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MOUNT PLEASANT OPERATION

EROSION AND SEDIMENT CONTROL PLAN

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1 INTRODUCTION

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales (NSW), approximately 3 kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton (Figure 1). The village of Aberdeen and locality of Kayuga are also located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively (Figure 1). MACH Energy purchased the MPO from Coal & Allied Operations Pty Ltd (Coal & Allied) in 2016.

MACH Mount Pleasant Operations Pty Ltd is the manager of the MPO as agent for, and on behalf of, the unincorporated Mount Pleasant Joint Venture between MACH Energy Australia Pty Ltd (MACH Energy) (95 per cent [%] owner) and J.C.D. Australia Pty Ltd (5% owner). This Erosion and Sediment Control Plan (ESCP) is implemented at the MPO by MACH Energy.

The initial development application for the MPO was made in 1997. This was supported by an Environmental Impact Statement (EIS) prepared by Environmental Resources Management (ERM) Mitchell McCotter (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal & Allied. This allowed for the "Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities" at the MPO. The consent allowed for operations 24 hours per day seven days per week and the extraction of 197 million tonnes (Mt) of run-of-mine (ROM) coal over a 21 year period, at a rate of up to 10.5 Mt of ROM coal per year.

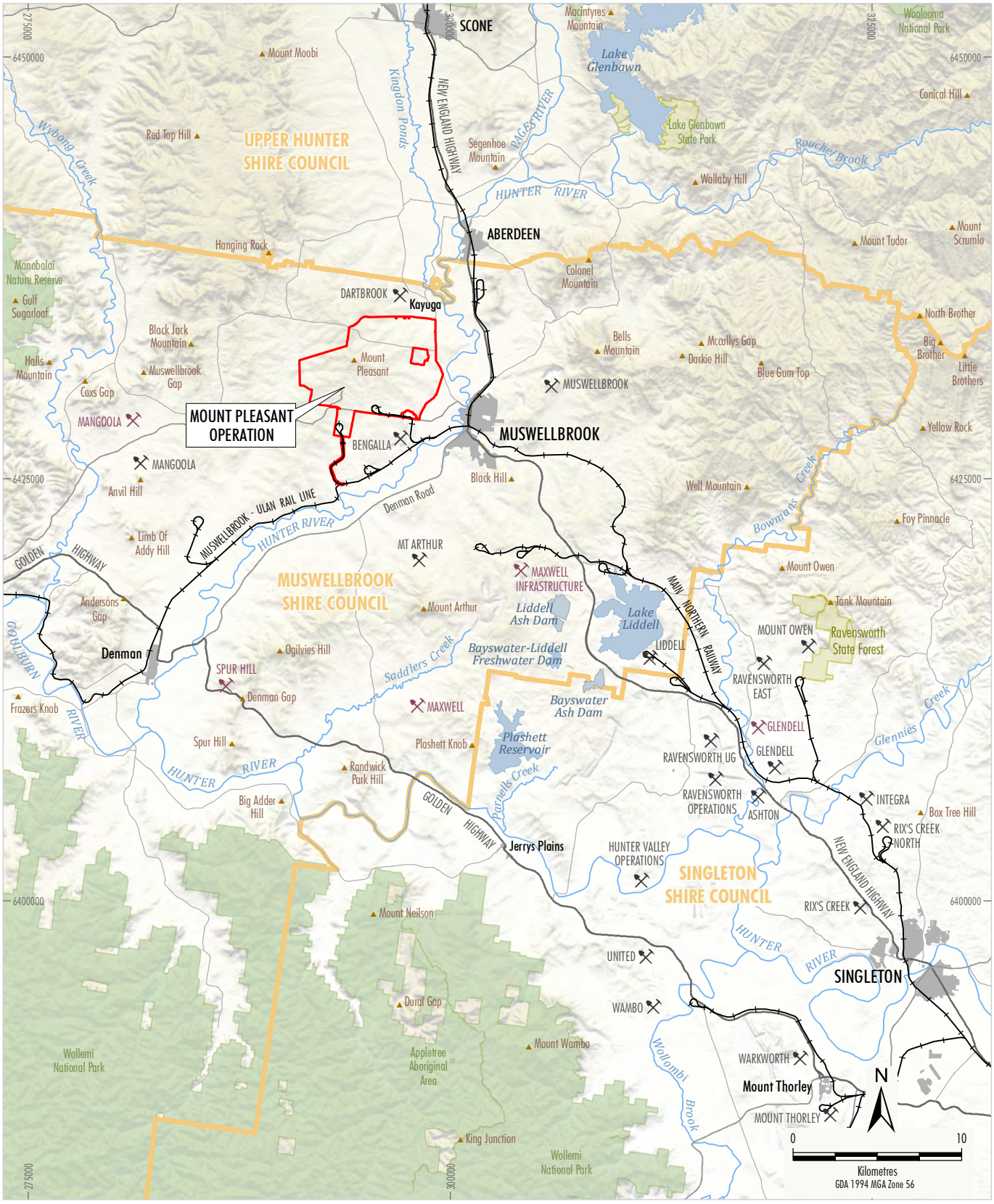
The Mount Pleasant Project Modification (MOD 1) was submitted on 19 May 2010 with a supporting Environmental Assessment (EA) prepared by EMGA Mitchell McLennan (EMGA Mitchell McLennan, 2010). MOD 1 included the provision of an infrastructure envelope for siting the mine infrastructure, the provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line and modification of the existing Development Consent DA 92/97 boundaries to accommodate the optional conveyor/service corridor and minor administrative changes. MOD 1 was approved on 19 September 2011.

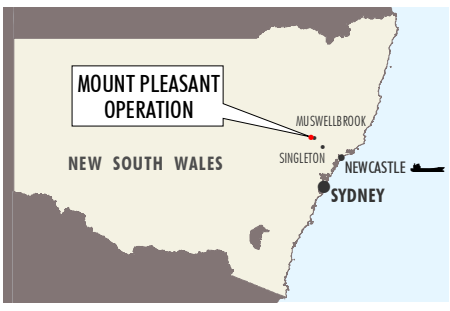
The MPO South Pit Haul Road Modification (MOD 2) was submitted on 30 January 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017a). MOD 2 proposed to realign an internal haul road to enable more efficient access to the South Pit open cut, with no other material changes to the approved MPO. MOD 2 was approved on 29 March 2017.

The MPO Mine Optimisation Modification (MOD 3) was submitted on 31 May 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017b). MOD 3 comprised an extension to the time limit on mining operations (to 22 December 2026) and extensions to the South Pit Eastern Out of Pit Emplacement to facilitate development of an improved final landform. MOD 3 was approved on 24 August 2018.

The MPO Rail Modification (MOD 4) was submitted on 18 December 2017 with a supporting EA prepared by MACH Energy (MACH Energy, 2017c). MOD 4 proposed the following changes:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that followed the original rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.





LEGEND

- Mining Operation
- Proposed Mining Operations (Application Lodged)
- Railway
- Local Government Boundary
- State Forest/Reserve
- National Parks and Wildlife Estate
- Mining Lease Boundary (Mount Pleasant Operation)

Source: NSW Spatial Services (2020)

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Project Location

Figure 1

MAC-18-03 MP2020_ Figure 1_ Rev B

MOD 4 was approved on 16 November 2018 by the Secretary of the Department of Planning and Environment (under Delegation). Appendix 2 of the modified Development Consent DA 92/97 illustrates the Conceptual Project Layout Plan of the approved MPO at 2021 and 2025, Approved Surface Disturbance Plan and Conceptual Final Landform (Attachment 1) incorporating the MOD 4 infrastructure relocations.

1.1 PURPOSE AND SCOPE

This Erosion and Sediment Control Plan (ESCP) has been prepared by MACH Energy to satisfy the requirements under Development Consent DA 92/97 (as modified) and specifically Condition 28(b), Schedule 3.

This ESCP describes the management measures proposed to control potential erosion impacts associated with construction and operation of the MPO, including for example, initial establishment and development works, open cut mining, operation of the coal handling and preparation plant, rail spur/loop and Fines Emplacement Area, and the supply of water to the MPO.

The ESCP applies to all employees and contractors at the MPO and covers all areas within the MPO boundary. The ESCP applies to the life of the MPO, including (but not limited to) the period of mining operations specified in Development Consent DA 92/97, which currently permits mining until 22 December 2026. As required by Condition 5, Schedule 2 of Development Consent DA 92/97, the ESCP will continue to apply (excluding mining operations) beyond 22 December 2026, as required, until the rehabilitation and any additional undertakings (required by the Secretary of the NSW Department of Planning, Industry, and Environment [DPIE], or the Division of Mining, Exploration and Geoscience [MEG] within the Department of Regional NSW) have been carried out satisfactorily.

This ESCP has been developed in-line with best practice erosion and sediment control measures listed in *Managing Urban Stormwater Soils and Construction Volume 1* (Landcom, 2004), *Managing Urban Stormwater Soils and Construction Volume 2E – Mines and quarries* (NSW Department of Environment and Climate Change [DECC], 2008), and the International Erosion Control Association (IECA) Australasian document, *Best Practice Erosion and Sediment Control* (IECA, 2008).

