# Ironhide Enterprises Pty Ltd – 465 Shallow Bay Road, Shallow Bay NSW 2428

## Concept Erosion & Sediment Control Plan – Mid Coast Council: Development Application - PL2024/0052

**NOTES - Administration & General**

1. This the relevant Concept Erosion & Sediment Control Plan has been prepared to address the anticipated Conditions of Consent pending approval by Mid Coast Council of Development Application No. PL2024/0052, local Development Control Plan, relevant specifications, and procedures.
2. Works programming to maximise the mitigation of erosion by the early implementation of permanent drainage measures, temporary and permanent soil surface stabilisation measures, and minimising the area and duration of soil disturbance.
3. Bureau of Meteorology weather forecasting to be monitored daily for the local 7-Day weather outlook. See Appendix D – 'Wet weather contingency procedure'. Site management measures to be planned for imminent storm/rainfall/flood/wind events include, but are not limited to;
   - avoiding additional soil disturbance immediately prior to an event,
   - provision of additional erosion and sediment controls in critical locations,
   - installing, repairing, and/or adjusting 'clean' (off site water) and 'dirty' (on site) water drainage measures,
   - desilting and re-instating sediment controls as required,
   - implementing stockpile protection measures,
   - stabilising and sealing disturbed soil surfaces,
   - minimising dry soil handling in windy conditions,
   - evacuating or protecting erodible materials in lower lying areas.
4. The plan is to be revised as necessary (i.e., progression of works, altered site conditions or weather). **The controls depicted are subject to staging and the controls may be progressively implemented or removed according to progression of works.**
5. All erosion and sediment controls generally to be constructed in accordance with `Blue Book Volume 1' (Managing Urban Storm Water: Soils and Construction - 4th Edition, Landcom, March 2004) & Volume 2E 'Mines and Quarries' (DECC 2008), associated guidelines & NSW specifications and standard drawings. See Appendix A – 'Sediment Basin Assessment & Calculations', Appendix B – 'Standard Drawings', and Appendix C – 'Sediment Basin Management & Dewatering Procedure'.
6. Substitute materials may be utilised in the construction of erosion or sediment controls where functionality is not affected, i.e., compacted mulch bunds in place of sediment fences, stabilised earth berms in place of excavated drains near underground services or timber pegs in place of star pickets where electrical or gas hazards exist.
7. Personnel constructing controls to have demonstrated competence and experience.
8. All existing vegetated or undisturbed areas outside of the works area to be regarded as Exclusion zones and to be delineated with fencing, tape, or other markers, as required. All site personnel to be instructed to avoid Exclusion zones or damaging installed controls.

**Erosion Control**

9. Prior to commencement of significant works, install surface drains, sediment traps, sumps & filters, and other surface runoff control measures to control runoff onto, across, and from the works zones to prevent the loss of sediment from the site.
10. Where applicable, construction zones in constrained areas to be managed in smaller, defined sub-catchments to reduce slope lengths and minimise sediment loads to boundary controls.
11. Stripped topsoil to be stripped and stockpiled generally as per SD 4-1. Any viable stripped topsoil to be stored in stockpiles.
12. Short term on-site stockpiles to be located away from drains and flow lines and be controlled with sediment fence or storm covers.
13. Any significant (long & steep) cut/fill batters should be progressively overlaid with Rolled Erosion Control Products (RECP's such as jute mesh, coir fibre mesh, etc), mulching, Organic Fibre Mulches (OFM's) or geobinders to reduce erosion and rilling, prior to permanent stabilisation with cover crops, mulching or other long-term surface protection.
14. Vehicles transporting bulk materials on public roads are to correctly cover loads to prevent loss of load and/or dust generation.
15. Temporary controls in addition to those shown may be required at strategic locations as required by the progression of works or weather conditions.

**Water Management**

16. Maximise the interception and diversion of 'clean' (off site water) away from works areas. The 'clean' flows to be conveyed in stabilised drainage lines to suitable discharge points. The flows to be discharged to off-site areas at non-erosive velocities with adequate diffusers, level spreaders, etc. Ensure drainage paths and controls are adjusted as required to maximise the separation of 'clean' (off site) and 'dirty' (on site) water flows through/off site.
17. Flows paths with high velocity flows over unstabilised areas to be controlled with
    - applied soil surface stabilisers i.e., geotextile lining, applied soil binders, coarse rock lining, etc
    - suitably constructed check dams placed at intervals to maximise flow suppression and settling of coarse sediment.
18. Where possible, provide sandbag or other bunding controls at on-site collection points & pit inlets to prevent flows bypassing controls to downslope areas.
19. Protect all existing and constructed inlets to pits & culverts from sediment ingress.
20. Where practical, maintain and/or improve existing stabilised drains to assist in the diversion of 'clean' (off site) flows.
21. Flooded excavations, ponded water, etc. to be extracted where required and utilised for site purposes or treated to achieve acceptable water quality prior to discharge.

**Sediment Control**

22. Vegetation to be progressively cleared to minimise disturbance by area and duration. Cleared vegetation to be windrowed parallel to the contour until mulching/removal to control flows across cleared areas.
23. The installation of preliminary sediment controls such as perimeter sediment fencing, windrowed vegetation/mulch, excavated sediment traps, check dams, coir log/straw bale filters, etc, will be implemented prior to significant soil disturbance within the catchment.
24. Accumulated water in sediment traps/sumps cannot be pumped, discharged, or released from site without completing a dewatering checklist.
25. The site access road to be remain stabilised with suitable aggregate material, as existing. Sediment tracking monitoring to be undertaken to ensure that no sediment tracking impacts on local roads occurs. Unnecessary vehicle movements over unstabilised or vegetated areas to avoided during wet conditions.
26. Personnel to ensure visual dust monitoring is maintained during works, and dust suppression is undertaken regularly. Dust control to be regularly conducted with water application and soil stockpiles to suitably covered if required. Additional dust suppression measures to be utilised to minimise dust pollution during periods of high winds.
27. Temporary 'dirty' water drainage will be adjusted progressively to maximise flows to sediment control devices.

**Contamination**

29. Excavation of sub-soils to be inspected and monitored as works proceeds, to identify potential contamination. Any potentially contaminated soils to be stripped or excavated separately and transported directly to the designated stockpile, treatment area or licensed waste facility.
30. Potentially contaminated soils are to be stored within an appropriately bunded area and covered with heavy grade plastic or other impermeable covers for the duration of rainfall.
31. Ground disturbance and machinery/vehicle movements in potentially contaminated areas will be minimised to essential works.

**Monitoring & Reporting and Inspection & Maintenance**

32. Inspections of erosion and sediment controls will occur following rainfall events >10mm (daily on workdays or as soon as practical during site shutdown periods), with any necessary repairs implemented as soon as possible.
33. Relevant checklists and records to be maintained noting details such as rainfall received, repairs to controls and amounts of sediments cleaned from controls.
34. Sediment traps, sumps and filters are to be desilted when 60% of storage capacity is reached.
35. All site personnel to report any spill, leaks, or other failure to relevant response staff as soon as possible.

