pipe invert	EL 25.0 m
1 in 10 AEP peak discharge	3.9 m^3/s
Peak 1 in 10 AEP water level (m)	EL 28.6 m
Cofferdam design crest level (m)	EL 30.25 m (top of core)

1.2. Location and alignment

The cofferdam has been positioned such that it provides flood protection and flow diversion for downstream construction areas including the:

- outlet tower;
- main embankment; and
- outlet valve pit.

The alignment was selected to cross the unnamed tributary such that the crest length and embankment fill volumes are minimised.

1.3. Geometry

The cofferdam crest has a design width of 30 m with upstream and downstream slopes of 2H:1V. The wide crest width has been provided for the following reasons:

- To allow the cofferdam to be used as construction access roads and haul routes.
- To allow the cofferdam crest to be used as a potential stockpile location.

The design allows the Contractor to modify the width of the cofferdam crest, subject to acceptance from the Principal, should the design width not be required.

1.4. Material zoning

The material zoning for the cofferdam is shown in Figure 1-1 and comprises:

- Central clay core with symmetric side slopes at 0.25H:1V. The core will be founded on highly to moderately weathered or better rock. Based on the geotechnical investigation, the depth was assumed to be approximately 5 metres along the valley where deep alluvial material may be present and approximately 1.5 metres elsewhere.
- Zone 1 material sourced from the Eurobodalla Quarry unless on site materials are found that meet the specification.
- Zone 1A select earthfill shoulders. Zone 1A material is intended to be sourced from overburden material won from stripping of the on-site quarry and other excavations. The Zone 1A fill will be a random fill of varying quality and is therefore not likely to be suitable for the core zone. The cofferdam shoulders will be founded on highly weathered or better rock.
- Zone 2A filter diaphragm around the outlet conduit.
- Zone 3B placed on the upstream and downstream faces to provide erosion protection.
- Crest capping.

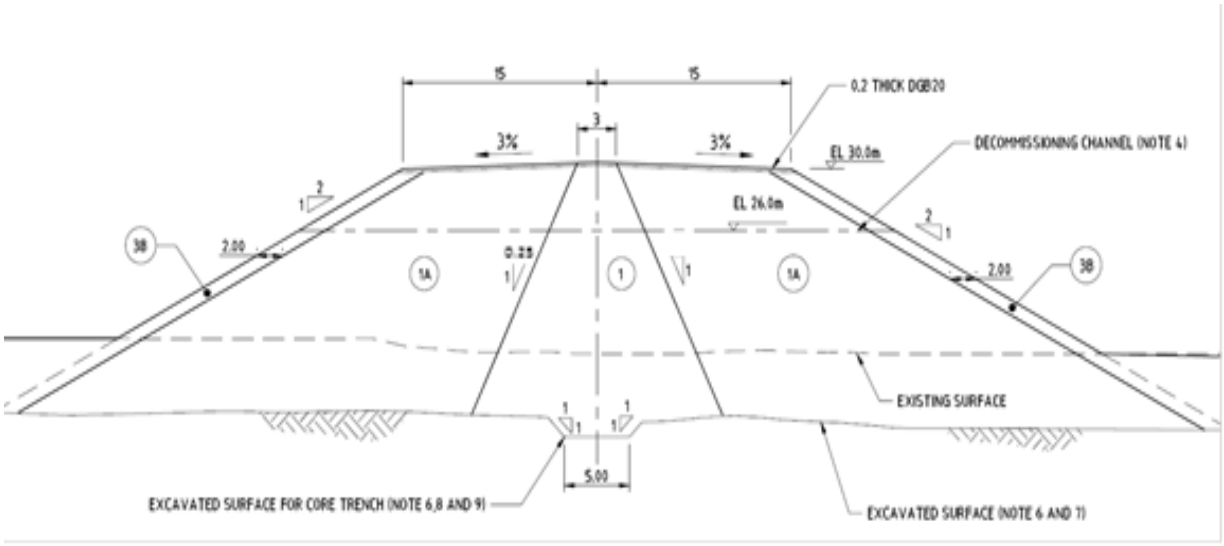

Figure 1-1 Typical cofferdam section (extract from Drg ST-3115)

1.5. Temporary diversion pipeline

The invert level of the temporary diversion pipeline at the precast headwall on the upstream face of the cofferdam is EL 25 metres. The temporary diversion pipeline will be an OD 1290, 8 millimetres thick mild steel pipe (unlined) encased in concrete to reduce the potential for defects associated with poorly compacted layers around the outlet conduit. The temporary diversion pipeline is to be constructed following placement of cofferdam fill material to above the level of the pipe. The excavation in the cofferdam fill for the pipe should be a minimum of 2.2 metres wide and 2.2 metres deep and fully backfilled with low strength concrete.

Temporary erosion protection is required at the downstream end of the diversion/outlet pipeline until construction of the outlet valve pit and permanent downstream erosion protection.

1.6. Decommissioning of the cofferdam

The cofferdam will provide flood protection and diversion during construction of the storage. Prior to filling of the reservoir, the cofferdam will be decommissioned. Decommissioning of the cofferdam includes:

- Construction of a concrete plug at the base outlet tower at the connection point for the temporary diversion conduit.
- Excavation of a channel through the cofferdam. The decommissioning channel base is designed at EL 26 metres (1 metre below the lowest outlet tower port) ensuring that the cofferdam does not contribute to creation of dead storage within the reservoir.