1.2 STRUCTURE OF THE ESCP

This ESCP is a component of the Water Management Plan (WMP) for the MPO.

The remainder of the ESCP is structured as follows:

- Section 2: Outlines the statutory obligations relevant to this ESCP.
- Section 3: Provides a description of the baseline data available for the MPO which relates to this ESCP.
- Section 4: Outlines the potential causes of soil erosion, sedimentation and flooding, relevant to the MPO.
- Section 5: Describes the MPO erosion and sediment control strategy.
- Section 6: Outlines the review process for MPO documentation, including in particular for this ESCP.
- Section 7: Outlines the reporting procedures proposed for the MPO.
- Section 8: Provides a list of references cited in this report.

2 STATUTORY OBLIGATIONS

The statutory obligations relevant to the MPO are contained in:

- the conditions of Development Consent DA 92/97 (as modified);
- the condition of the Commonwealth Approval EPBC 2011/5795;
- relevant licences (including Environment Protection Licence [EPL] 20850), permits and mining leases (MLs) (ML 1645, ML 1708, ML 1709, ML 1713, ML 1750 and ML 1808); and
- other relevant legislation.

Obligations relevant to this ESCP are described below.

2.1 DEVELOPMENT CONSENT DA 92/97

The conditions of Development Consent DA 92/97 relevant to the content and structure of this ESCP are described below. A comprehensive list of all conditions in Development Consent DA 92/97 relevant to water is provided in the WMP.

2.1.1 ESCP Requirements

Condition 28(b), Schedule 3 of Development Consent DA 92/97 requires the preparation of an ESCP as part of the WMP for the MPO (refer Table 1).

Table 1
ESCP Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 3	Section where addressed in this ESCP document
28. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary...The plan must include: *... (b) an Erosion and Sediment Control Plan, which must:*	
• *identify activities that could cause soil erosion, generate sediment or affect flooding;*	Section 4
• *describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage any flood risk;*	Section 5
• *describe the location, function, and capacity of erosion and sediment control structures;*	Section 5
• *describe what measures would be implemented to maintain the structures over time;*	Section 5

2.1.2 Management Plan (General) Requirements

Condition 2, Schedule 5 of Development Consent DA 92/97 outlines the general management plan requirements that are applicable to the preparation of the ESCP.

Table 2 presents these requirements and indicates where each is addressed within this ESCP.

Table 2
General Development Consent DA 92/97 Conditions

MPO Development Consent DA 92/97 Schedule 5	Section where addressed in this ESCP Document
2. *The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:*	
(a) detailed baseline data;	Section 3
(b) a description of: • *the relevant statutory requirements (including any relevant consent, licence or lease conditions);*	Section 2
• *any relevant limits or performance measures/criteria;*	Surface Water Management Plan (SWMP) and Groundwater Management Plan (GWMP)
• *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*	SWMP and GWMP
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 5
(d) a program to monitor and report on the: • *impacts and environmental performance of the development;* • *effectiveness of any management measures (see c above);*	Section 6
(e) a contingency plan to manage any unpredicted impacts and their consequences;	Surface and Ground Water Response Plan
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 6
(g) a protocol for managing and reporting any: • *incidents;* • *complaints;* • *non-compliances with statutory requirements; and* • *exceedances of the impact assessment criteria and/or performance criteria; and*	Section 7
(h) a protocol for periodic review of the plan. *Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.*	Section 6

2.2 LICENCES, PERMITS AND LEASES

Water management at the MPO is conducted in accordance with a number of licences, permits and leases. Key licences, permits and leases relating to water at the MPO include:

- Water Access Licences (WALs) issued under the *Water Management Act, 2000*.
- Discharge credits (46) held under the NSW *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation, 2002.*
- ML 1645, ML 1708, ML 1709, ML 1713, ML 1750 and ML 1808 issued under Part 5 of the NSW *Mining Act, 1992* and approved by the Minister for Mineral Resources.
- Environment Protection Licence 20850 issued under Part 3 of the NSW *Protection of the Environment Operations Act, 1997* by the NSW Environment Protection Authority (EPA).
- The Mining Operations Plan, as required by ML conditions issued under the *Mining Act 1992* and approved by the MEG.

2.3 OTHER LEGISLATION

A description of other legislation relevant to MPO water management is provided in the WMP, SWMP and GWMP.

3 BASELINE DATA

3.1 SOIL TYPES

Soil type data derived across the MPO area from the 1997 EIS is summarised in Table 3 below.

Table 3
Summary of Soil Types

Soil Types	Characteristics
Alluvial – Floodplain Soils	Uniform medium or fine textured clay profile, consisting of clay loams, silty clay loam or light clay topsoils. Slightly to highly dispersive.
Drainage Flat / Drainage Line Soils	Brown solonised soils and brown and yellow solidic soils. Slightly dispersible topsoils and highly dispersible subsoils.
Hillslope Soils	Dominate the study area. Topsoils are stable though occasionally highly dispersible. Subsoils are highly dispersible.
Sandy Hillslope Soils	Sandy parent material. Topsoil in two layers: • Light sandy clay loam, loam fine sandy or fine sandy clay loam. • Clayey sand, sandy loam or light – fine sandy clay loam. Subsoil is sandy – light medium clay – slightly – highly dispersible.
Volcanic Hillslope Soils	Uniform structured clay soils. Topsoil is fine sandy clay loam or light clay. Subsoils consist of silty – light medium clays. Slight – moderate dispersibility.

Source: ERM Mitchell McCotter (1997).

More recently, Golder Associates (2016) compiled a Geotechnical Investigation Report on the MPO area. This investigation described the typical soil conditions found at the site as follows:

1. Vegetation cover throughout the site varies with grass cover in lower areas including gullies and flood plains.
2. Topsoil depth generally ranges from 0.2 metres (m) to 0.4 m depth. Topsoils generally comprise of sandy and/or silty clays.
3. Alluvial soils underlying the topsoil generally comprise cohesive soils and granular soils.
    i. Alluvial soils are predominately cohesive, comprising clay with varying quantities of silt and sand.
    ii. Granular soils were only encountered on the lower slopes, towards the south-eastern portion of the site. Granular soils comprise a mixture of sand and gravel with up to 30% silts and clays.
4. Residual soils generally comprise clays derived from the weathering of the underlying sandstone and siltstone materials. Residual soils are generally less than 1 m in depth.
5. Bedrock encountered in the shallow excavations generally comprised sandstone or siltstone.

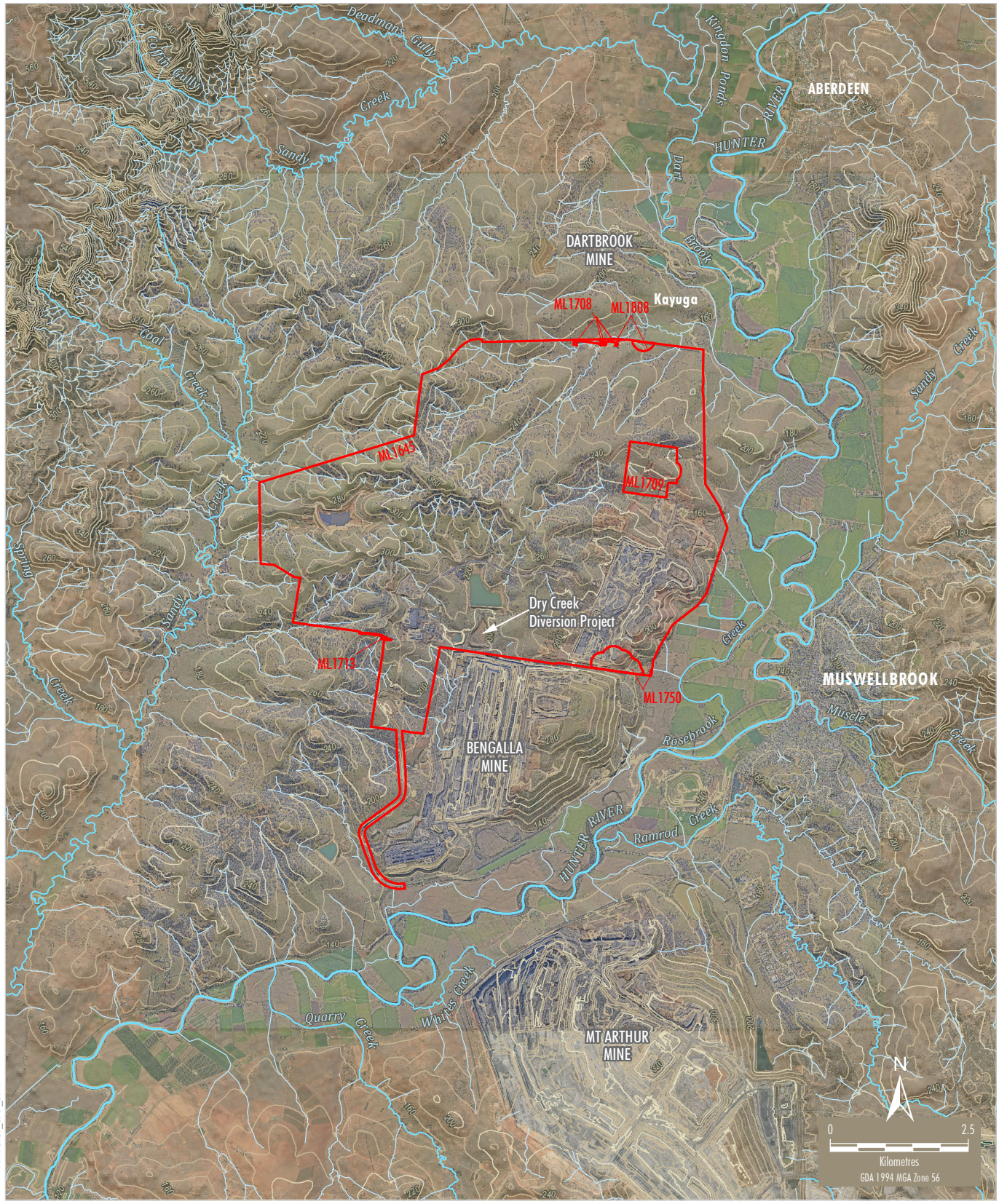
In the southern portion of the MPO area, deep alluvial soil deposits associated with the Hunter River system exist.

