CIC Australia Pty Ltd

Jumping Creek Development - Site Environmental Management Plan

Mine Site Area 3

2 November 2015



When you think with a global mind problems get smaller

This page has been left intentionally blank

Jumping Creek Development - Site Environmental Management Plan

Prepared for
CIC Australia Pty Ltd

Prepared by
Coffey Environments Australia Pty Ltd
16 Mildura Street
Fyshwick ACT 2609 Australia
t: 02 6260 7288 f: 02 6260 7211
ABN: 65 140 765 902

2 November 2015

ENAURHOD04744AA-R01

Quality information

Revision history

Revision	Description	Date	Originator	Reviewer	Approver
V0	Draft	10/8/2015	Michael Carbone	Gary Bagwell	Gary Bagwell
V1	Final	02/11/2015	Michael Carbone	Gary Bagwell	Gary Bagwell

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Final	1	PDF	CIC Australia – Malcolm Leslie	02/11/2015

Table of contents

1. Introduction 1
    1.1. Background 1
    1.2. Objectives 1
    1.3. Scope of work 1
    1.4. Previous environmental assessments 2
2. Site details 3
    2.1. Site area details 3
    2.2. Zoning 3
    2.3. Historical Land Use 3
    2.4. Site condition and surrounding environment 4
        2.4.1. Site Description and Condition 4
3. Mine Site 3 – contamination condition 5
    3.1. Contaminants of potential concern 5
        3.1.1. Mine Site 3 Area 5
    3.2. Remediation carried out in Mine Site 3 area 5
4. Soil cap management 6
    4.1. Capping layout 6
    4.2. Excavation/Intrusive Work 6
    4.3. Vegetation and tree plantings 7
        4.3.1. Planting of shallow rooted vegetation and/or trees within a growing medium above the geotextile membrane 7
        4.3.2. Planting of deep rooted vegetation and/or trees within the fill beneath the geotextile membrane 8
        4.3.3. Landscape Architecture, Furniture and Related Infrastructure 9
    4.4. Mitigation controls and off-site disposal waste classification 10
        4.4.1. Materials tracking 10
    4.5. Managing unexpected finds 10
    4.6. Training and Induction of Personnel 11
    4.7. Groundwater extraction 12
    4.8. Imported Soils Criteria 12
5. Roles and responsibilities 13
    5.1. Change of land ownership 14
6. Environmental Monitoring & Review 15
    6.1. Routine Inspection and Maintenance of Capping 15
        6.1.1. Frequency 15

6.2. Capping Monitoring Details & Maintenance and Repairs 15
6.3. Activity Specific Monitoring 16
6.3.1. Frequency 16
6.3.2. Close Out Reporting 16
6.4. Auditing 16
6.4.1. Routine Activity 16
6.4.2. Activity Specific 16
7. Incidents, Corrective and Preventative Action 16
8. Emergency Response and Preparedness 17
9. Review of SEMP 18
10. Records 18
11. Important information about your Coffey Environmental Report 19
12. References 21

Tables (in text)

Table 5.1 Contacts
Table 5.2 Roles and Responsibilities

Figures

Figure 1 Site location plan
Figure 2 Site domains of investigation and mine site exclusion zones
Figure 3 Mine site 3 exclsuion zone
Figure 4 Schematic of capping layer

Appendices

Appendix A - Figures
Appendix B – Proposed development plans
Appendix C – Monitoring well survey plan

1. Introduction

1.1. Background

CIC Australia Pty Ltd (CIC) intends to develop the site known as Jumping Creek, located near Lonergan Drive, Greenleigh (Queanbeyan) NSW, for residential subdivision development.

Various environmental investigations have been carried out over 1999 to 2007, prior to Coffey Environments Pty Ltd (Coffey) performing environmental assessment and remediation planning of the site in 2009 and 2010. Site assessment informed a contaminated land audit conducted by Environmental Strategies Pty Ltd (Mr Rod Harwood). The site audit was carried out to support partial rezoning of the site.

A Remediation Action Plan (RAP) prepared for the site in 2010 (Coffey, 2010), describes remediation requirements for two former mine site areas, Mine Site 3 and Mine Site 4. Included in the remediation strategy for these areas is implementation of a clean cap over areas containing elevated levels of heavy metals (mainly arsenic, copper, lead and zinc), to enable public open space use within the development. The capped areas are to be managed in accordance with a Site Environmental Management Plan. The site auditor confirmed the requirement for a SEMP.