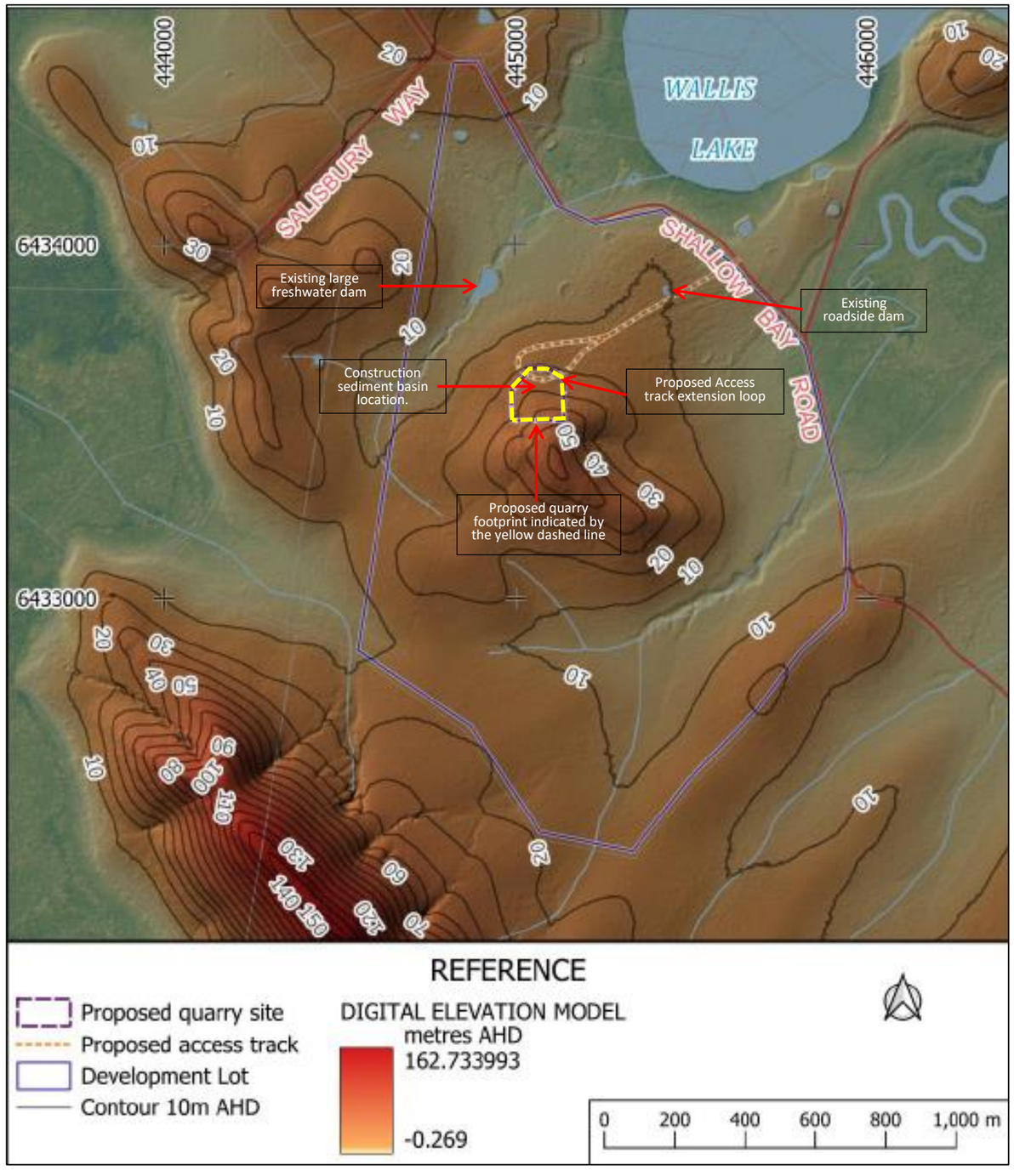
**Stabilisation**

36. Erosion and sediment controls are to be maintained until the relevant catchments are stabilised, re-vegetated, or sealed adequately to achieve soil surface protection factors as per the 'Blue Book' requirements.
37. Completed earthworks areas will be backfilled and compacted in a staged manner as soon as possible. Adjacent disturbed areas will be suitably trimmed and stabilised as required.
38. Stabilisation of areas is to occur progressively in conjunction with the completion of earthworks.
39. Areas subject to heavy compaction and disturbance from vehicle movements and machinery to be scarified to a depth >100mm prior to topsoiling and seeding.

| Version | Drawn by | Date | Signed | Reviewed by | Date |
|---|---|---|---|---|---|
| 01 | A. Littlewood | 17/03/2025 | | | |

| Statement of Compliance |
|---|
| This Concept Erosion & Sediment Control Plan (PESCP) has been developed, and is certified by, an appropriately qualified and experienced professional in erosion and sediment control. The PESCP and any associated documents and calculations, have been prepared to a standard which, if properly implemented, should achieve the water quality objectives described in 'Managing Urban Stormwater – Soils & Construction Volumes 1 & 2 – NSW Landcom 2006 & NSW DECC 2008.<br>All erosion and sediment control measures are designed to be in accordance with Mid Coast Council's Great Lakes Development Control Plan 2013. (DCP).<br>Signed: _____ Andrew Littlewood – Senior Soil Conservationist - CPESC No. 5988 & CESSWI No. 12101 Date: 17 March 2025 |

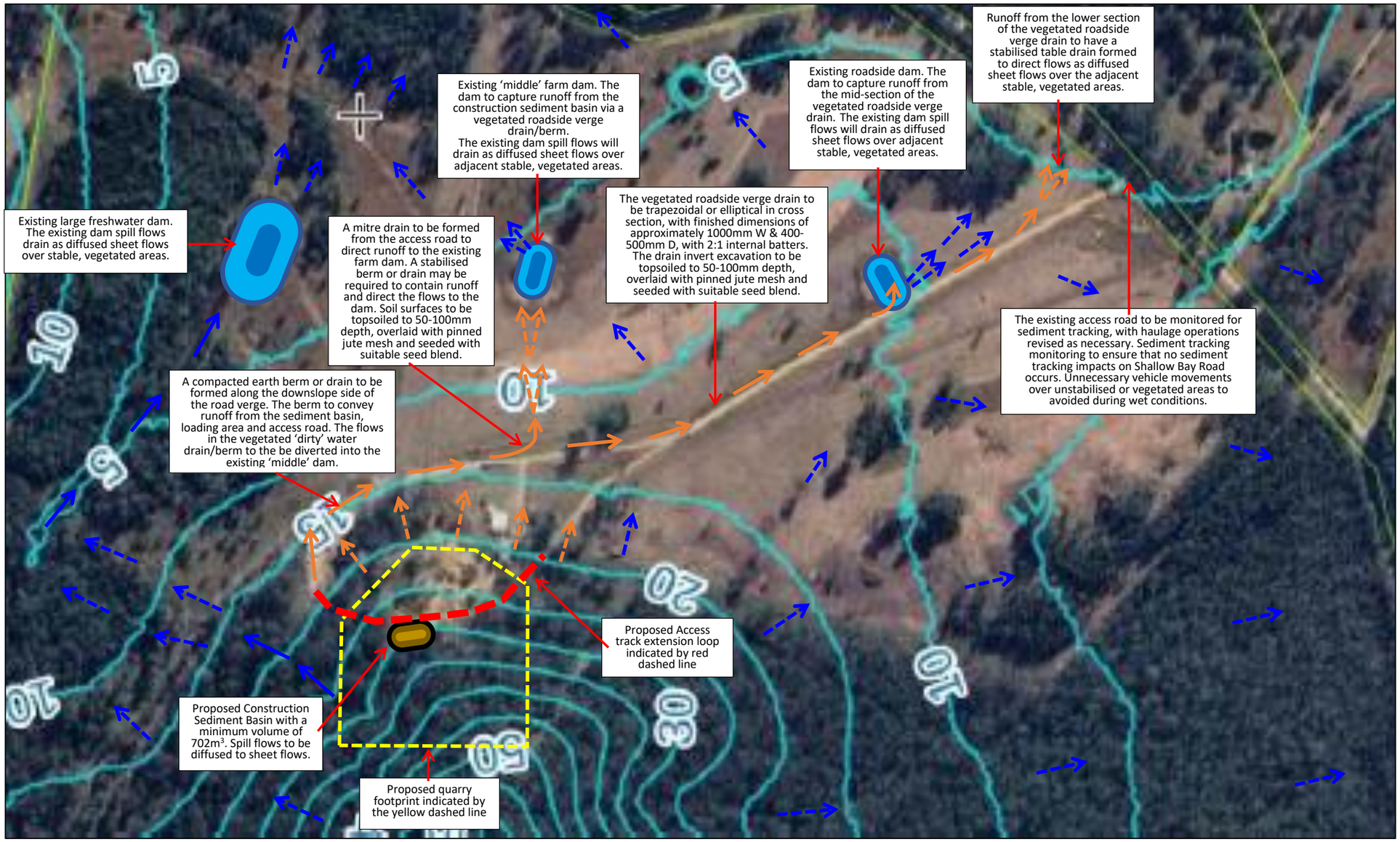
Overall Site Plan - Extract of the Development Site Plan from Figure 2.5 from the draft Statement of Environmental Effects prepared by Quarry Plan NSW – March 2025



Ironhide Enterprises Pty Ltd – 465 Shallow Bay Road, Shallow Bay NSW 2428

Concept Erosion & Sediment Control Plan – Mid Coast Council: Development Application - PL2024/0052

# Concept Erosion & Sediment Control Plan - Quarry Establishment Earthworks: Site drainage Overview.




| Legend | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 'Clean' Water – Sheet Flows | | Piped Drainage | | Stabilised Earth Berm (geo/jute/seed) | | Sediment basin / large sump | | Filter bag or sediment fence inlet filter | | Vegetated Filter | |
| Clean' Water – Concentrated Flow/Drain | | Topsoil stockpile<br>Spoil/rock stockpile | | Existing Farm Dam | | Filter bag / rock & shade cloth sediment filter | | Compacted mulch bund<br>Clearing slash & surface mulching | | Stabilised Haul Road/Compound/Access Track | |
| 'Dirty' Water - Concentrated Flow/Drain | | Vegetated drain<br>Rock lined drain | | Level Spreader / Diffuser | | Compacted Mulch / Rock & Geotextile / topsoil sediment trap | | Coir Log/s<br>Straw bale or coir log filter | | Wheel Wash | |
| 'Dirty' Water – Sheet Flows | | Geotextile Stabilised spillway/drain | | Coarse rock / sandbag check dam | | Excavated sediment trap with spill weir | | Sediment Fence Geotextile Apron | | Hydrocarbon boom Turbidity Curtain | |

# Ironhide Enterprises Pty Ltd – 465 Shallow Bay Road, Shallow Bay NSW 2428

## Concept Erosion & Sediment Control Plan – Mid Coast Council: Development Application - PL2024/0052

## Concept Erosion & Sediment Control Plan - Quarry Establishment Earthworks: Clearing, topsoil stripping and overburden removal.

A 'dirty' water drain or stabilised berm to be formed to convey spill flows from the construction sediment basin and runoff from the Loading Area catchment. The drain to discharge the flows via a stabilised table drain to vegetated areas upslope from the existing 'middle' farm dam.

A compacted earth berm (dimensions TBC during topsoil tripping) with 2:1 batters to be formed along the downslope side of the road verge. The berm to be seeded with suitable seed blend. The berm to capture runoff downslope from the access road and divert flows to the vegetated 'dirty' water drain which flows to the roadside dam.

Sediment fence traps or coir log filters to be installed downslope from the stockpile & loading area. The controls to be monitored and repaired as required until vegetation has stabilised at least 90% of the stockpile formation.