3.2 FLOOD EVENTS

The main drainage feature within the vicinity of the MPO is the Hunter River which flows in a southerly direction approximately 1 km to the east of the MPO ML boundary. There are a number of ephemeral drainage lines which traverse the MPO area and drain into the Hunter River. The eastern portion of the MPO area drains via Rosebrook Creek, as well as other unnamed drainages. Areas in the south and west of the MPO area drain via an unnamed drainage line (sometimes referred to as Dry Creek) and Sandy Creek respectively, both of which are tributaries of the Hunter River. All other areas drain into unnamed drainage lines, which flow directly into the Hunter River. Figure 2 shows the drainage network and topography in the vicinity of the MPO.

In 2018, Royal HaskoningDHV completed a Muswellbrook Floodplain Risk Management Study on behalf of the Muswellbrook Shire Council (Royal HaskoningDHV, 2018). Royal HaskoningDHV (2018) determined the 1% Annual Exceedance Probability (AEP) flood extent for the Hunter River.

The 1% AEP flood extent, in conjunction with the Approximate Eastern Extent of Approved Surface Development of the MPO, and the approved MOD 4 rail spur, are shown on Figure 3.



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LEGEND

Mining Lease Boundary (Mount Pleasant Operation)

Contour (20 m Interval)

Source: MACH (2020); NSW Spatial Services (2020)
Orthophoto: MACH Energy (July 2020)

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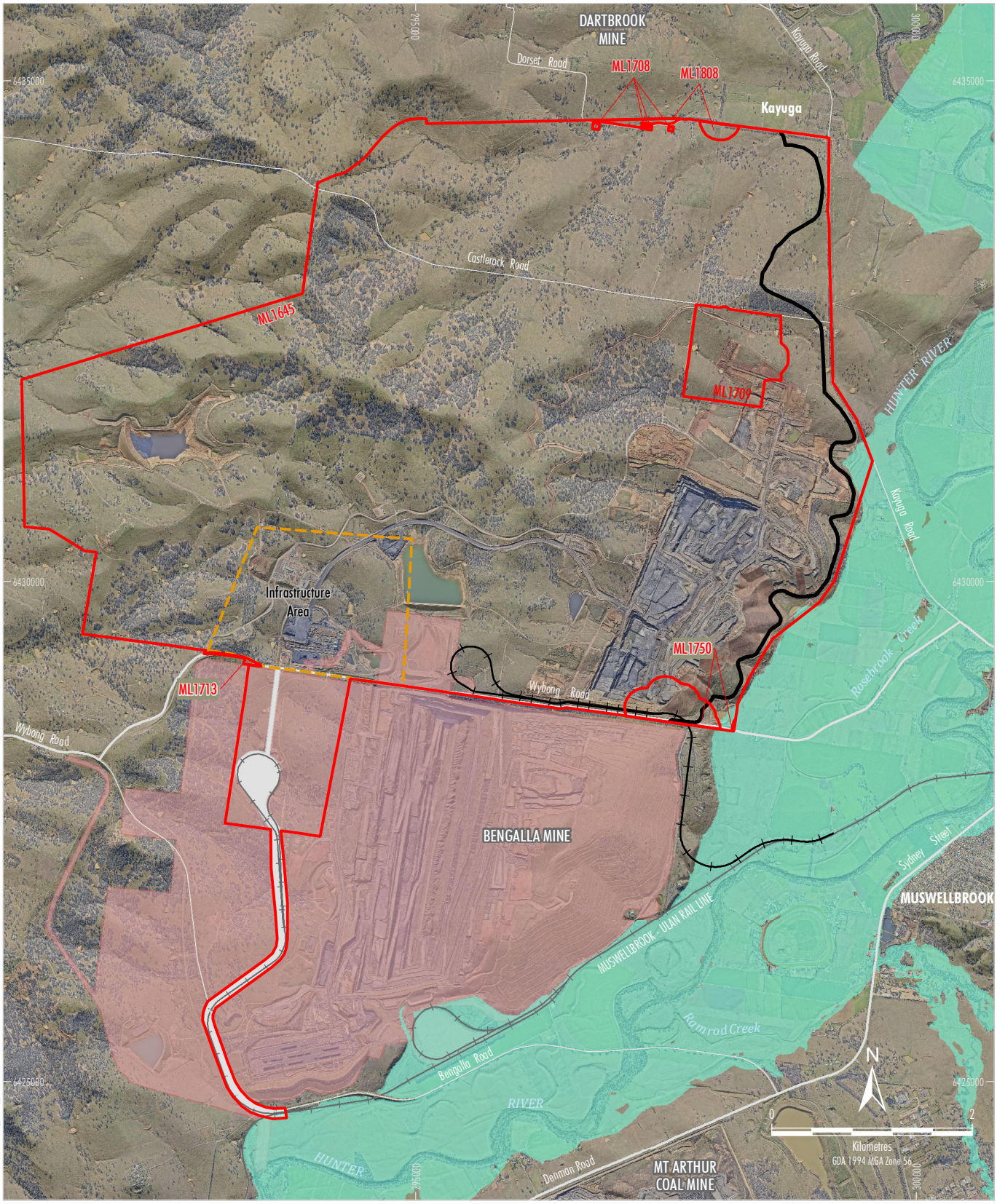
Local Drainage Network and Topography

Figure 2



MAC-18-03 MP2020_ESCP_202A

LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Infrastructure Area Envelope
- Eastern Extent of Approved Surface Development (1997 EIS Year 20, as modified)*
- Approved MOD4 Rail Spur and Loop
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- 1% AEP Flood Extent #

Source: MACH (2020); NSW Spatial Services (2020); Department of Planning and Environment (2016); Royal Haskoning DHV (2018)
Orthophoto: MACH Energy (July 2020)

Note: * Excludes some incidental Project components such as water management infrastructure, access tracks, topsoil stockpiles, power supply, other ancillary works and construction disturbance.

The 1% AEP Flood Extent has been digitised from Royal Haskoning DHV (2018).

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Hunter River - 1% AEP Flood Extent

Figure 3

4 POTENTIAL CAUSES OF SOIL EROSION, SEDIMENTATION AND FLOODING EFFECTS

Key activities that have the potential to cause or increase soil erosion and sedimentation at the MPO are disturbance of land and soils in relation to mining activities involving clearing, stripping and stockpiling activities. Specifically, these include:

- clearing and stripping of land prior to mining, or for other mining related activities;
- clearing of land for some Aboriginal archaeological surveys (i.e. scrapes);
- open cut mining activities including the placement of overburden and topsoil stockpiling;
- exploration activities;
- installation of services and infrastructure, including mine water dams, sumps and drains;
- changes to drainage lines and/or catchments, including upslope diversions;
- excavation of borrow areas and quarries for obtaining material for construction;
- management and rehabilitation of the Fines Emplacement Area;
- use of coal stockpiles and coal handling equipment including mobile equipment, coal crushing equipment, train loading infrastructure and conveyors;
- runoff from haul roads and access roads;
- vehicle and equipment movements; and
- earthworks associated with mine site rehabilitation.

4.1 FLOODING EFFECTS

As shown on Figure 3, the Eastern Extent of Approved Surface Development (incorporating the MPO major landforms) are located outside the 1% AEP flood extent for the Hunter River. Accordingly, the potential for the MPO major landforms to result in changes to flood depth, extent or velocity in the vicinity of the MPO is considered to be negligible.