1.2. Objectives

The objective of the SEMP is to facilitate effective management of the capping structure installed on the Mine Site 3 area to ensure continued protection of site occupants from site contamination associated with natural mineralisation which remain beneath the cap.

The SEMP supports the draft planning proposal for the development and enables the local Council (Queanbeyan City Council) to appreciate the remediation and post remediation management requirements within the Mine Site 3 area.

1.3. Scope of work

This SEMP has been prepared in general accordance with the relevant NSW EPA approved guidelines, particularly the *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW OEH, 2011).

The SEMP has been prepared to address:

- A summary of contamination remaining on the site that requires on-going management;
- Site plans and work as executed drawings showing the extent of the cap and its construction (note as built construction plans are pending at the time of compiling the report);
- An outline of maintenance requirements for the capping structure, including a monitoring/inspection program;
- The application of controls on future excavations in the area of the cap,
- An outline of management requirements for contaminated soils and rock beneath the cap, should these be required to be disturbed, including:
    - Health and safety requirements for construction/maintenance workers and other site personnel, together with environmental management requirements, in the event that maintenance work in the vicinity of the cap is required,
    - Requirements for management of surplus soils, and

    - Contingency plans.
- An outline of responsibilities for implementation of the SEMP and enforcement mechanisms.

It is considered that the SEMPs should be sufficient to allow for 'close out' of the site audit, as required following the implementation of the RAP and associated validation of the remedial works. It is envisaged that these works may be conducted as part of the subdivision works, post development approval.

1.4. Previous environmental assessments

This SEMP is supported by information from previous assessments carried out for the site listed below and summarised in the RAP Coffey 2010.

- IT Environmental Pty Ltd (Australia), 1999. Stage 2 Environmental Investigation, Jumping Creek, Queanbeyan NSW, 2620, (Ref: J109217B dated 24 November 1999);
- EGIS Consulting Australia, 2001. Fairlane (Canberra) Pty Ltd Jumping Creek Site, Queanbeyan, NSW, Summary Auditor Report, (Ref:VA0420) September 2001;
- Parsons Brickerhoff Australia Pty Ltd, 2007. Jumping Creek Supplementary Contamination Assessment, (Ref: 2111525/PR_6551), September 2007;
- NSW Archaeology Pty Ltd, 2009.Draft Proposed Jumping Creek Rezoning Queanbeyan, NSW Aboriginal Archaeological Study, January 2009;
- Coffey Environments Pty Ltd, 2010 (draft) Stage 3 Contamination Assessment, Queanbeyan NSW, (Ref: ENVICANB0233AA-R01a), 12 January 2010.
- Coffey Environments Pty Ltd, 2009, Remediation Action Plan, Sheep Dip Area, Jumping Creek, Queanbeyan NSW, (ref: ENVICANB00233AA-R02a), 15 December 2009; and
- Coffey Environments Pty Ltd, 2010 (draft), Remediation Action Plan, Whole of Site Area, Jumping Creek, Queanbeyan NSW, (ref: ENVICANB00233AA-R03a), 4 June 2010.
- Environmental Strategies, 2010, Site Audit Report, Jumping Creek Queanbeyan NSW (Ref: 9014 SAR 146), 20 August 2010.

2. Site details

2.1. Site area details

This SEMP for Mine Site 3 applies to the site identified below.

Table 2.1 Site details

Item	Details
Site Owner	CIC Australia Pty Ltd
Site Address	Closest road: Lonergan Drive, Greenleigh NSW
Lot and DP No.	Lot 1 of DP711905
Local Government Area	Queanbeyan City Council
Coordinates	E 704742 S 6083175
Site Location Plan	Refer to Figures 1
Site Layout	Refer to Figure 2
Total Site Area	109 Ha, approx.
Mine Site Area 3	9,400 m^2 approx. (exclusion zone)
Site Elevation (mAHD)	590 to 600mAHD
Previous Land Use:	Rural and mining
Current Land Use:	No current authorised land use
Proposed Land Use:	Low density residential and public open space

AHD – Australian Height Datum

A plan of the Jumping Creek Site, showing the indicative Mine Site 3 area within the overall development is shown in Figure 2 (Site Layout Plan).