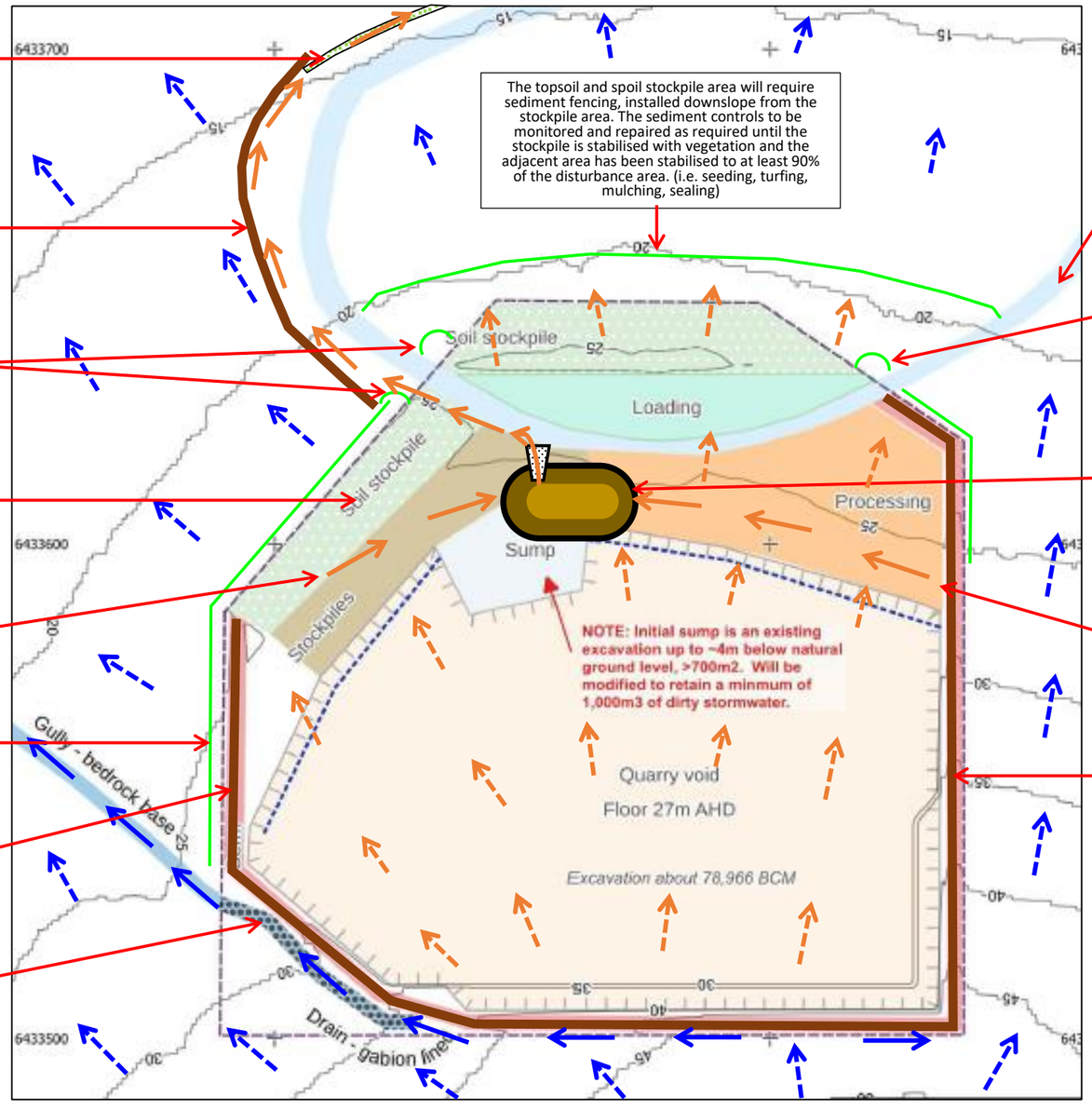
A large, compacted earth berm (dimensions TBC during topsoil tripping) with 2:1 batters to be formed along the downslope clearing boundary. The berm to be seeded with suitable seed blend. The berm to capture control runoff from the Stockpile area.

'Dirty' water contour drains to be formed prior to topsoil stripping & earthworks upslope from the 27m AHD contour level. The 'dirty' water contour drains to commence near the boundaries and extend along the contour to drain runoff to the construction sediment basin.

Sediment fencing to be installed downslope from the stockpile area. The sediment controls to be monitored and repaired as required until the stockpile is stabilised with vegetation and the adjacent area has been stabilised to at least 90% of the disturbance area. (i.e. seeding, turfing, mulching, sealing)

A compacted topsoil berm approximately 1500mm W x 1000mm H with 2:1 batters to be formed along the southern and western clearing boundaries. The berm to be seeded with suitable seed blend.

A geotextile and rock or gabion drain to be formed along the southern clearing boundary, which will interface with downstream watercourse gully that has a bedrock streambed.




Proposed Access track extension loop indicated by blue shaded area.

Sediment fence traps or coir log filters to be installed downslope from the stockpile and the loading & processing area. The controls to be monitored and repaired as required until vegetation has stabilised at least 90% of the stockpile formation.

Proposed Construction Sediment Basin with a minimum volume of 702m$^3$. Spillway to be 1/3 width of the basin and excavated into natural ground with a minimum 750mm invert. The spillway excavation to be stabilised with plastic underlay and geotextile overlay securely pinned in position. Spill flows to be directed to a stabilised drain or berm to convey flows to the vegetated areas upslope from the existing 'middle' farm dam.

'Dirty' water contour drains to be formed prior to topsoil stripping & earthworks upslope from the 25m AHD contour level. The 'dirty' water contour drains to commence near the boundaries and extend along the contour to drain runoff to the construction sediment basin.

A compacted topsoil berm approximately 1000mm W x 500mm H with 2:1 batters to be formed along the eastern clearing boundary. The berm to be seeded with suitable seed blend.

### Legend

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 'Clean' Water – Sheet Flows | | Piped Drainage | | Stabilised Earth Berm (geo/jute/seed) | | Sediment basin / large sump | | Filter bag or sediment fence inlet filter | | Vegetated Filter | |
| Clean' Water – Concentrated Flow/Drain | | Topsoil stockpile<br>Spoil/rock stockpile | | Existing Farm Dam | | Filter bag / rock & shade cloth sediment filter | | Compacted mulch bund<br>Clearing slash & surface mulching | | Stabilised Haul Road/Compound/Access Track | |
| 'Dirty' Water - Concentrated Flow/Drain | | Vegetated drain<br>Rock lined drain | | Level Spreader / Diffuser | | Compacted Mulch / Rock & Geotextile / topsoil sediment trap | | Coir Log/s<br>Straw bale or coir log filter | | Wheel Wash | |
| 'Dirty' Water – Sheet Flows | | Geotextile Stabilised spillway/drain | | Coarse rock / sandbag check dam | | Excavated sediment trap with spill weir | | Sediment Fence Geotextile Apron | | Hydrocarbon boom Turbidity Curtain | |

# Appendix A – Sediment Basin Assessment & Calculations

Site Characteristics Table & Revised Universal Soil Loss Equation (RUSLE) Data

| Location | Shallow Bay Road Quarry |
|---|---|
| Construction duration | <12 months earthworks – 85$^{th}$%ile adopted (Sensitive)<br>(Sect. 6.3.4 – (f). Blue Book) |
| Erosion Hazard | High (On slopes >9%)<br>(Sect 4.4.1 & Figure 4.6 – Blue Book) |
| Soil Loss Class | Class 5<br>(High Erosion Hazard)<br>(Sect 4.4.2. & Table 4.2 – Blue Book) |
| Batter Restrictions | Yes<br>Generally, >10m batter length @ 2H:1V ranging to >12m @ 3H:1V<br>(Sect 4.4.2 – (a) & Figure 4.7 – Blue Book) |
| Seasonal erosion hazard | Yes – February & March<br>(Sect 4.4.2 – (c), Figure 4.9 & Table 4.3 – Blue Book) |
| Soil texture group | Not Mapped |
| USCS Class | Not Mapped |
| Soil erodibility factor – K factor | Not Mapped - 0.055 Adopted |
| Sediment Type | Not Mapped - Type D Adopted |
| Soil hydrologic group | Not Mapped - Group D Adopted |
| 85th %ile, 5-day rainfall event | 41.2 mm - Taree<br>(Sect 6.3.4 – Table 6.3a - Blue Book) |
| Rainfall Intensity - millimetres per hour | 11.5 mm/hour<br>(2 Year, 6 Hour storm – see BOM IFD Table below) |
| Rainfall Erosivity – R factor | 2857<br>(Calculated from 2-year EY, 6 Hour storm, where S=11.5mm/hour and where R = 164.74(1.1177) $^{s}S^{0.6444}$<br>Blue Book - Appendix A2 & B) |
| Volumetric runoff coefficient - Cv | 0.51<br>(Blue Book – Appendix F: Table F2 |
| Slope Length | 80 metres adopted |
| LS Factor | Variable |
| Erosion control practice factor – P factor | 1.3 |
| Ground cover – C Factor | 1.0 |
| Sediment Storage Zone Volume design | 2 months soil loss<br>(Sect 6.3.4.- I (ii) - Blue Book) |

RUSLE Catchment Assessment & Sediment Basin Calculations

## 1. Erosion Hazard and Sediment Basins

**Site Name:** Shallow Bay Quarry

**Site Location:** 465 Shallow Bay Road, Shallow Bay NSW 2428

**Precinct/Stage:** Quarry Establishment Earthworks: Clearing, topsoil stripping and overburden removal

**Other Details:**

| Site area | Sub-catchment or Name of Structure | | | | | | Notes |
|---|---|---|---|---|---|---|---|
| | SBQ | | | | | | |
| Total catchment area (ha) | 2 | | | | | | |
| Disturbed catchment area (ha) | 2 | | | | | | |

**Soil analysis (enter sediment type if known, or laboratory particle size data)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sediment Type (C, F or D) if known: | D | | | | | | From Appendix C (if known) |
| % sand (fraction 0.02 to 2.00 mm) | | | | | | | Enter the percentage of each soil fraction. E.g. enter 10 for 10% |
| % silt (fraction 0.002 to 0.02 mm) | | | | | | | |
| % clay (fraction finer than 0.002 mm) | | | | | | | |
| Dispersion percentage | | | | | | | E.g. enter 10 for dispersion of 10% |
| % of whole soil dispersible | | | | | | | See Section 6.3.3(e). Auto-calculated |
| Soil Texture Group | D | | | | | | Automatic calculation from above |