Notwithstanding, the approved MPO MOD 4 rail spur would cross the Hunter River floodplain, as defined by the 1% AEP flood extent (Figure 3). MACH Energy's proposed management of flood risks associated with the MOD 4 rail infrastructure (including the rail spur) is outlined in Section 5.5.

5 EROSION AND SEDIMENT CONTROL STRATEGY

Erosion and sediment controls are implemented at the MPO to mitigate the impacts of the proposed development on nearby watercourses and the surrounding environment. Standard erosion and sediment control techniques are designed and operated in accordance with the requirements of *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and *Volume 2E – Mines and Quarries* (DECC, 2008).

A summary of the general erosion and sediment control principles employed by MACH Energy to limit erosion on site are outlined in Section 5.1. In addition, site specific erosion and sediment control strategies are described in Section 5.2, and design criteria associated with the ESCP are described in Section 5.3.

5.1 GENERAL PRINCIPLES

The following general principles underpin MACH Energy's approach to erosion and sediment control at the site:

- Minimising surface disturbance and restricting access to undisturbed areas.
- Progressive rehabilitation/stabilisation of mining and infrastructure areas.
- Separation of runoff from disturbed and undisturbed areas, where practicable.
- Management of runoff from mining and infrastructure areas through the mine water management system.
- Construction of suitable erosion and sediment controls such as drains and sediment dams to control, contain and manage sediment laden surface runoff.

Development activities will generally occur in the following order:

1. Installation of a stabilised site access route.
2. Selective stripping and stockpiling of available topsoil.
3. Construction of diversion drains (typically upslope of disturbance areas) – these are only constructed where they significantly reduce the catchment reporting to disturbance areas.
4. Construction of appropriately sized sediment dams/sumps where required to provide for temporary retention of runoff from disturbance areas. Where practicable, existing farm dams, mine water dams and open cut pits will be preferentially utilised for this purpose.
5. Construction of collection drains (downslope of or within disturbance areas) where required, to convey runoff to sediment dams or other mine water storages.
6. Construction of sediment controls (e.g. sediment fences) downslope of disturbance and stockpile areas, where required.

Construction/development works and mining activities will only take place once appropriate erosion and sediment control measures are in place.

5.2 EROSION AND SEDIMENT CONTROL MEASURES

Typical erosion and sedimentation control strategies that will be implemented for construction, operation and rehabilitation activities at the MPO are described in the sections below. Specific erosion and sediment controls will be designed in conjunction with the design of water management systems.

The function and capacity of key erosion and sediment control structures (e.g. environmental and sediment dams) are described in Sections 4.1 and 4.2 of the Site Water Balance. The location of these features is shown on the Conceptual Project Layout Plans in Attachment 1.

5.2.1 Erosion and Sediment Control

The following erosion and sediment control measures will be implemented in all areas of the site where disturbance from construction/development and mining activities occurs:

- relevant internal approvals and permits will be obtained before commencement of surface disturbance in the construction stage and mining phase (e.g. Ground Disturbance Permits [GDPs]);
- the extent of disturbance (including trafficable areas) will be minimised and identified using appropriate pegging, barriers or signage;
- appropriate erosion and sediment controls will be approved and established prior to land disturbance and will remain in place until exposed areas are stabilised;
- runoff from undisturbed catchments will be diverted around the disturbance areas via diversion drains and banks to discharge into natural watercourses, where practical;
- runoff from disturbed areas will be diverted into sediment dams;
- drains, diversion banks and channels will be stabilised and scour protection will be provided as necessary;
- temporary erosion and sediment control measures will be used on-site and may include silt fences, hay bales, stacked timber with geotextile, jute mesh, check dams, cross banks, contour banks, armouring and straw mulching; and
- topsoil will be stockpiled for reuse and all stockpiles will be managed as described in Section 5.2.2.

Drainage considerations will be incorporated into the landform design plan to slow and direct water flow and minimise erosion. Diversion drains will be constructed as per MACH Energy design plans.

5.2.2 Soil Management

Topsoil management strategies are described in the approved Mining Operations Plan and Rehabilitation Management Plan (MOP/RMP) for the MPO and summarised below.

Topsoil Stripping

Topsoil stripping activities will be undertaken in a manner that minimises impacts to air quality, flora and fauna, and water quality due to erosion. Measures to reduce potential impacts of topsoil stripping on air quality, flora and fauna are described in the Air Quality and Greenhouse Gas Management Plan and Biodiversity Management Plan, respectively.

Examples of these measures include:

- Minimising the re-handling of topsoil material.
- Avoiding or postponing stripping activities if excessive dust lift off occurs.

- Spraying material with a low moisture content with water prior to and/or during handling if necessary and practicable to control visible dust.
- Minimising vegetation clearance where practical.

Erosion and sediment controls that would be implemented to minimise potential impacts to downstream water quality are described in Section 5.2.1.

Topsoil will be stripped and salvaged to maximise its value for re-use in rehabilitation and will be guided by soil mapping and the suitable soil stripping depths as described in the MOP/RMP.

Topsoil Management

Where possible, topsoil will be transported directly to rehabilitation areas. Where this is not possible, topsoil stockpiles will be established away from active transport corridors and on level or gently sloping areas, where available, to minimise erosion and potential soil loss. Topsoil and subsoil (including alluvial soil) will be stockpiled separately where practical.

Topsoil stockpiles will be limited to a height of 3 m (except for two trial stockpiles, described in the MOP/RMP, which will be limited to a height of 5 m). Subsoil stockpiles (including alluvial soil stockpiles) will be limited to 5 m in height. Indicative locations of existing and proposed topsoil and subsoil stockpiles are shown in the MOP/RMP. Both short-term and long-term topsoil and subsoil stockpiles will be managed to maintain seed reserves and microbial soil associations as described in the MOP/RMP.

Topsoil stockpiles will be established with sediment control measures such as those listed in Section 5.2.1, including installation of silt fences around stockpiles to control potential loss of stockpiled soil through erosion prior to vegetative stabilisation and construction of stockpiles with a “rough” surface condition to reduce erosion hazard.

5.2.3 Specific ESCPs

Specific erosion and sediment control plans (Specific ESCPs) may be required to be developed to accompany a GDP. A GDP is required for all proposed land disturbance works at the MPO. The GDP application process requires the person/s seeking the disturbance ‘the applicant’, provide a plan which adequately illustrates the location and type of all proposed erosion and sediment controls.

The preparation of specific ESCPs must be developed in accordance with this ESCP and in consultation with the MPO Environmental Superintendent.

5.3 DESIGN CRITERIA

Specific erosion and sediment controls to be implemented at the MPO include, but are not limited to:

- clean water diversion drains and banks;
- silt fences (or equivalent control);
- vegetated buffer strips; and
- sediment dams/basins.

Other *Blue Book* (Landcom, 2004) erosion and sediment control measures may be implemented at the MPO as required.

5.3.1 Clean Water Diversion Drains and Banks

Clean water runoff from undisturbed areas will be preferentially diverted around disturbed areas, where practical. Appropriate protection will be established at the down slope end of diversion drains, including level spreaders and other energy dissipation devices.

Additional planting of grass, small shrubs and riparian species will be implemented as necessary to maintain channel stability.

5.3.2 Silt Fences

Where necessary, silt fences will be constructed immediately down slope of areas to be disturbed to minimise the potential for sediment transport into receiving catchments and waterways. Silt fences will be constructed along site contours where practicable. The catchment areas of silt fences are to be limited by constructing the fences with small returns at 20 m intervals to create smaller contributing sub catchments (refer Figure SD 6 – 8 [Landcom, 2004] [Attachment 2]), unless otherwise approved in the GDP.

The requirement and location for silt fences will be assessed by the applicant of the GDP, in consultation with the MACH Environment Superintendent as part of the GDP process.

Silt fences are considered a temporary control measure and would only be utilised until they are no longer required or a more permanent control measure is installed.

5.3.3 Vegetated Buffer Strips

A vegetated buffer strip is a vegetated area (generally grass covered), provided around the perimeter of an earthworks footprint. The primary purpose of a vegetated buffer strip is to reduce sediment transportation by acting as a ‘sediment trap’.

A vegetated buffer strip shall generally be located adjacent to the earthworks clearance footprint. A visible structure, such as a fence, markers, or road, will generally be constructed around the buffer zone to clearly identify the area and prevent vehicle disturbance.

The vegetation within a vegetated buffer strip shall be maintained such that it remains effective in controlling bed load sediment runoff.

The requirement and utilisation of any proposed vegetative buffer strip will be assessed by the applicant of the GDP, in consultation with the MACH Environment Superintendent as part of the GDP process.

5.3.4 Sediment Dams

Sediment dams would be installed as required in order to capture and treat sediment laden runoff from disturbed areas prior to release off-site. The use of flocculants or other ameliorants to reduce suspended sediment content will be considered on a case-by-case basis.

Sediment dams will be designed with consideration given to soil and overburden characteristics and the planned contributing area of disturbance. The sediment dams will be sized in accordance with current recommended design standards in the following guidelines:

- *Managing Urban Stormwater, Soils and Construction Volume 1* (Landcom, 2004); and
- *Managing Urban Stormwater, Soils and Construction*, *Volume 2E – Mines and Quarries* (DECC, 2008).