2.2. Zoning

The site was formerly zoned in the Queanbeyan City Council (2007) LEP zoning plans as 1 (a) Rural "A" Zone. A review of council records at that time (Queanbeyan, 2007) indicates that the site has not been previously zoned for any other land uses.

The QCC LEP 2012 zoning plan, indicates the site encompasses the following current zones: E2 - Environment Conservation, E4 - Environmental Living and RE2 - Private Recreation, DM - Deferred Matter.

2.3. Historical Land Use

Previous land uses have been adequately documented in (IT Environmental 1999) and (PB 2007), and are summarised as follows:

The Site has been previously used for a variety of land uses including:

- Mining of lead, copper, zinc and possibly gold;
- Possible minerals processing activities;

- Limestone quarry and processing kiln; and
- Pastoral activities, including one known remnant sheep dip.

2.4. Site condition and surrounding environment

Site condition and environment information for Mine Site 3 is provided in previous reports, particularly Coffey (2010). The following provide a brief summary of relevant information for the SEMP.

2.4.1. Site Description and Condition

The Site is located to the south east of the suburb of Greenleigh, Queanbeyan and covers an area of approximately 109 Ha. The site lies in an enclosed valley within the Queanbeyan River corridor, with the Queanbeyan River to the west and high country to the east. The Site is highly undulating (described below), and is dissected by Jumping Creek, ridgelines, gullies and associated drainage channels.

The Site is bound by Queanbeyan River to the south west and low density residential allotments to the south west and west and by undeveloped land to the north, east and south.

The Site is predominantly vegetated, with mature trees, shrubs, grasses and including invasive species (weeds, including significant blackberry). There are many unsealed access tracks, as well as evidence that the land has been previously cleared giving the Site a rural outlook. The Site is secured by a fence and gate at the end of Lonergan Drive. However un-authorized users of the Site were observed during previous investigations, suggesting there were other access points. Observed unauthorized uses included motorbike riding, four wheel driving and bushwalking.

For the purposes of previous assessment, the site has been divided into 5 geographical sub-areas defined by the ridges and gullies of Jumping Creek and its tributaries. These have been described as Domains of Interest (DOI1 to DOI5). The DOI's, as well as remnant anthropological features associated with the site as identified by previous assessment, are shown in Figure 2, and are described as follows.

Table 2.2 Domains of interest

Feature	Sub-area	Description
Mine Site 1	DOI 3	Mine shaft?
Mine Site 3	DOI 1	1 mine shaft > 6m depth, surrounded by tailings stockpile
Mine Site 4	DOI 2	2 open pits, adit and mine shaft, and a number of tailings stockpiles
Former Minerals Processing Area	DOI 2	A number of structures including a concrete pad, wooden posts, concrete troughs sumps, and drainage structures
Former Kiln	DOI 3	An old brick faced kiln, along with evidence of shallow clay extraction and limestone quarrying.
Former Sheep Dip	DOI 4	Located on the plateau of a small hill. Contains a concrete sheep dip run, concrete pad, considered to have been the base of the drainage pen; general waste, corrugated iron and old wood footings. This area is dealt with in a separate RAP for this area (Coffey, 2009) and is not discussed further in this document.

3. Mine Site 3 – contamination condition

3.1. Contaminants of potential concern

Based on the review of previous investigations (Coffey 2010), the following contaminants of concern (CoCs) for remediation in soils have been identified:

- Arsenic, copper, zinc, mercury, lead and cadmium;

The above set of CoC's for remediation are based on the contaminants exceeding either the relevant environmental or human health investigation levels in the previous investigations.

Site contamination relating to Mine Site area 3 will only be considered in this SEMP detailed within this report.

3.1.1. Mine Site 3 Area

Arsenic, cadmium and lead were detected at Mine Site 3 in surface and subsurface soils exceeding relevant health criteria, while copper and zinc were also recorded at some of these locations only exceeding the relevant environmental criteria. The contaminants detected in this area are considered to be associated with natural mineral bearing rock present within the Mine Site 3 area, at depth as well as weathered material and skeletal soils at the surface. A conservative estimate of the area considered to be affected by elevated metals concentrations was made by interpolating to the nearest assessment location where levels were below the relevant criteria, as shown in Figure 3. This area is estimated to be 3,500 m^2. The exclusion zone surrounding this area is estimated at approximately 9,400m^2.