**Rainfall data**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Design rainfall depth (no of days) | 5 | | | | | | See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25. |
| Design rainfall depth (percentile) | 85 | | | | | | |
| x-day, y-percentile rainfall event (mm) | 41.2 | | | | | | |
| Rainfall R-factor (if known) | 2857 | | | | | | Only need to enter one or the other here |
| IFD: 2-year, 6-hour storm (if known) | 11.5 | | | | | | |

**RUSLE Factors**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rainfall erosivity (*R*-factor) | 2857 | | | | | | Auto-filled from above |
| Soil erodibility (*K*-factor) | 0.055 | | | | | | |
| Slope length (m) | 100 | | | | | | |
| Slope gradient (%) | 8.5 | | | | | | RUSLE LS factor calculated for a high rill/interrill ratio. |
| Length/gradient (*LS*-factor) | 2.55 | | | | | | |
| Erosion control practice (*P*-factor) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | |
| Ground cover (*C*-factor) | 1 | 1 | 1 | 1 | 1 | 1 | |

**Sediment Basin Design Criteria (for Type D/F basins only. Leave blank for Type C basins)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Storage (soil) zone design (no of months) | 2 | 2 | 2 | 2 | 2 | 2 | Minimum is generally 2 months |
| Cv (Volumetric runoff coefficient) | 0.69 | | | | | | See Table F2, page F-4 in Appendix F |

**Calculations and Type D/F Sediment Basin Volumes**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Soil loss (t/ha/yr) | 521 | | | | | | |
| Soil Loss Class | 5 | | | | | | See Table 4.2, page 4-13 |
| Soil loss ($m^3$/ha/yr) | 400 | | | | | | Conversion to cubic metres |
| Sediment basin storage (soil) volume ($m^3$) | 133 | | | | | | See Sections 6.3.4(i) for calculations |
| Sediment basin settling (water) volume ($m^3$) | 569 | | | | | | See Sections 6.3.4(i) for calculations |
| Sediment basin total volume ($m^3$) | 702 | | | | | | |

NB for sizing of Type C (coarse) sediment basins, see Worksheet 3 (if required).

Bureau of Meteorology – Very Frequent Design Rainfall Depth IFD Table

2-Year, 6 Hour rainfall event circled in red.



Australian Government
Bureau of Meteorology

## Location

**Label:** Not provided

**Latitude:** -32.2324 [Nearest grid cell: 32.2375 (S)]

**Longitude:** 152.4149 [Nearest grid cell: 152.4125 (E)]

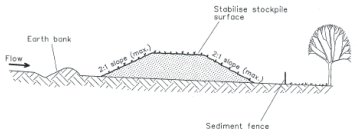
## Very Frequent Design Rainfall Depth (mm)

Issued: 20 February 2025

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
FAQ for New ARR probability terminology

| | Exceedance per Year (EY) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Duration** | **12EY** | **6EY** | **4EY** | **3EY** | **2EY** | **1EY** | **0.5EY#** | **0.2EY*** |
| 1 min | 0.975 | 1.12 | 1.39 | 1.57 | 1.84 | 2.32 | 2.96 | 3.86 |
| 2 min | 1.64 | 1.89 | 2.31 | 2.61 | 3.05 | 3.82 | 4.90 | 6.51 |
| 3 min | 2.28 | 2.63 | 3.23 | 3.66 | 4.27 | 5.34 | 6.84 | 9.04 |
| 4 min | 2.86 | 3.30 | 4.07 | 4.62 | 5.39 | 6.76 | 8.63 | 11.3 |
| 5 min | 3.38 | 3.91 | 4.83 | 5.48 | 6.42 | 8.04 | 10.3 | 13.4 |
| 10 min | 5.32 | 6.18 | 7.67 | 8.75 | 10.3 | 12.9 | 16.5 | 21.4 |
| 15 min | 6.83 | 7.70 | 9.57 | 10.9 | 12.9 | 16.3 | 20.7 | 26.9 |
| 20 min | 7.61 | 8.62 | 11.0 | 12.5 | 14.7 | 18.7 | 23.8 | 31.0 |
| 25 min | 8.39 | 9.72 | 12.1 | 13.8 | 16.2 | 20.7 | 26.3 | 34.4 |
| 30 min | 9.04 | 10.5 | 13.0 | 14.8 | 17.5 | 22.3 | 28.4 | 37.1 |
| 45 min | 10.5 | 12.1 | 15.1 | 17.2 | 20.3 | 26.0 | 33.2 | 43.5 |
| 1 hour | 11.6 | 13.4 | 16.6 | 19.0 | 22.4 | 28.7 | 36.7 | 48.3 |
| 1.5 hour | 13.3 | 15.3 | 19.0 | 21.7 | 25.7 | 33.0 | 42.1 | 55.5 |
| 2 hour | 14.6 | 16.9 | 20.9 | 23.9 | 28.3 | 36.3 | 46.4 | 61.2 |
| 3 hour | 16.8 | 19.3 | 24.0 | 27.4 | 32.5 | 41.9 | 53.4 | 70.2 |
| 4.5 hour | 19.3 | 22.3 | 27.8 | 31.8 | 37.8 | 48.7 | 61.9 | 80.9 |
| 6 hour | 21.4 | 24.8 | 31.0 | 35.5 | 42.2 | 54.4 | 69.1 | 89.9 |
| 9 hour | 24.9 | 28.9 | 36.3 | 41.7 | 49.6 | 64.1 | 81.2 | 105 |
| 12 hour | 27.7 | 32.3 | 40.6 | 46.8 | 55.8 | 72.2 | 91.2 | 117 |
| 18 hour | 32.1 | 37.6 | 47.8 | 55.0 | 65.8 | 85.4 | 108 | 137 |
| 24 hour | 35.5 | 41.8 | 53.0 | 61.3 | 73.5 | 95.0 | 121 | 153 |
| 30 hour | 38.2 | 45.1 | 57.4 | 66.5 | 79.9 | 104 | 131 | 167 |
| 36 hour | 40.4 | 47.8 | 61.0 | 70.7 | 85.1 | 112 | 140 | 178 |
| 48 hour | 43.8 | 51.9 | 66.5 | 77.3 | 93.4 | 123 | 155 | 197 |
| 72 hour | 47.9 | 57.1 | 73.7 | 86.0 | 104 | 139 | 175 | 223 |
| 96 hour | 50.1 | 60.0 | 78.0 | 91.4 | 111 | 148 | 187 | 240 |
| 120 hour | 51.2 | 61.7 | 80.8 | 95.1 | 116 | 155 | 196 | 252 |

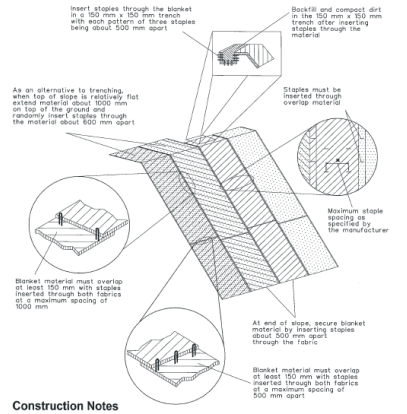
# Appendix B - Standard Drawings




**Construction Notes**

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

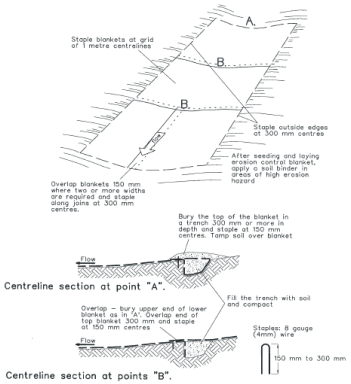
**STOCKPILES** SD 4-1




**Construction Notes**

1. Remove any rocks, clods, sticks or grass from the ground surface before laying the matting.
2. Spread topsoil to at least 75 mm depth.
3. Where appropriate, complete fertilising and seeding on a properly prepared seedbed (Standard Drawing 7-1) before laying the matting.
4. Ensure the fabric can be continuously in contact with the soil by grading the surface carefully first.
5. Lay the matting in "shingle-fashion" with the ends of each upstream roll overlapping the next roll downslope.
6. Ensure sufficient staples are used to maintain a good contact between the soil and the matting.

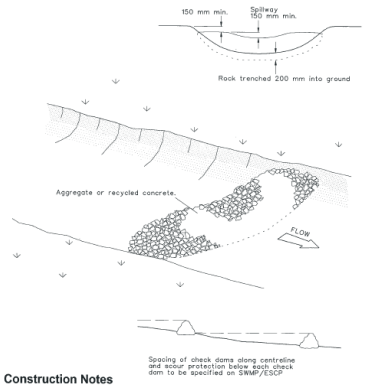
**RECP : SHEET FLOW** SD 5-2




**Construction Notes**

1. Remove any rocks, clods, sticks or grass from the surface before laying matting
2. Ensure that topsoil is at least 75 mm deep.
3. Complete fertilising and seeding before laying the matting.
4. Ensure fabric will be continuously in contact with the soil by grading the surface carefully first.
5. Lay the fabric in "shingle-fashion", with the end of each upstream roll overlapping those downstream. Ensure each roll is anchored properly at its upslope end (Standard Drawing 5-7b).
6. Ensure that the full width of flow in the channel is covered by the matting up to the design storm event, usually in the 10-year ARI time of concentration storm event.
7. Divert water from the structure until vegetation is stabilised properly.

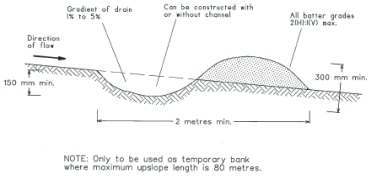
**RECP : CONCENTRATED FLOW** SD 5-7




**Construction Notes**

1. Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.
2. Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the trenches to at least 100 mm above the ground surface to reduce the risk of undercutting.
3. Normally, their maximum height should not exceed 600 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.
4. Space the dams so the toe of the upstream dam is level with the spillway of the next downstream dam.