The sediment dam volumes will be designed to comply with Table 6.1 of *Managing Urban Stormwater, Soils and Construction, Volume 2E – Mines and Quarries* (DECC, 2008) based on the following design standards and methodology:

- "Type D and F" sediment basins consistent with SD 6 – 4 from Landcom (2004) (Attachment 3).
- Embankment and spillway design standard will vary based on the duration of the disturbance of the sediment dam catchment, however, it is anticipated that most sediment dam catchments will be disturbed for greater than three years (including time for rehabilitation to adequately establish). Therefore, assuming a 'standard' receiving environment, the dam capacity must be designed to capture a 90th percentile 5-day duration rainfall event (39.35 mm for the MPO), with a spillway that is structurally sound for a 1 in 50 AEP rainfall event.
- Total sediment basin volume = settling zone volume + sediment storage volume. The sediment storage volume is the portion of the basin storage volume that progressively fills with sediment until the basin is de-silted. The settling zone is the minimum required free storage capacity that must be restored within 5 days after a runoff event.
- Sediment storage volume = 50% of settling zone volume.

The adopted design standard does not provide 100% containment for runoff from disturbed areas. Hence, it is possible and expected that overflows will occur from sediment dams if rainfall exceeds the design standard. The final design, type, location, function and capacity of all proposed sediment dams will be assessed by the applicant of the GDP, in consultation with the MACH Environment Superintendent, as part of the GDP process.

Sediment dams will be constructed prior to any land disturbance activities occurring, in accordance with the GDP and will be maintained during the duration of catchment disturbance. Sediment dams will be maintained in a drawn down state as far as practicable by transferring water to the mine water dams, with water to be used for dust suppression or other mine related purposes.

Level markers will be installed in sediment dams that are in place for longer durations (i.e. three years or more) to identify the required storage volumes. Dams will be dewatered as required, and in some cases, capacities may be increased to provide additional storage capacity if catchment areas or catchment disturbance changes.

Runoff from rehabilitated areas will be diverted to sediment dams for treatment until the water quality of surface runoff is suitable for release from the site, at which time the sediment dams may be decommissioned or active management (by dewatering and periodic de-silting) ceased. In the latter case, the sediment dams would remain in place in the longer term and become an asset for future land use.

5.4 MANAGEMENT OF EROSION AND SEDIMENT DAMS

MACH Energy will implement the following management measures in relation to environmental and sediment dams:

- Within 5 days following a rainfall event, sediment dams will be dewatered to the mine water system or to well-grassed areas where sufficient grassed buffer exists to prevent the migration of sediments to watercourses.
- Environmental and sediment dams will be maintained in between rainfall events to ensure sufficient capacity is available to manage the required rainfall intensity.
- Environmental and sediment dam batters will be appropriately stabilised to assist with minimising the potential for erosion of dam batters.

- Environmental and sediment dams that have the potential to spill to the environment will be inspected monthly and immediately after rainfall events with more than 20 mm in 24 hours. Dams will be inspected for capacity, structural integrity and effectiveness. Where inspections indicate substantial accumulation of sediment in a sediment dam, clean-out will be undertaken as soon as practicable so as to reinstate the minimum required volumes.

Each inspection will be documented with a summary of the identified maintenance requirements for each inspected dam.

5.5 MANAGEMENT OF FLOOD RISK

As described in Section 4.1, the MPO major landforms are not located within the Hunter River 1% AEP flood extent and are therefore predicted to have a negligible impact on flood depth, extent and velocity in the vicinity of the MPO.

Notwithstanding, the approved MPO MOD 4 rail spur crosses the Hunter River floodplain. A conceptual design for the MOD 4 rail spur was modelled by WRM Water and Environment as part of the MOD 4 EA (WRM Water and Environment, 2017).

In accordance with Condition 44C, Schedule 3 of Development Consent DA 92/97, MACH Energy has designed the final MOD 4 rail infrastructure to meet the following performance criteria during a 1% AEP flood event (WRM Water and Environment, 2020):

a) no more than 0.1 m increase in flood levels on any privately-owned land;

b) no more than 0.01 m increase in flood levels at any privately-owned residence or commercial spaces;

c) no more than 0.01 m increase in flood levels at any public roads servicing privately-owned properties; and

d) no more than 0.1 m per second increase in flood velocities at privately-owned residences or commercial spaces.

An independent review of the proposed final design of the MOD 4 rail infrastructure was undertaken by Royal HaskoningDHV (2020) in accordance with Condition 44D, Schedule 3 of Development Consent DA 92/97. The final design of the MOD 4 rail infrastructure meets the performance criteria specified in Condition 44C, Schedule 3 of Development Consent DA 92/97 (Royal HaskoningDHV, 2020) and was approved by the DPIE on 5 August 2020.

Construction of the approved MOD 4 rail infrastructure will be carried out in accordance with the Construction Environmental Management Plan.

5.6 MANAGEMENT OF EXISTING RAIL LOOP AND INFRASTRUCTURE CORRIDOR

In accordance with Condition 37, Schedule 3 of Development Consent DA 92/97, MACH Energy will remove all infrastructure associated with the development within ML 1645 south of Wybong Road, including infrastructure associated with the existing rail spur and loop (shown as 'Indicative Existing Coal Transport Infrastructure' in Figure 3). This is with the exception of infrastructure which the operator of the Bengalla Mine agrees, in writing, can remain in situ.

MACH Energy will stabilise redundant rail infrastructure areas within the footprint of the Bengalla Mine such that they do not pose an ongoing material source of dust emissions (i.e. seeding to establish a cover crop and/or application of a dust suppressant) prior to management of these areas being transferred to the Bengalla Mine.

Existing MPO rail spur erosion and sediment control water management structures (e.g. sediment fences) within the footprint of the Bengalla Mine will also be left in place, subject to agreement of the Bengalla Mine.

5.7 MONITORING OF EROSION AND SEDIMENT CONTROL STRUCTURES

Erosion and sediment control structures will be inspected at regular intervals (monthly) and also following significant rainfall events (i.e. more than 20 mm in a 24 hour period), using both drone surveys and on the ground visual inspections. These inspections provide for early detection of potential issues and monitor the effectiveness of the controls installed. These inspections will then inform any maintenance works to be carried out. Inspections will be carried out by Environmental Staff, Mining or Processing Staff, or the suitably qualified dam inspector at the site,

MACH Energy will also undertake periodic internal erosion and sediment control audits at the MPO via an independent / third-party specialist with the appropriate qualifications / experience (i.e. Certified Professional in Erosion & Sediment Control (CPESC)).

6 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

6.1 ANNUAL REVIEW

In accordance with Condition 3, Schedule 5 of Development Consent DA 92/97 MACH Energy will review and evaluate the environmental performance of the MPO by the end of March each year (for the preceding calendar year) (or other such timing as agreed by the Secretary of the DPIE).

In relation to water, the Annual Review will:

- include a review of the performance of erosion and sediment controls relating to the MPO over the past year, which includes a comparison of these results to evaluate compliance against the:
  - relevant statutory requirements, limits or performance measures/criteria (refer Section 2);
  - monitoring results of the previous years; and
  - relevant predictions in the EIS and MOD1, MOD2, MOD3 and MOD4 EAs;
- identify any water-related non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the water monitoring data over the life of the MPO;
- identify any discrepancies between the predicted and actual water impacts of the MPO, and analyse the potential cause of any significant discrepancies; and
- describe what water-related measures will be implemented over the next year to improve the environmental performance of the MPO.

The Annual Review will be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/) in accordance with Condition 11, Schedule 5 of Development Consent DA 92/97.

6.2 ESCP REVISION

In accordance with Condition 4, Schedule 5 of Development Consent DA 92/97, this ESCP will be reviewed, and if necessary revised (to the satisfaction of the Secretary of the DPIE), within three months of the submission of:

- an Annual Review (Condition 3, Schedule 5);
- an incident report (Condition 7, Schedule 5);
- an Independent Environmental Audit (Condition 9, Schedule 5); and
- any modification to the conditions of Development Consent DA 92/97[1].

Within 4 weeks of conducting a review of this ESCP, MACH Energy will advise the Secretary of the DPIE of the outcomes of the review, and submit any revised documents for the approval of the Secretary.

In accordance with Condition 4A, Schedule 5 of Development Consent DA 92/97, MACH Energy may submit a revised ESCP for the approval of the Secretary at any time, and may also submit any revision to this ESCP required under Development Consent DA 92/97 on a staged basis.

[1] Note that in the event of an inconsistency between Condition 4(d), Schedule 5 of Development Consent DA 92/97 and any Condition in Schedule 3, the latter prevails.

If agreed with the Secretary of the DPIE, a revision to this ESCP required under Development Consent DA 92/97 may be prepared without undertaking consultation with all parties nominated under the relevant Condition of Development Consent DA 92/97.