Inspection of Mine Site 3 identified one mine shaft along with small volume stockpiles around the opening to the mine shaft, and it is considered that the small volume stockpiles also contain elevated metals concentrations, as they would have been derived from the mineral bearing rock. It is understood that these materials have been retained within the mine shaft under the remediation and capping, discussed in the next section.

3.2. Remediation carried out in Mine Site 3 area

The following general scope tasks have been applied to the remediation of mine site area 3:

1. Removal and offsite disposal of any loose demolition or building wastes;
2. Conduct weed removal, or weed suppression over the 'remediation area 3', as well as implement tree protection to significant native trees or plants;
3. Management of stockpiled or disturbed materials by either:
   - Placement within the mine shaft at Mine Site 3; and/ or
   - Consolidation of remaining stockpiled and disturbed contaminated materials into a mound or depression within 'remediation area 3';
4. Placement of a geofabric marker layer over the consolidated contaminated materials. The purpose of the geofabric marker layer is to provide interim erosion control of these areas prior to completion of capping, as well as a marker of the location of these materials for on-going management;
5. Capping of Remediation Area 3 with suitable barrier, a physical separation/water exclusion barrier, as defined in the ANZECC Guidelines for the Assessment of Onsite Containment of

Contaminated Soil September 1999, shall be built. The barrier should consist of the any or a combination of the following:

- A layer of clean validated soil/ landscaping materials to a minimum thickness of 300mm; or
- Engineered pavement.
- The area which is capped should be recorded by survey, for validation purposes; and

6. Stabilisation of the Site by revegetation with suitable plantings, in accordance with a landscaping plan.

In addition, where stockpiled or disturbed material cannot be accommodated on-site under the cap, then they are to be disposed to a licensed landfill following waste characterisation. Other works may also be required in order to satisfactorily address physical hazards at the Site (for example, completely filling or otherwise restricting access to the mine shaft), however these works are considered to be outside the scope of the RAP.

4. Soil cap management

4.1. Capping layout

Whenever intrusive works and or maintenance works are planned to be performed in this area the SEMP must be consulted to ensure the capping is protected and maintained and also to provide adequate protection to the health of works undertaking these works.

The contaminated area that is capped is approximately 3,500m^2 and presented in Figure 3. Based on the laboratory testing the chemical nature of the underlying soil indicates it is inconsistent with the proposed residential land use. Therefore the remedial method agreed with the site contamination auditor was to remediate this area such that it would be acceptable within the broader development. The agreed approach involved designating this area for open space within the development and creating a barrier (capping layer) to prevent direct or incidental access to the impacted soils.

The contaminated materials within mine area 3 were covered with a layer of geofabric and a layer of 30 mm square barrier mesh (the latter marked with warning tape), both overlain with a 300 mm thickness of clean validated soil or appropriate landscaping materials, to lessen the potential for direct contact with the underlying soil. Shallow root grasses/plants or other similar vegetation were utilised to landscape this area. A schematic of the general capping layout (cross section view) that was achieved is presented in Figure 4.

In some portions of the designated area of mine site 3, access roads or pathways were positioned. In these areas the capping layer (geofabric and minimum capping thickness) was still adhered to. In the roadway areas, road base materials were applied in lieu of the validated soils or landscaping materials to maintain the minimum 300mm capping layer thickness.

4.2. Excavation/Intrusive Work

The following hazard mitigation measures apply for the above area for any intrusive works other than general landscaping maintenance at the surface (ie above geofabric layer):

- Generic site induction;

- Use of generic Standard Operating Procedures (SOPs), Occupational Health and Safety (OH&S) Plan and/or Safe Work Method Statements (SWMS) for the works to be undertaken, where applicable.

For any other subsurface intrusive work within the management area, not covered by generic SOPs, OHSPs and/or SWMS, the following is to be prepared:

- An OHSP and/or SWMS; and
- Activity Specific Site Management Plan (ASSMP).

These documents are to address health and safety requirements and environmental management requirements for undertaking the task and for handling potentially contaminated soil material..

- A copy of the OH&S Plan and/or SWMS and the ASSMP is to be provided to the Land Custodian's Project Officer / Land Manager for review and approval prior to commencing any works within the management area.