**ROCK CHECK DAM** SD 5-4

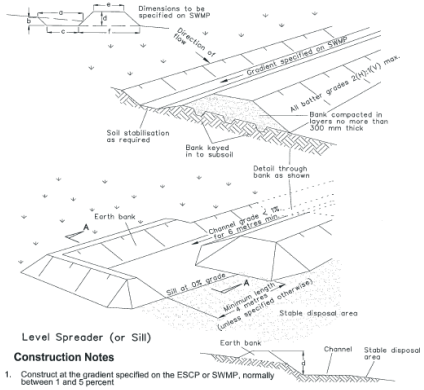



NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

**Construction Notes**

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

**EARTH BANK (LOW FLOW)** SD 5-5

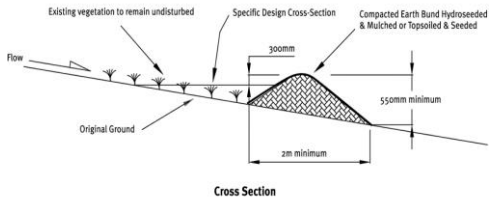



**Construction Notes**

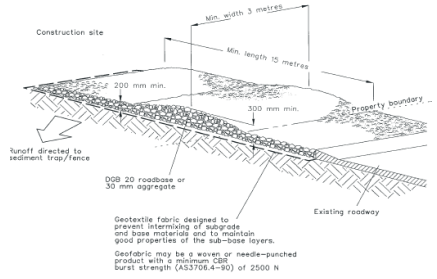
1. Construct at the gradient specified on the ESCP or SWMP, normally between 1 and 5 percent
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V-shaped, at the dimensions shown on the SWMP.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction following Table 5.2 in Landcom (2004).
7. Where discharging to erodible lands, ensure they outlet through a properly constructed level spreader.
8. Construct the level spreader at the gradient specified on the ESCP or SWMP, normally less than 1 percent or level.
9. Where possible, ensure they discharge waters onto either stabilised or undisturbed disposal sites within the same subcatchment area from which the water originated. Approval might be required to discharge into other subcatchments.

**EARTH BANK (HIGH FLOWS)** SD 5-6

## Stabilised topsoil diversion bank




**Cross Section**



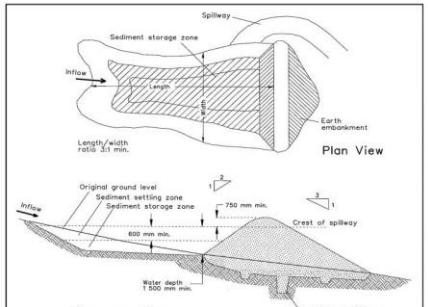

**Construction Notes**

1. Strip the topsoil, level the site and compact the subgrade.
2. Cover the area with needle-punched geotextile.
3. Construct a 200-mm thick pad over the geotextile using road base or 30-mm aggregate.
4. Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
5. Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence

**STABILISED SITE ACCESS** SD 6-14

# Ironhide Enterprises Pty Ltd – 465 Shallow Bay Road, Shallow Bay NSW 2428

## Concept Erosion & Sediment Control Plan – Mid Coast Council: Development Application - PL2024/0052

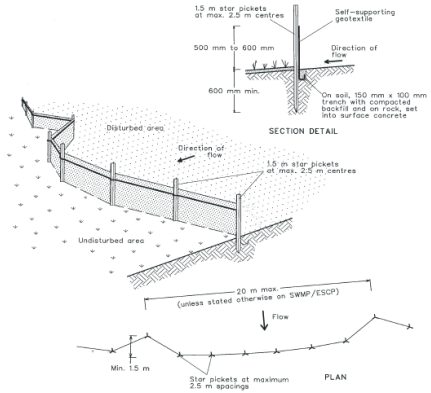



**Construction Notes**

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

**EARTH BASIN - WET** SD 6-4

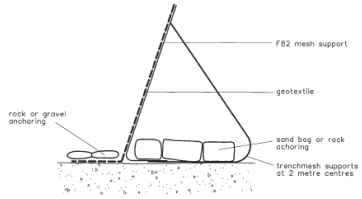
(APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)




**Construction Notes**

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

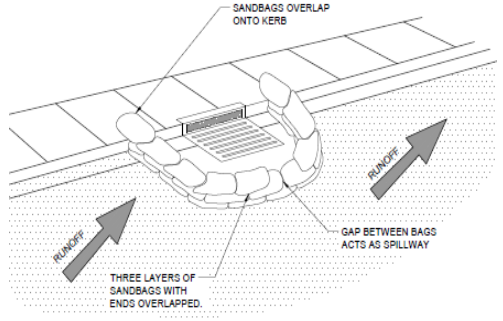
**SEDIMENT FENCE** SD 6-8




**Construction Notes**

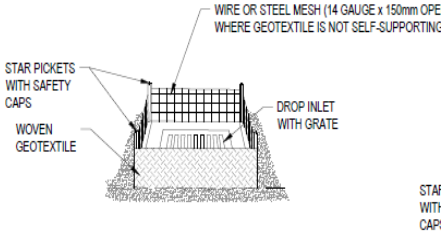
1. Install this type of sediment fence when use of support posts is not desirable or not possible. Such conditions might apply, for example, where approval is granted from the appropriate authorities to place these fences in highly sensitive estuarine areas.
2. Use bent trench mesh to support the F82 welded mesh facing as shown on the drawing above. Attach the geotextile to the welded mesh facing using UV resistant cable ties.
3. Stabilise the whole structure with sandbag or rock anchoring over the trench mesh and the leading edge of the geotextile. The anchoring should be sufficiently large to ensure stability of the structure in the design storm event, usually the 10 year event.

**ALTERNATIVE SEDIMENT FENCE** SD 6-9



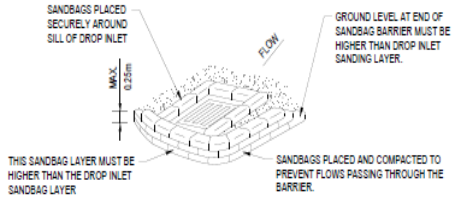

**SANDBAG SEDIMENT TRAP FOR KERB INLET**

N.T.S.



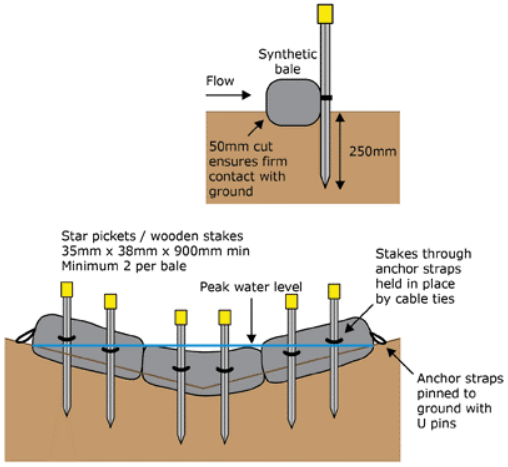

**GEOTEXTILE INLET FILTER (SD 6-12) - PERSPECTIVE**

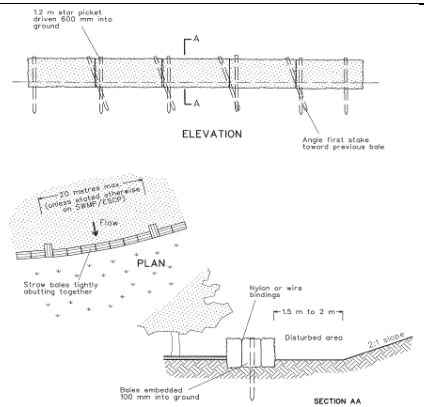
NTS




**SEDIMENT BARRIER (SD 5-4) DETAIL**

## Coir Log Filter



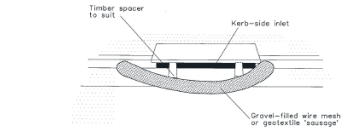

**Construction Notes**

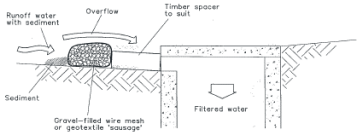
1. Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
3. Ensure that the maximum height of the filter is one bale.
4. Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
5. Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the toe.
6. Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

**STRAW BALE FILTER** SD 6-7

# Ironhide Enterprises Pty Ltd – 465 Shallow Bay Road, Shallow Bay NSW 2428

## Concept Erosion & Sediment Control Plan – Mid Coast Council: Development Application - PL2024/0052



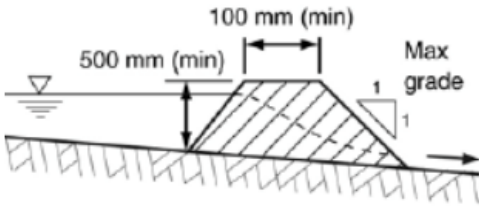

NOTE: This practice only to be used where specified in an approved SWMP/ESCP.

**Construction Notes**

1. Install filters to kerb inlets only at sag points.
2. Fabricate a sleeve made from geotextile or wire mesh longer than the length of the inlet pit and fill it with 25 mm to 50 mm gravel.
3. Form an elliptical cross-section about 150 mm high x 400 mm wide.
4. Place the filter at the opening leaving at least a 100-mm space between it and the kerb inlet. Maintain the opening with spacer blocks.
5. Form a seal with the kerb to prevent sediment bypassing the filter.
6. Sandbags filled with gravel can substitute for the mesh or geotextile providing they are placed so that they firmly abut each other and sediment-laden waters cannot pass between.