This ESCP will be made publicly available on the MACH Energy website (https://machenergyaustralia.com.au/), in accordance with Condition 11, Schedule 5 of Development Consent DA 92/97.

7 REPORTING PROCEDURES

In accordance with Condition 2, Schedule 5 of Development Consent DA 92/97, MACH Energy has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in Section 5 of the WMP.

In accordance with Condition 8, Schedule 5 of Development Consent DA 92/97, MACH Energy will provide regular reporting on the environmental performance of the MPO on the MACH Energy website (https://machenergyaustralia.com.au/).

8 REFERENCES

EMGA Mitchell McLennan (2010) *Mount Pleasant Project Modification, Environmental Assessment.*

Environmental Resources Management (ERM) Mitchell McCotter (1997) *Mount Pleasant Operation Environmental Impact Statement.*

Golder Associates (2016) *Mount Pleasant Mine – Geotechnical Investigation Report.*

International Erosion Control Association Australasia (2008) *Best Practise Erosion and Sediment Control.*

Landcom (2004) *Managing Urban Stormwater Soils and Construction Volume 1 Fourth Edition*. March 2004, NSW Government.

MACH Energy Australia Pty Ltd (2017a) *Mount Pleasant Operation (DA 92/97) – South Pit Haul Road Modification*.

MACH Energy Australia Pty Ltd (2017b) *Mount Pleasant Operation – Mine Optimisation Modification Environmental Assessment.*

MACH Energy (2017c) *Mount Pleasant Operation – Rail Modification Environmental Assessment.*

NSW Department of Environment and Climate Change (DECC) (2008) *Managing Urban Stormwater – Soils and Construction – Volume 2E Mines and Quarries*. June 2008.

Royal HaskoningDHV (2018) *Muswellbrook Floodplain Risk Management Study and Plan.*

Royal HaskoningDHV (2020) *Rail Spur Design Flood Impact Assessment Review*.

WorleyParsons Services Pty Ltd (2014) *Hunter River Flood Study (Muswellbrook to Denman)*. Prepared for the Muswellbrook Shire Council.

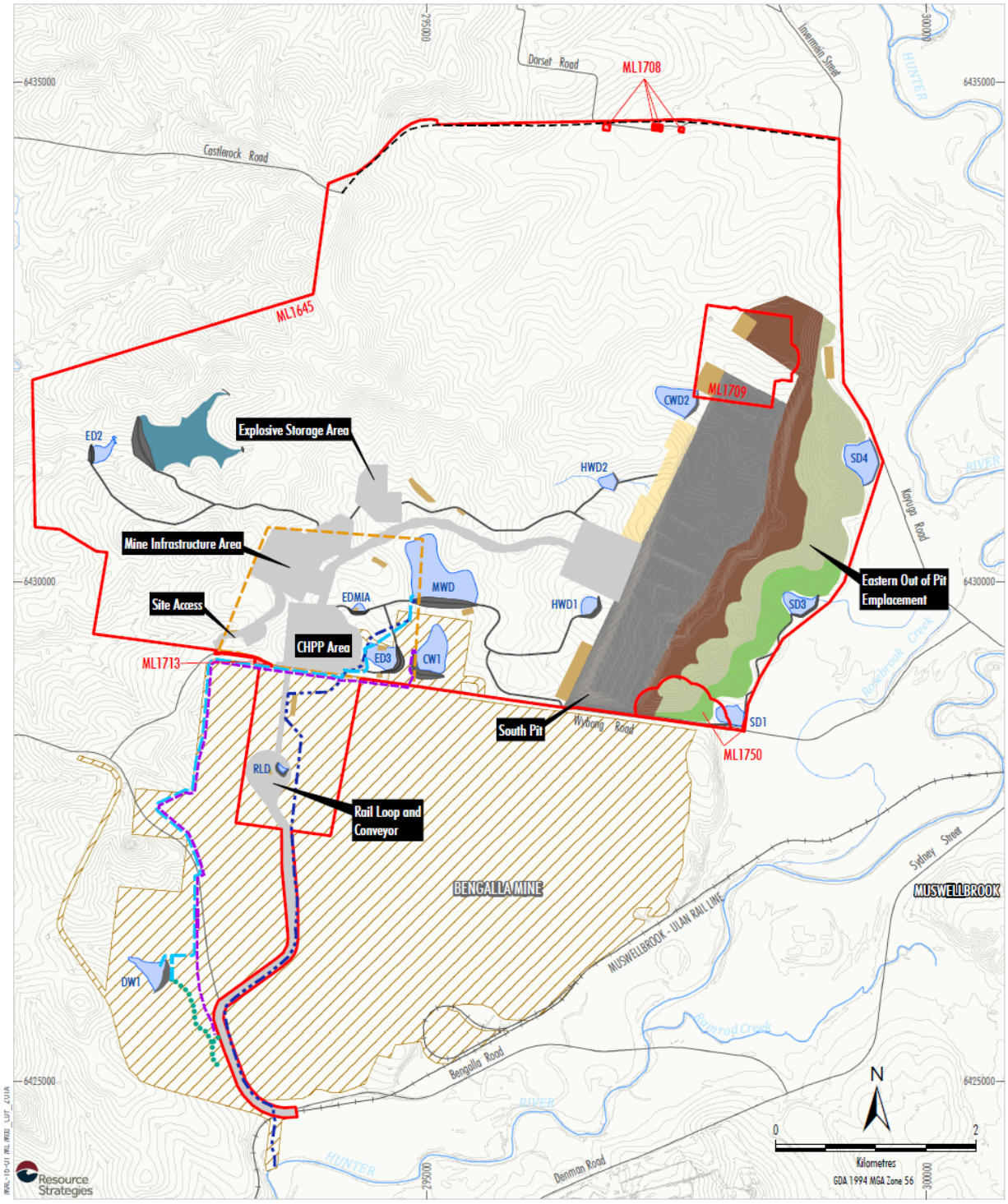
WRM Water and Environment (2017) *Mount Pleasant Operation Rail Modification Flood Assessment.*

WRM Water and Environment (2020) *Mount Pleasant Operation Rail Loop Stage 2 Rail Modification Flood Impact Assessment*.

ATTACHMENT 1

APPENDIX 2 OF DEVELOPMENT CONSENT DA 92/97

APPENDIX 2
FIGURE 1 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2021



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Stripping Area
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation
- Infrastructure and Borrow/Stockpile Area
- Access Road
- Northern Link Road

Indicative Water Pipeline Alignment

- MPO Hunter River Supply Pipeline
- MPO DW1 Pipeline (Bi-directional)
- Bengalla Mine CW1 Pipeline
- Approximate Extent of Scour Protection
- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)