Obtain an excavation and intrusive works permit from the Land Custodian's Project Officer / Land Manager prior to undertaking the works.

Any contractor undertaking any intrusive works including but not limited to:

- Landscaping;
- Gardening;
- Maintenance & repairs;
- Utility works; and
- Excavation / construction;

In the designated open space area contractors must be made aware of the presence of the barrier layer and the requirement for it to be preserved, and for a minimum 300 mm thickness of validated soil cover / landscaping materials to be maintained.

In the event that intrusive excavation is to be undertaken into the underlying contaminated soil (ie below the geotextile layer), the top cover soil/landscaping material is to be stockpiled separately from the underlying contaminated soils. All excavated contaminated soil from below the geotextile barrier stockpiled on surface must be placed on 200 micron plastic sheet and then the stockpile cover by plastic sheet to prevent introducing contamination at depth to the surface.

At the completion of excavation works, the excavated soils must be returned for backfill to their point of origin (for example contaminated soil returned at depth below the geotextile layer followed by the geotextile layer and then the validated cover soil / landscaping materials). No excavated contaminated soil is to be moved / placed outside of the designated remediation area.

Where any soil is excavated for removal from the site, soils must be disposed off-site to licensed landfill in accordance with NSW EPA waste disposal regulations and guidelines prevailing at the time.

4.3. Vegetation and tree plantings

4.3.1. Planting of shallow rooted vegetation and/or trees within a growing medium above the geotextile membrane

New shallow rooted vegetation and/or trees can be planted above the geotextile membrane after placement of growing medium. This option is applicable to shallow rooted vegetation and/or trees whose roots are unlikely to extend beyond the growing medium. Vegetation or trees with deeper root systems may disrupt the geotextile membrane impairing its function or and/or result in the root system growing laterally rather than vertically potentially affecting the long term stability of the vegetation/tree.

It may be necessary to seek advice from an experienced landscape architect and a suitably experienced Environmental Consultant.

Under this option the suitable growing medium would be placed above the geotextile membrane; either directly on top of the geotextile membrane or on top of previously placed growing medium. If it is necessary to remove previously placed soils above the geotextile membrane, care should be taken when removing the soils not to penetrate or damage the integrity of the geotextile membrane.

If the work results in damage of the geotextile membrane and/or penetration through the geotextile membrane, advice from a suitably experienced Environmental Consultant regarding requirement for placement of additional geotextile membrane is to be sought.

A sketch diagram showing this option is presented below in Figure 4.1.

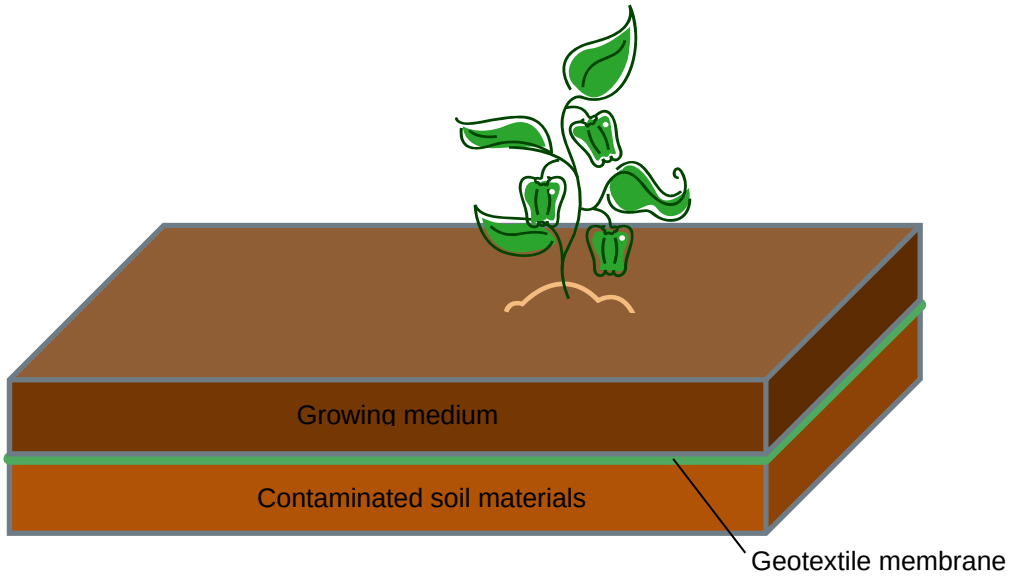


Figure 4.1 Shallow Rooted Vegetation and Tree Plantings above the Geotextile Membrane

4.3.2. Planting of deep rooted vegetation and/or trees within the fill beneath the geotextile membrane

New deep rooted vegetation and/or trees can be planted beneath the geotextile membrane. This option is applicable to deep rooted vegetation and/or trees with deep root systems that could disrupt, disturb or damage the function of the geotextile membrane, if planted above it.