**MESH AND GRAVEL INLET FILTER** **SD 6-11**

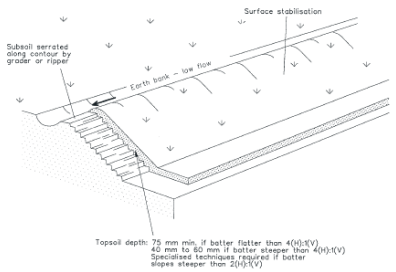
Mulch filter berm




Example photo of a compacted mulch berm on low grades.

Example photo of a compacted mulch berm on steeper grade with an upslope facing groyne

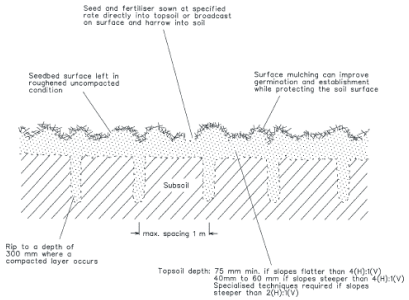
Example photo of a shade cloth and rock sediment filter.




**Construction Notes**

1. Scarify the ground surface along the line of the contour to a depth of 50 mm to 100 mm to break up any hardsetting surfaces and to provide a good bond between the respread material and subsoil.
2. Add soil ameliorants as required by the ESCP or SWMP.
3. Rip to a depth of 300 mm if compacted layers occur.
4. Where possible, replace topsoil to a depth of 40 to 60 mm on lands where the slope exceeds 4(H):1(V) and to at least 75 mm on lower gradients.

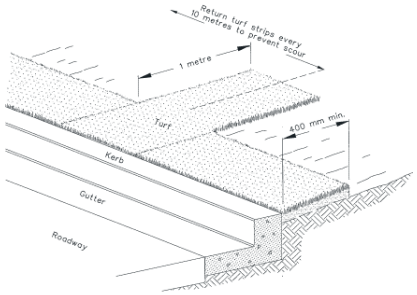
**REPLACING TOPSOIL** **SD 4-2**




**Construction Notes**

1. Loosen compacted soil before sowing any seed. If necessary, rip the soil to a depth of 300 mm. Avoid rotary hoe cultivation.
2. Work the ground only as much as necessary to achieve the desired tilth and prepare a good seedbed.
3. Avoid cultivation in very wet or very dry conditions.
4. Cultivate on or close to the contour where possible, not up and down the slope.

**SEEDBED PREPARATION** **SD 7-1**




**Construction Notes**

1. Install a 400-mm minimum wide roll of turf on the footpath next to the kerb and at the same level as the top of the kerb.
2. Lay 1.4 metre long turf strips normal to the kerb every 10 metres.
3. Rehabilitate disturbed soil behind the

**KERBSIDE TURF STRIP** **SD 6-13**

**Appendix C**

Sediment Basin Management & Dewatering Procedure

## 1.1 Purpose

The purpose of the Sediment Basin Management & Dewatering Procedure (the Procedure) is to detail the actions to be taken in regard to site dewatering in general and specific measures for the construction and maintenance of sediment basins including steps to be taken prior to any discharge.

Adherence to the methodology outlined in procedure will ensure that works are carried out in accordance with industry standard and environmental conditions.

## 1.2. Scope

The Procedure applies to the following works:

- Sediment basin management and maintenance; and
- Dewatering of excavations and construction water generally, and
- Acid sulfate leachate ponds in the event that acid sulfate soils or rock is encountered.

## 1.3. Objectives

The objectives of this Procedure are to:

- Ensure all Project personnel are aware of the requirements of this procedure
- Detail personnel responsible for undertaking actions relating to sediment basin, construction dewatering and acid sulfate leachate management on the site;
- Providing a uniform, controlled methodology and clear criteria for water releases from the site;
- Implement industry standard methods for managing sediment basins and dewatering in accordance with best practice guidelines such as Managing Urban Stormwater Soils and Construction (Landcom 2004) and Acid Sulfate Soil Manual (ASSMAC 1998);
- Ensure water discharges from site are compliant with:
    - the NSW EPA Water Quality Criteria;
    - Managing Urban Stormwater Soils and Construction (Landcom 2004)
    - Approved Erosion and Control Plan; and
- Comply with environmental requirements of the Project, including all legal requirements and contractual obligations.

The procedure shall ensure appropriate environmental protection measures are in place relating to sediment basins, construction water management (dewatering of excavations, culverts, etc) and management of leachate collected in ponds from acid sulfate material stockpiles.

## 2. Sediment Basin Management & Dewatering Procedure

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| **Planning** | | |
| A copy of this Sediment Basin Management and Discharge Procedure will be kept on site and be made available to all relevant project personnel | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| All relevant project personnel will be made aware of this document during the site induction and again in Toolbox Talks and targeted training sessions. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| **Training and Awareness** | | |
| Training, instruction and equipment familiarisation for environmental personnel undertaking water quality monitoring, equipment calibration and maintenance will be the responsibility of the Environmental Site Representative. This will be completed prior to the initial use of equipment or as new equipment arrives on site. | Environmental Site Representative | Site Establishment / Duration |
| Training sessions will be conducted with Supervisors, Foreman, and Environmental Work Crew and relevant personnel. The training will address<br>• Construction of Sediment Basins<br>• Preliminary post-rainfall inspections<br>• Testing and recording<br>• Treatment methods and recording<br>• Details of the Water Discharge Permit<br>• Dewatering requirements, methods and recording<br>• Maintenance requirements, methods and recording<br>• Storage, Handling and Application of Flocculants | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| Any personnel that are responsible for monitoring pumps during dewatering activities, and that have not undertaken training described above, will undertake a specific toolbox talk to ensure awareness of requirements. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| **Construction of Sediment Basins** | | |
| Refer to the relevant PESCPs for the location of the sediment basin/s. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| The location and design criteria (volume – length, width & depth) for the sediment basin/s will be outlined in the relevant PESCP. The following criteria will be observed:<br>• All requirements of Landcom's - Managing Urban Stormwater: Soils and Construction Volume 1 (the Blue Book). Refer to Section 6.3.3 volume 1 of the Blue Book for detailed design of the sediment basin.<br>• Impervious clay to be used where required in construction of the internal basin invert and embankments.<br>• Inlet and outlet structures will be appropriately constructed to cater for the nominated rainfall event.<br>• Markers will be present to indicate sediment storage volume and to ensure adequate capacity levels are available. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| Sediment basins will be constructed in a way that predominantly only site run-off is collected, and clean water is diverted around them.<br>Earthworks will be conducted in a way so as to avoid ponding of water. | Supervisor / Environmental Site Representative | Site Establishment / Duration |

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| The sediment basin/s to be constructed prior to any earthworks or topsoil stripping in the catchment being undertaken. Necessary clearing to access the basin location and associated earthworks will occur with appropriate erosion and sediment controls installed. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| Where applicable, the formation of operational sediment basins will be partially or fully constructed in early stages of works and managed as a temporary sediment basin to capture construction runoff. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| Effective diversions such as drains and berms will be implemented to ensure that the diversion of site runoff is maximised to basins during all stages of construction. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| Water Quality Testing, Treatment & Criteria for Discharge | | |
| Captured water to be discharged from sediment basins must meet the following criteria:<br>• pH between 6.5 – 8.5<br>• TSS < 50mg/L and<br>• Oil and grease - no visible trace. | Supervisor / Environmental Site Representative | Duration |
| <u>Correlation between TSS and Turbidity</u><br>A correlation between TSS and turbidity may be developed for the basin/s to allow discharge based on turbidity levels. This correlation will be submitted to the relevant Approval Authority for approval prior to implementation.<br>If approved, a TSS sample will be taken from every tenth discharge and tested to confirm compliance with required criteria. These results will be used to check and revise the correlation. If these tests indicate an exceedance of TSS criteria, discharges on the basis of turbidity measurements will be suspended until the correlation can be re-established and approved. | Environmental Manager/ Environmental Site Representative | Duration |
| Potential contamination of any basin or ponded waters will be considered prior to discharge. Where the main source is from storm water, TSS and oil and grease are considered to be the likely pollutants. Where groundwater is a significant contributing source, influence from ASS/PASS, or other contaminants will be considered as potential pollutants and additional testing in the form of pH and metals may be undertaken. | Supervisor / Environmental Site Representative | Duration |
| Water Treatment | | |
| The drain inverts upslope from sediment basin inlets will be pre-dosed with suitable flocculants/coagulants (Gypsum or Calcium Chloride broadcast in the drain invert and/or Anionic Polyacrylamide gel blocks suspended in cages in locations of turbulent water flow.) to pre-treat run-off before it enters the basin during rainfall | Supervisor / Environmental Site Representative | Duration |
| The implementation of rain-activated, passive dosing units will deploy suitable liquid flocculants/coagulants during prolonged rainfall events to promote rapid coagulation/flocculation of sediment laden water in the treatment forebay of sediment basins. | Supervisor / Environmental Site Representative | Duration |
| Onsite reuse of ponded stormwater or infiltrated groundwater should always be the first dewatering option considered. Onsite reuse may include application for dust suppression, earthworks compaction and vegetation establishment. | Supervisor / Environmental Site Representative | Duration |
| If water is to be used for construction purposes (e.g. compaction, dust control) no treatment is required. However, the water should be removed to re-secure design capacity of sediment basins within 5 days. | Supervisor / Environmental Site Representative | Duration |