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MOUNT PLEASANT OPERATION

FIGURE 2 - CONCEPTUAL PROJECT LAYOUT PLAN AT 2025

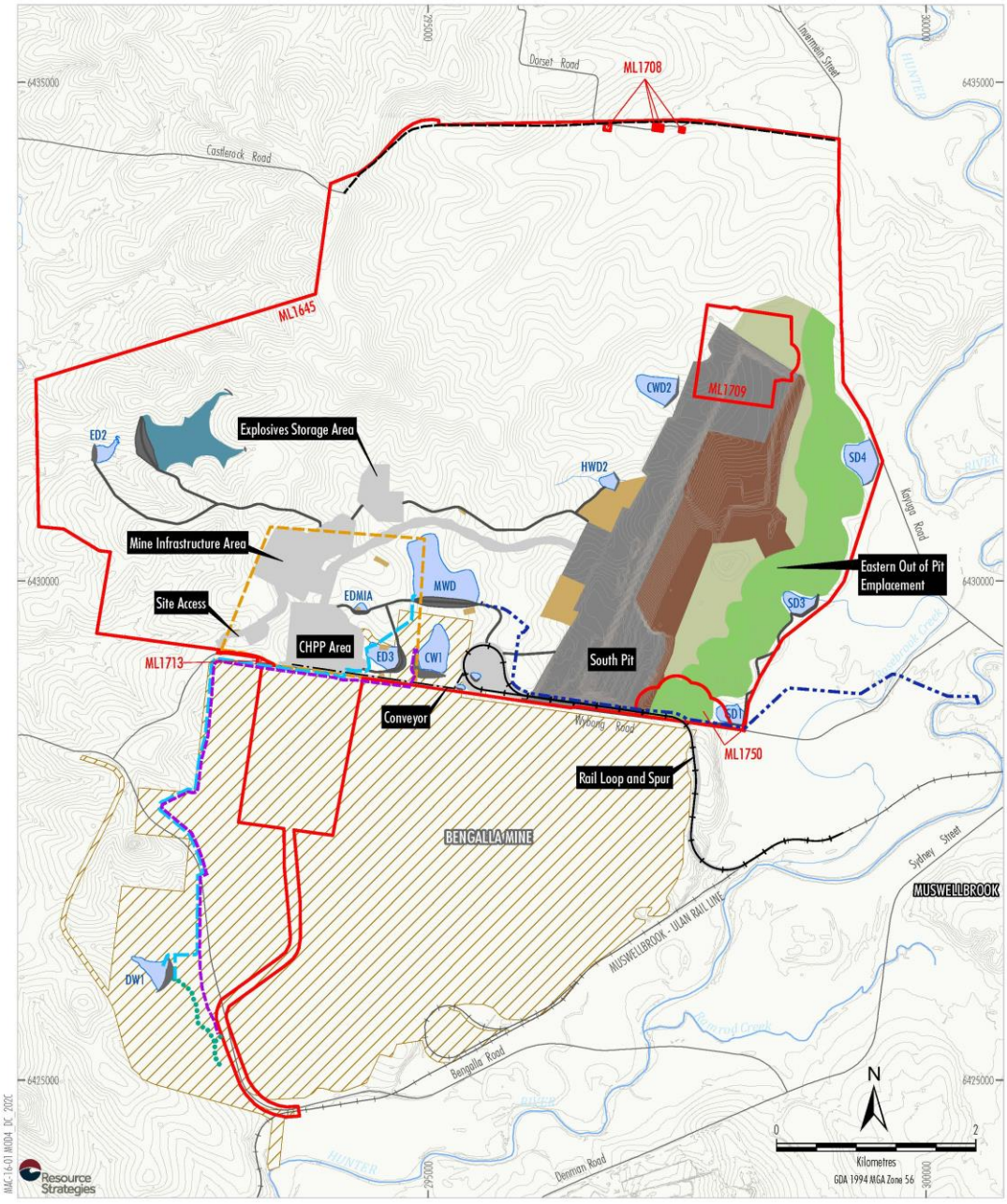
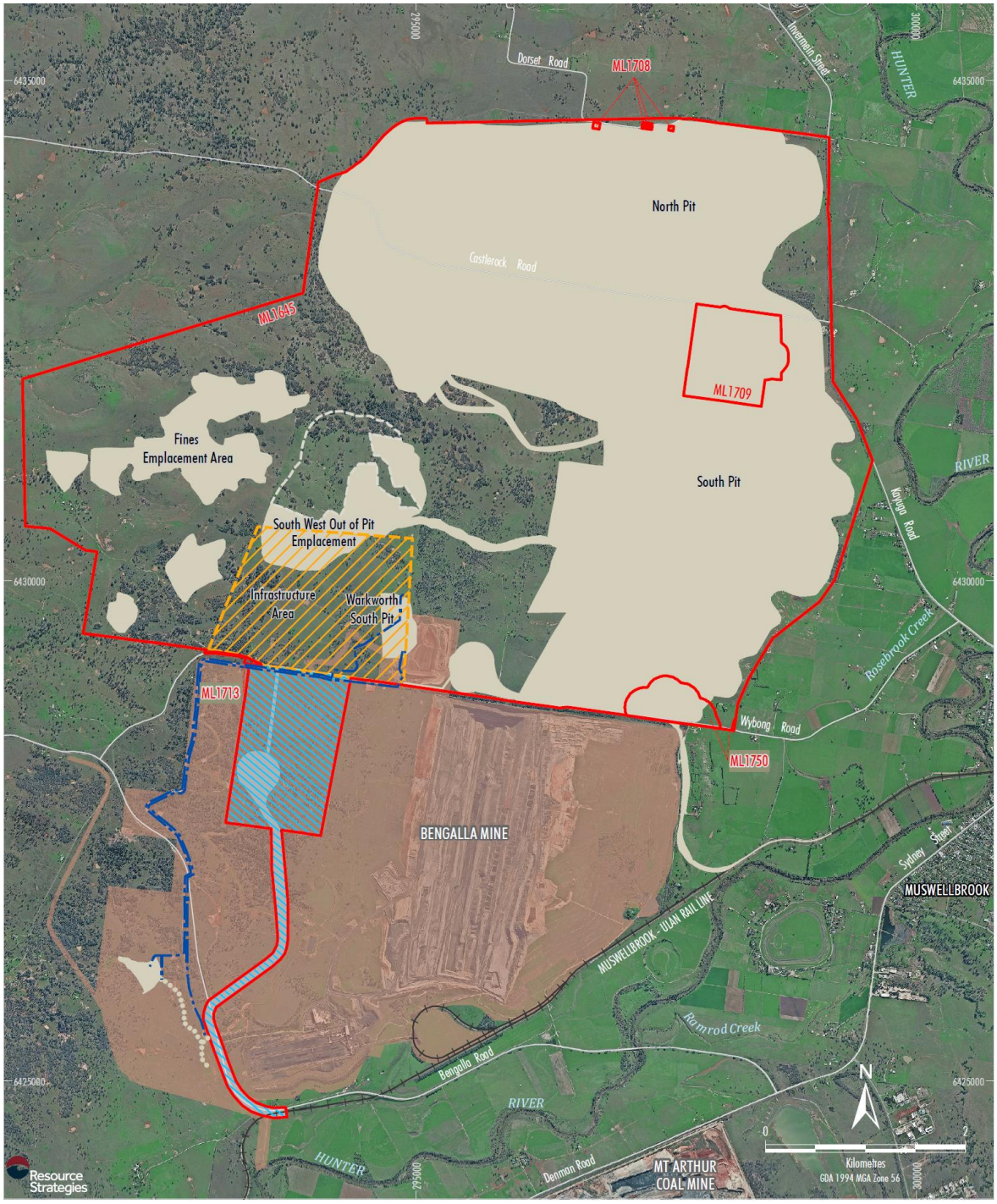


FIGURE 3 - APPROVED SURFACE DISTURBANCE PLAN



LEGEND

- Mining Lease Boundary
- Approximate Extent of Approved Surface Development [1]
- Indicative Water Pipeline Alignment
- Area Relinquished for Overburden Emplacement and Major Infrastructure
- Infrastructure Area Envelope
- Infrastructure to be removed under the Terms of Condition 37, Schedule 3
- Indicative Existing Coal Transport Infrastructure
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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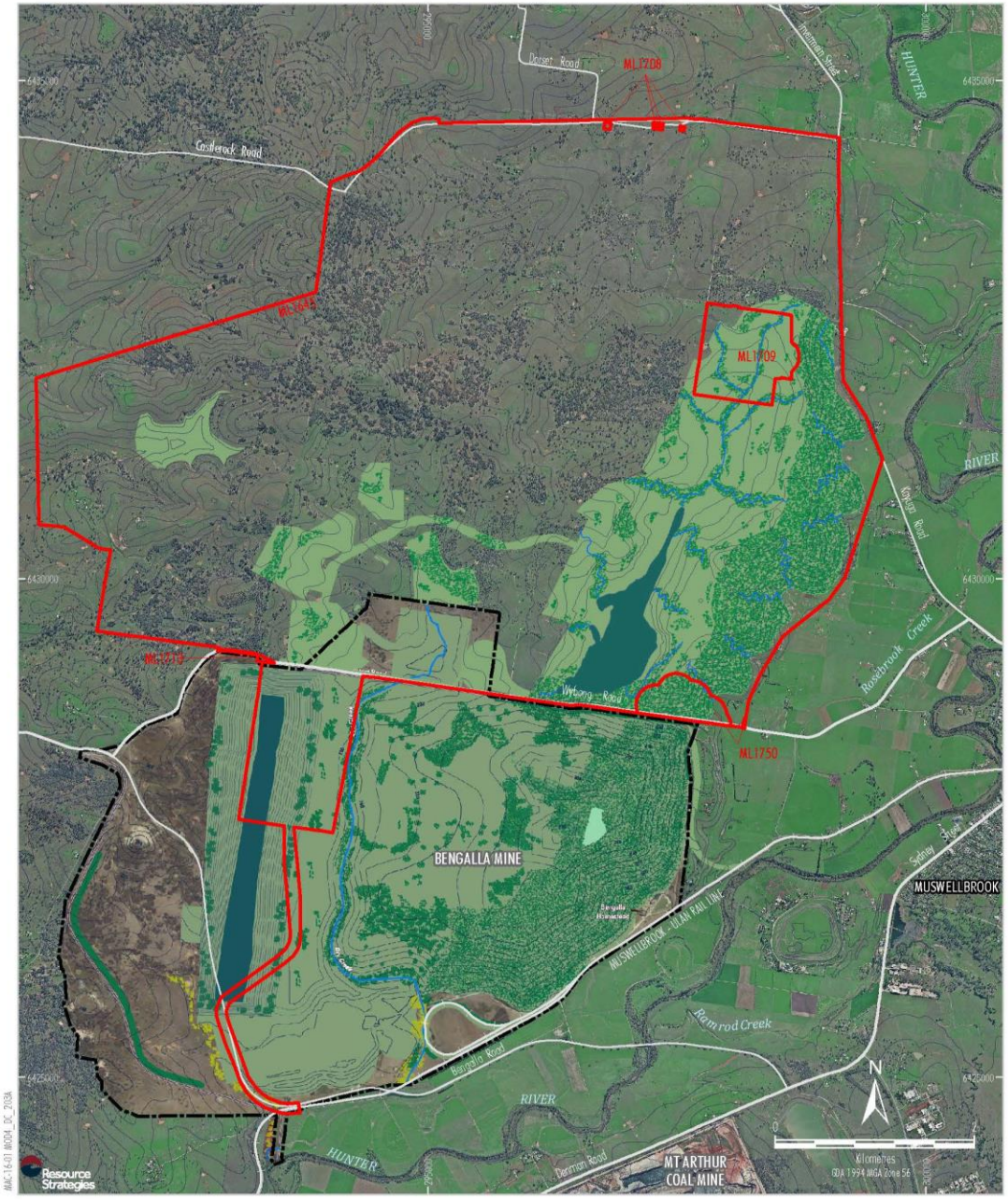
MOUNT PLEASANT OPERATION