Under this option the existing soils overlying the geotextile membrane in the area of the tree planting must be removed carefully to avoid penetrating or damaging the integrity of the geotextile membrane.

Once exposed the geotextile membrane is to be cut to allow for planting of the vegetation/tree. The cut must be made in a shape of a cross (or similar), so that the cut flap can be placed back on the soil after the tree is planted (see Figure 4.2).

Under this option the deeper tree roots can be planted directly into the fill beneath the geotextile membrane or the fill can be removed and replaced by growing medium. Care should be taken in the

handling and management of any of the underlying fill removed (either temporarily or permanently) as the fill may contain asbestos. Any surplus fill from beneath the geotextile membrane that is disposed offsite, must be done in accordance with Section 4.4 below and NSW EPA requirements to a facility licensed to receive the contaminated soil waste.

Once the vegetation and/or tree has been planted the geotextile membrane must be placed around the tree. Growing medium is to be placed on top of the geotextile membrane to natural ground level.

An activity specific site management plan (ASSMP), as described in Section 8 below, must be prepared to appropriately manage the works, where the geotextile membrane is to be breached and disturbance of material below the cap is to be carried out. The ASSMP is to be reviewed by a suitably experienced Environmental Consultant to ensure that the plan includes provision for appropriate reinstatement of the geotextile membrane and that the proposed work does not result in asbestos contamination in the material above the geotextile membrane.

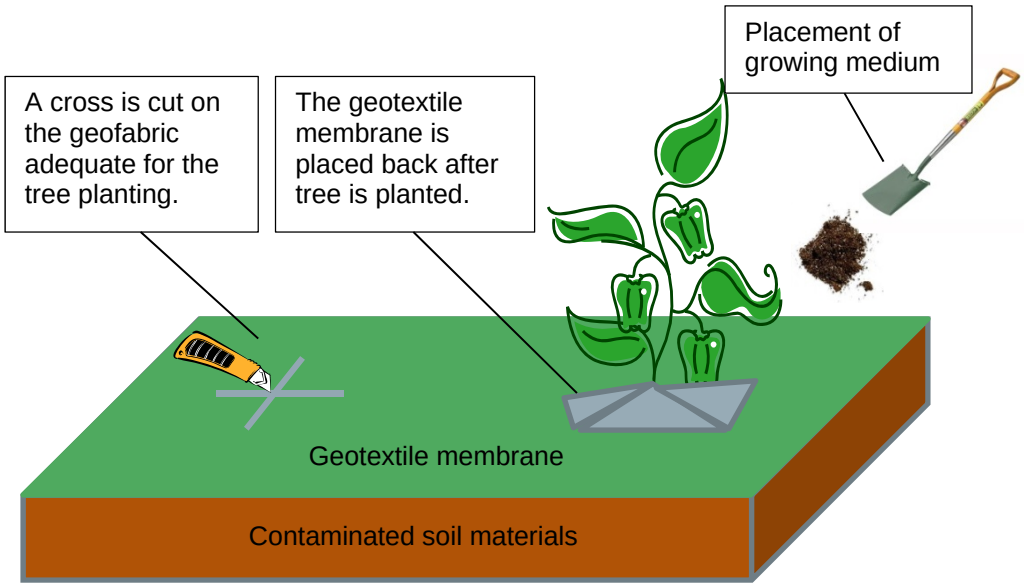


Figure 4.2 Deep Rooted Vegetation and Tree Plantings below the Geotextile Membrane

4.3.3. Landscape Architecture, Furniture and Related Infrastructure

For any other landscape architecture / furniture (bollards, etc.) and related infrastructure, a similar management strategy for tree planting and vegetation presented above (sections 4.3.1 and 4.3.2) can be adopted. Similar to vegetation plantings the control measures for this outdoor infrastructure, furniture is dependent on whether the related infrastructure is to be installed above or below the geotextile layer. It is important that the correct control measures are followed to reduce the risk to workers and future users of the open space.