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| All sediment basins to be inspected for capacity and water quality daily on work days and within 24 hours (out of site hours) following cessation of a rain period. | Supervisor / Environmental Site Representative | Duration |
| Before any de-watering of site areas, excavations, etc, the parameters of pH, T.S.S. and oil and grease are to be tested and meet the following criteria:<br>• pH between 6.5 – 8.5<br>• TSS < 50mg/L; and<br>• Oil and grease < 10mg/L (and no visible trace).<br>Treatment should commence as soon as practical following cessation of a rain to allow enough time for settlement of suspended solids. | Supervisor / Environmental Site Representative | Duration |
| Records of water quality management must be maintained and the required records include:<br>• The date(s) on which the sample was taken;<br>• The time(s) at which the sample was collected;<br>• The name of the person who collected the sample. | Supervisor / Environmental Site Representative | Duration |
| **pH**<br>Treatment should be undertaken as follows:<br>• Test basin water with a suitable pH meter. No action is required if the pH reading is between 6.5 and 8.5<br>• Lime to be added if pH below 6.5 or Hydrochloric Acid (32% Muriatic) or Sulfuric Acid to be added if pH above 8.5<br>• Determine volume of water to be treated in the sediment basin.<br>• Determine the percentage of lime or acid required by taking a 10-litre sample of basin water and adding a known amount of lime or acid (initially 0.004%). If the pH is still not acceptable, vary the amount of lime or acid until within the limits.<br>• Once the required percentage has been determined, calculate the actual amount of lime or acid to be added by multiplying the volume of water in the basin by the determined percentage.<br>• Add the required amount of lime or acid to the basin and mix the water in the sediment basin well<br>• Treat for pH prior to T.S.S. | Supervisor / Environmental Site Representative | Duration |
| **Total Suspended Solids**<br>• Test the sediment basin water initially for NTU using a turbidity tube, nephelometer (Turbidity tester) or by comparing with water samples contained in jars with representative readings up to 100mg/l.<br>• When the comparative NTU readings indicate T.S.S. levels are <50mg/l obtain a grab sample in accordance with approved sampling methods. The water sample to be promptly analysed by a laboratory that is NATA certified in T.S.S. testing.<br>• No further treatment action is required if T.S.S. results are <50mg/l. | Supervisor / Environmental Site Representative | Duration |

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| **<u>Total Suspended Solids</u>**<br>• Test the sediment basin water initially for NTU using a turbidity tube, nephelometer (Turbidity tester) or by comparing with water samples contained in jars with representative readings up to 100mg/l.<br>• When the comparative NTU readings indicate T.S.S. levels are <50mg/l obtain a grab sample in accordance with approved sampling methods. The water sample to be promptly analysed by a laboratory that is NATA certified in T.S.S. testing.<br>• No further treatment action is required if T.S.S. results are <50mg/l.<br>• If basins require flocculation (e.g. T.S.S. >50mg/l), a flocculant/coagulant is to be utilised at the determined dosage initially, then treated with incremental doses should more flocculant be required.<br>• Basins should be monitored daily after flocculation until desired TSS is achieved and to assist in determination of optimal dosage levels.<br>Methods of application to include:<br>• broadcast by shovels on small sumps and excavations is acceptable. This method requires spreading powdered coagulants (i.e. gypsum, calcium chloride, etc) evenly and thinly (i.e. “dusting”) over as much of the water surface as possible.<br>• For sediment basins or areas with a large water surface area. The powdered or flake style coagulants should be pre-mixed thoroughly in a drum with clean water and sprayed over the maximum surface area of water as possible.<br>• When spraying coagulant mixtures, the mixture should hit the water at between 10 to 20 degrees to increase surface areas exposure to the water column.<br>• Alternative water treatment utilising liquid flocculants/coagulants will require the assessed dosage to be pre-mixed and discharged into the basin. Following dosing, the basin water is to be gently re-circulated for a suitable period (2-4 hours) to allow chemical reaction time, and to keep precipitated flocculant/coagulant in suspension a sufficient time to collect the maximum quantity of fine suspended particles into floc clusters.<br>• The process outlined may need to be repeated if acceptable water quality is not achieved initially.<br>**<u>Oil and Grease</u>**<br>• Examine surface of water for evidence (e.g. sheen, discoloration).<br>• No action if no visual contamination.<br>• Oil absorbent material to be spread if there is contamination (e.g. cell-u-sorb). Leave basins to compensate for 24 to 48 hours. | Supervisor / Environmental Site Representative | Duration |

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| After retesting, and once the above field tests indicate, the water quality is acceptable, pumping or siphoning can commence with the water extraction inlet protected to prevent extraction of sediment. | Supervisor / Environmental Site Representative | Duration |
| Discharging Water | | |
| Where possible ponded water and sediment basin water will be reused on site for compaction, dust suppression, and irrigation. | Supervisor / Environmental Site Representative | Duration |
| The whole process of water quality management in sediment basins will be completed within 5 days of cessation of a rain period. | Supervisor / Environmental Site Representative | Duration |
| Water may be discharged from site where the tested water quality meets NSW EPA criteria and the Site Representative gives approval. The discharge outlet will be constructed to prevent erosion and scour. | Supervisor / Environmental Site Representative | Duration |
| The Supervisor is to ensure that treated water has been re-tested for pH and turbidity (NTU) in-situ immediately prior to discharge. | Supervisor / Environmental Site Representative | Duration |
| The preferred method for dewatering a sediment basin is by the use of a static siphon system with sufficient flow capacity to discharge the volume of supernatant water within a reasonable timeframe (i.e. 12 to 24 hours). The siphon inlet is to be positioned so that settled sediments are not extracted during dewatering. The siphon system is to be installed above the sediment basin embankment and not within the basin spillway. | Supervisor / Environmental Site Representative | Duration |
| Where sediment basins are to be dewatered by pump, suitable inlet protection devices (i.e. float & housing or extraction tube) will be provided to prevent the extraction of settled sediments within the basin. The flows from the pump outlet and basin are to be constantly monitored during discharge. | Supervisor / Environmental Site Representative | Duration |
| Only personnel who have undertaken the relevant training and been approved by the Supervisor may operate pumps and discharge sediment basins. During dewatering pumps must be monitored at all times to ensure that settled sediment is not disturbed or extracted, and that water is discharged in a diffused manner to prevent erosion. | Supervisor / Environmental Site Representative | Duration |
| A Sediment Basin Management Register will be maintained for each basin that details discharge volumes, dates, water treatment. The Sediment Basin Management Register will be updated when treated water is discharged from the basin. | Supervisor / Environmental Site Representative | Duration |
| Maintenance | | |
| Maintenance of the sediment basins will be ongoing for the duration of the Project and will comprise the following:<br>• The sediment storage capacity limit will be defined through the installation of a marker inside the basin. Sediment will be removed from the basin in accordance with the maintenance schedule, or when the accumulated sediment exceeds 60% of the sediment storage zone.<br>• Sediment removed from basins may be reused on site by incorporating into spoil.<br>• All sediment that will not be reused on site will be disposed of in locations that it will not be conveyed back into the construction areas or watercourses.<br>• Maintenance inspections will be undertaken and the results incorporated into the Weekly Environmental Inspection Checklist. | Supervisor / Environmental Site Representative | Duration |

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| The stormwater capacity of sediment basins will be reinstated within 5 days of the cessation of a rainfall event that causes runoff to occur | Supervisor / Environmental Site Representative | Duration |
| **Assessment and use of Coagulants & Flocculants** | | |
| Coagulation is the neutralisation and/or destabilisation of electrical charge on suspended soil colloids, whereas flocculation utilises bridging type interactions involving polyelectrolyte chains adsorbing to multiple colloid particles and aggregates through electrostatic charge interactions.<br>The following procedure will be implemented to determine the suitability and effectiveness of the various water treatment products.<br>• The product will be sourced from a reputable and traceable supplier together with MSDS and any other supporting documentation.<br>• Controlled 'jar testing' will be undertaken using site sourced water from the sediment basin. The jar testing will establish the site-specific dosing rates for any given products.<br>• Initial dosing will be undertaken incrementally up to the site specific/determined dosing rate in the event that the basin water responds to a lower dose in the 'real world' application.<br>• Settling rates in the basin will be assessed to determine the efficiency of each product.<br>• On site water sampling and testing will progressively assess the water's pH and turbidity in NTU's prior to lab testing.<br>• NATA certified lab testing for TSS, NTU & pH will be completed prior to any dry weather/controlled discharge to downstream waterways. | Supervisor / Environmental Site Representative | Duration |
| The range and type of suitable flocculants/coagulants (including typical dosing rates described as product required to water volume) that may be utilised include;<br>• Calcium Sulphate (Gypsum - powder) – 300ppm (30kg/100m3)<br>• Anionic Polyacrylamide (gel blocks) – 200ppm (20kg/100m3)<br>• Calcium Chloride (solid - flakes), – 200ppm (20kg/100m3)<br>• Aluminium Chlorohydrate (liquid) – 40ppm (4L/100m3)<br>• PAC23 (poly aluminium chloride 23% - solution) - 50ppm (12.5L/100m3) | Supervisor / Environmental Site Representative | Duration |
| **Storage and Handling of Flocculants** | | |
| **Environmental Management Controls** | **Person Responsible** | **Timing / Frequency** |
| Gypsum and agricultural lime will be stored on site as either bagged or bulk product. Storage of bulk gypsum and agricultural lime will be covered, within erosion and sediment controls in a position where run on water will not erode the stockpiles. | Supervisor / Environmental Site Representative | Duration |
| All treatment chemicals particularly acids and basics will be stored in appropriately bunded and covered locations that are locked to prevent unauthorised access. | Supervisor / Environmental Site Representative | Duration |
| All chemicals on site will be stored with MSDSs for ease of reference in the event of a spill or irritation/injury to handlers. | Supervisor / Environmental Site Representative | Duration |
| Requirements of the Material Safety Data Sheets (MSDSs) will be met to ensure compatible storage with other chemicals to ensure safety. | Supervisor / Environmental Site Representative | Duration |