Revised Approved Surface Disturbance Plan

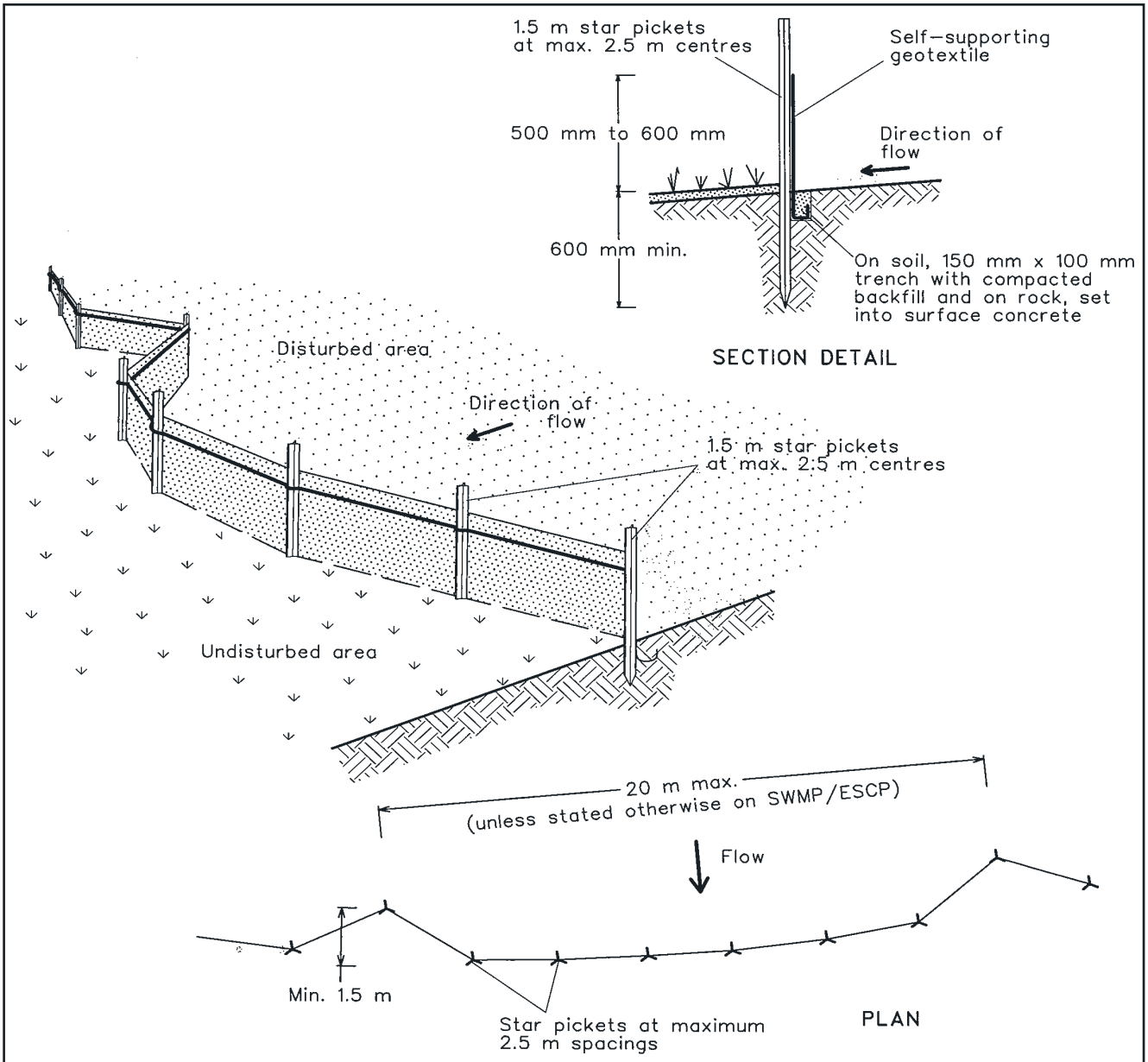
FIGURE 4 - CONCEPTUAL FINAL LANDFORM



ATTACHMENT 2

LANDCOM BLUE BOOK FIGURE SD6 – 8

(LANDCOM, 2004)



Construction Notes

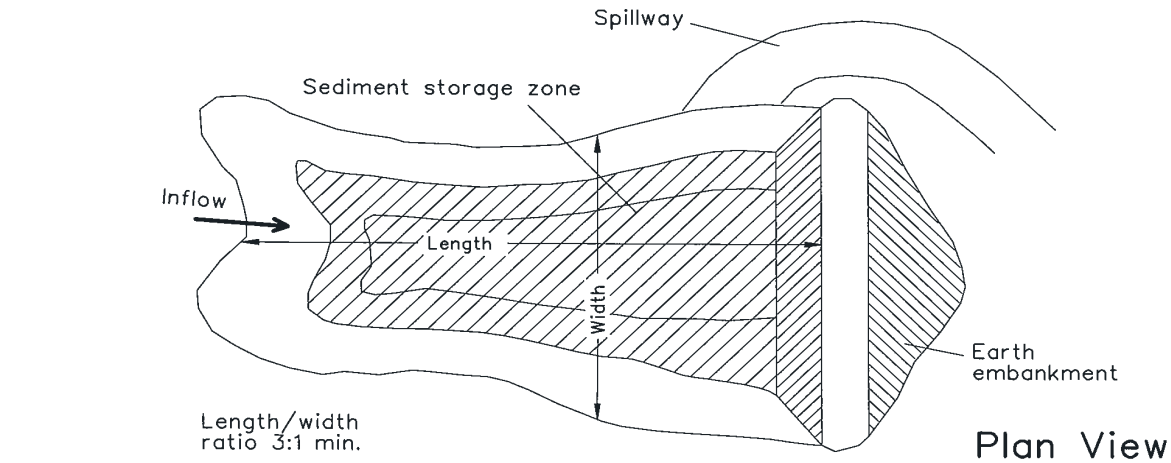
1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second 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.

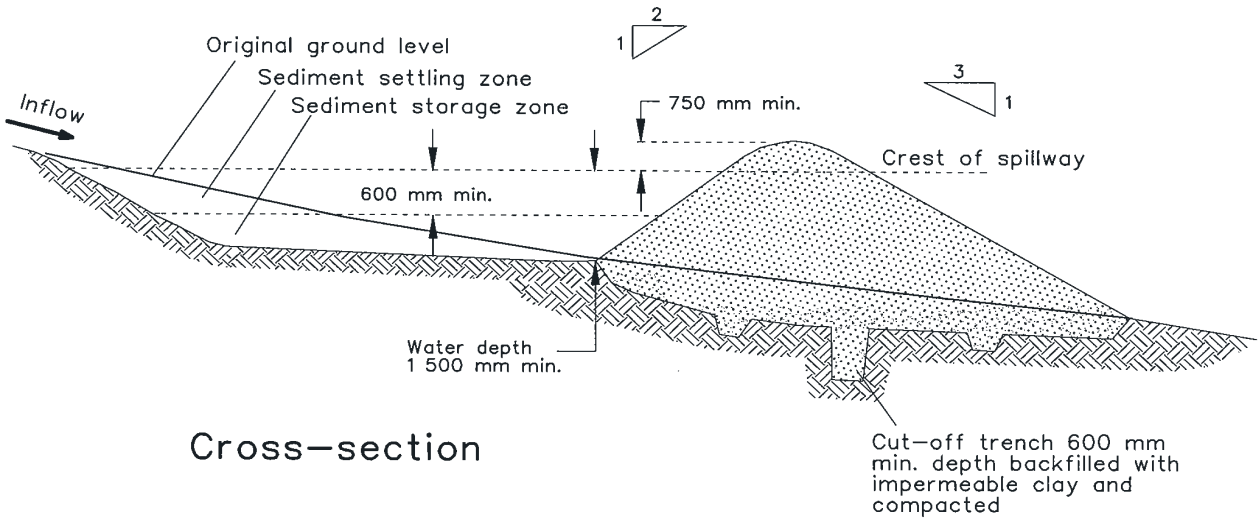
SEDIMENT FENCE — SD 6-8

ATTACHMENT 3

LANDCOM BLUE BOOK FIGURE SD6 – 4

(LANDCOM, 2004)





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

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

SD 6-4