| Monitoring and Record Keeping | | |
|---|---|---|
| **Environmental Management Controls** | **Person Responsible** | **Timing / Frequency** |
| All sediment basins will be inspected on a weekly basis as a minimum, with any defects or maintenance requirements reported immediately.<br>Sediment basins will be inspected immediately after rainfall events to assess:<br>• Water Storage capacity and water quality treatment requirements prior to discharge<br>• Following treatment and discharge from the sediment basin the sediment storage capacity and requirement for clean out will be assessed. | Supervisor / Environmental Site Representative | Duration |
| Records to be kept of the rainfall events, inspections undertaken, field tests undertaken, dosage rates and when basin water is released etc. | Supervisor / Environmental Site Representative | Duration |
| The results of all inspections, including inspection reports will be retained in the site environmental inspection register | Supervisor / Environmental Site Representative | Duration |
| All discharges will be recorded on a discharge permit which will include:<br>• Volume to be discharged<br>• Treatment details (e.g. Coagulant/ flocculant used, dosage, duration and treatment date)<br>• Water quality monitoring results (including date and time of testing)<br>• Discharge water quality results<br>• Date and time of discharge | Supervisor / Environmental Site Representative | Duration |
| Pumped discharge of any water off site will be monitored regularly to ensure that tested water quality meets all applicable criteria. | Supervisor / Environmental Site Representative | Duration |
| Decommissioning Construction Sediment Basins | | |
| Construction sediment basins will remain in place until all upstream areas have been stabilised to achieve a 'C' Factor of 0.05 which equates to 70% groundcover as per Blue Book 7.1 | Supervisor / Environmental Site Representative | Duration |
| All operational sediment basins will be desilted and reformed as per design requirements prior to completion of major works within the catchment. | Supervisor / Environmental Site Representative | Duration |
| Construction Sediment basins will be removed by restoring the ground disturbed by the construction of the basin similar to pre-existing conditions. This will be achieved by:<br>• Removing all redundant basin equipment such as basin markers, siphons, spillway linings, etc.<br>• Spreading and compacting the embankment material in the basin area<br>• Disturbed ground will be compacted to at least the relative density of the material in the ground adjacent to it. | Supervisor / Environmental Site Representative | Duration |

# 3. Procedure Review

The procedure will be regularly reviewed as part of the CEMP audit requirements. This document will be updated when needed in response to audit findings or changes to site conditions. The Environmental Site Representative will modify the procedure where improvements are identified.

**Appendix D**

Wet weather contingency procedure

## 1.1 Purpose

The purpose of the Wet Weather Contingency Procedure (the Procedure) is to detail the actions to be taken by construction personnel in response to an imminent severe rainfall event as forecast by the Australian Government - Bureau of Meteorology (BOM). The procedure provides guidance for monitoring BOM rainfall & storm event forecasts and other resources, to assist with Project preparations to minimise adverse site impacts where practical.

Adherence to the methodology outlined in procedure will ensure that works for wet weather contingency planning & implementation will be carried out in accordance with contract specifications and to maximise adherence to environmental obligations.

The purpose of the Wet Weather Contingency Procedure is to;

- Identify rainfall events which may cause significant precipitation over the site areas which would result in flash flooding and/or exacerbate erosion and sediment impacts;
- Include monitoring procedures of the Bureau of Meteorology (BOM) weather forecasts to predict severe rainfall events;
- Ensure emergency procedures are developed for the management of work areas, facilities and materials in a severe rainfall event that has the potential to impact areas of the Site;
- Ensure hazardous chemical & fuel/oil storage and stockpile areas are positioned in locations to limit the potential for adverse impacts from major runoff flows and/or flash flooding;
- Outline control measures for the protection of water quality in the event of a flood over the site;
- Ensure progressive stabilising methods for areas that may be potentially affected by flash flooding and/or significant scouring & erosion are implemented.

## 1.2. Scope

The Procedure applies to the following:

- Weather forecast monitoring and works planning,
- Implementation, monitoring and maintenance of erosion and sediment controls,
- Stockpile and hazardous materials storage,
- Sediment basin management, dewatering and maintenance.

## 1.3. Objectives

The objectives of this Procedure are to:

- Ensure all Project personnel are aware of the requirements of this procedure
- Detail personnel responsible for undertaking actions relating to works planning, erosion and sediment control management, sediment basin management & construction dewatering on the site;
- Comply with environmental requirements of the Project, including all legal requirements and contractual obligations.

## 2. Wet Weather Contingency & Management

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| **Planning** | | |
| A copy of this Wet Weather Contingency Procedure will be kept on site and be made available to all relevant project personnel | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| All relevant project personnel will be made aware of this document during the site induction and again in Toolbox Talks and targeted training sessions. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| **Training and Awareness** | | |
| Training & instruction of site personnel will be the responsibility of the Environment Manager/ Environmental Site Representative. | Environmental Site Representative | Site Establishment / Duration |
| Training sessions will be conducted with Supervisors, Foreman, Environmental Work Crew and relevant personnel. The training will address<br>• Weather forecast monitoring procedures and interpretation of forecasting by BOM and other sources<br>• Site erosion and sediment control status and high-risk areas<br>• Roles and responsibilities for wet weather preparation<br>• Temporary measure selection for augmentation or additional ERSED measures<br>• Pre & post-rainfall inspections and recording<br>• Dewatering requirements, methods and recording<br>• Identification of stabilisation and rectification works required. | Supervisor / Environmental Site Representative | Site Establishment / Duration |
| **Identification of significant rainfall events** | | |
| The daily BOM forecasts for the local area are issued each morning and late afternoon. The forecasts will be monitored daily, at the start of the shift and prior to shut down. The BOM three-day forecast outlook will be reviewed daily. | Supervisor / Environmental Site Representative | Duration |
| BOM forecasts indicating a high likelihood of storm fronts or rainfall events of = / > 10mm with an occurrence probability = / > 70% will be regarded as a potential rainfall event. | Supervisor / Environmental Site Representative | Duration |
| In periods of forecast storm weather or likely rainfall events, the tracking and intensity of approaching weather fronts is to be monitored regularly (where possible) to anticipate the time of the onset of wet weather. | Supervisor / Environmental Site Representative | Duration |
| **Wet Weather Management Procedures** | | |
| Where a potential rainfall event is deemed likely in the BOM three-day outlook, Project personnel are to review the scope and progress of existing and imminent site works to determine high risk areas and prioritise works to stabilise the nominated areas. High risk works include culvert works, scour protection installation, permanent drainage installation, trenching on grade, and sediment basin construction or maintenance. | Project Manager / Senior Engineer / Supervisors / Environmental Site Representative | Duration |

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| **Wet Weather Management Procedures** | | |
| The high-risk work areas that are identified will be managed by;<br>• Completion and temporary/permanent stabilisation of the high-risk work areas where time & resource constraints allow, prior to the onset of the potential rainfall event.<br>• Re-allocating resources from low-risk activities to assist with completion of high risk works prior to the onset of a rainfall event.<br>• Implementation of erosion controls in high-risk areas to minimise sediment control requirements. Erosion controls will be employed such as;<br>  ○ temporary geotextile linings or soil binders will be installed around culverts, scour protection works and drain junctions,<br>  ○ sandbag check dams, rock baffles, trench stops, etc will be utilised in open trenching on grade, temporary diversion drains, or concentrated flow paths over unstabilised areas. | Project Manager / Senior Engineer / Supervisors / Environmental Site Representative | Duration |
| The site sediment controls and sediment basins are to be inspected and any necessary rectification works undertaken such as;<br>• Sediment basins are to be managed in accordance with Sediment Basin Management Procedure to regain the maximum runoff capacity parameters, where possible,<br>• Sediment traps and filters to be desilted where more than 60% storage capacity is exceeded,<br>• Spillways and discharge points from sediment traps to be inspected and reinstated as required.<br>• Sediment fences, mulch bunds, earth berms to be inspected and repairs or reinstatement implemented as required. | Supervisor / Environmental Site Representative | Duration |
| The chemical, fuel and other hazardous material storage areas to be inspected to ensure their location is protected from the ingress of rainfall or concentrated overland flows. Bund controls to be inspected and accumulated liquids or other residues removed to a controlled waste location on site or for offsite disposal at licensed premises. | Supervisor / Environmental Site Representative | Duration |
| Following the onset of a significant storm event or rainfall event, the site controls to be inspected as soon as site conditions and safety requirements allow. The inspection to focus on high-risk areas to review the function and status of the installed erosion and sediment controls. | Supervisor / Environmental Site Representative | Duration |
| **Post-Rainfall/Storm Procedure** | | |
| The Post Rainfall Inspection will be conducted in accordance with the PESCP. The identified high-risk areas will be prioritised for any rectification or maintenance works, followed by areas with lower risk. | Supervisor / Environmental Site Representative | Duration |
| Records detailing the necessary works to reinstate the controls will be conducted in accordance with the PESCP. | Supervisor / Environmental Site Representative | Duration |
| Sediment basins are to be managed in accordance with Sediment Basin Management Procedure. Flocculation of the sediment basins may occur soon after the cessation of a rainfall event to improve the water quality parameters in circumstances where further significant rainfall is anticipated. | Supervisor / Environmental Site Representative | Duration |

| Environmental Management Controls | Person Responsible | Timing / Frequency |
|---|---|---|
| High risk work areas that are inundated will be prioritised for dewatering by;<br>• Dewatering to a sediment basin where sufficient capacity is available,<br>• Flocculated in-situ and discharged at a licensed discharge point when EPL water quality parameters are attained,<br>• Dewatered by water cart and utilised for construction purposes. | Supervisor / Environmental Site Representative | Duration |
| Repair and reinstatement of erosion and sediment controls to be implemented as site conditions allow, proceeding from high-risk areas to lower risk areas on site. | Supervisor / Environmental Site Representative | Duration |

# 3. Procedure Review

The procedure will be regularly reviewed as part of the CEMP audit requirements. This document will be updated when needed in response to audit findings or changes to site conditions. The Project Environmental Representative in consultation with the Client will modify the procedure where improvements are identified.