4.4. Mitigation controls and off-site disposal waste classification

All wastes removed from the Mine Site 3 area (such as previously unidentified contaminated soils) shall be transported in accordance with relevant road and transportation regulatory requirements. Wastes that are required to be classified prior to disposal shall include appropriate waste classification documents.

Where necessary, all site workers shall be equipped with appropriate personal protection equipment (PPE) prior to handling of waste materials including contaminated soils.

4.4.1. Materials tracking

All materials movements onto and offsite should be appropriately tracked to record source and fate of all materials related to specific activities. The material movements should be documented in an appropriate report on the works undertaken and should include for each material type a summary of volumes of material movements onto and off site, details of source locations and/or placement onsite, details of validation or waste classification and the fate of the materials. Copies of all relevant dockets should also be included in the report.

4.5. Managing unexpected finds

If during the site management work, material is encountered which appears to be potentially contaminated and appears to be different from the soils described in the previous assessment reports, the following procedures should apply:

- Excavation works at that part of the site where the suspicious material (soil) was encountered should cease until inspection is carried out by the project environmental consultant;
- Where materials have been disturbed or stockpiled, controls should be put in place to prevent erosion or dusts, which may include covering the materials with polythene sheet;
- Based on visual inspection, the project environmental consultant will provide interim advice on health and safety of remedial works, soil storage and soil disposal to allow remediation to proceed if possible; and
- Based on sampling and analysis of the material, the project environmental consultant will provide advice as to remedial requirements for the material.

Based on the previous contamination assessments, potential ‘unexpected finds’ which could reasonably be possible within the management area may include fill materials or soils that exhibit indicators of potential contamination (including anthropogenic inclusions including building rubble).

Other unexpected finds below are possible but considered unlikely:

- Unusual odour
- Soil staining
- Hydrocarbon
- Drums
- asbestos

Should unexpected finds of contamination or potential contamination be found onsite, the following protocols will be adopted:

1. Stop work in the potentially hazardous area as soon as it is safe to do so and move to a designated meeting point.
2. Assess the potential risk to human health posed by the unexpected find and assess if evacuation or emergency services need to be contacted.
3. Delineate an exclusion/quarantine zone around the affected area using fencing and/or appropriate barriers and signage.
4. Contact the suitably experienced Environmental Consultant (Coffey) for advice and request a site visit to undertake an assessment of the unexpected find. The Environmental Consultant will decide if it is necessary to contact WorkSafe NSW (this could involve consultation with Land Custodian), the NSW EPA Auditor and/or others relevant parties/authorities.
5. The Environmental Consultant will assess the unexpected find and provide advice on:
   - the preliminary assessment of the contamination and need for immediate management controls (if any);
   - what further assessment and/or remediation works may be required and how such works should be undertaken;
   - requirements for a remedial action plan (if necessary) and associated validation works;
   - if necessary or appropriate the Environmental Consultant will advise and/or liaise with NSW EPA Auditor on the unexpected find and appropriate actions.
6. Works are not to recommence in the area affected by the unexpected find until appropriate advice has been obtained from the Environmental Consultant and the find has been managed/remediated.
7. The Environmental Consultant will validate the management/remediation of the find and provide advice on recommencing works in the affected area and liaise with NSW EPA Auditor as appropriate.
8. Removal of any material suspected of containing asbestos must be undertaken by a suitably licenced NSW Asbestos Removalist.

All validation reports assessing the site suitability for its permitted uses following remediation and validation works must be forwarded to NSW EPA Auditor for review and endorsement.

4.6. Training and Induction of Personnel

All personnel conducting intrusive works (see section 6.2) and follow-up / ongoing maintenance works on the site will be inducted during remedial construction/excavation activities on the awareness of the SEMP in particular in regards to the capping layout, identification of potential unexpected finds of contamination. The induction will be undertaken at the time of the general site induction, with additional information provided during the works via toolbox meetings.

Site personnel will have general competencies to identify unexpected finds of contamination in the field and that these competencies will be used in good faith during earthworks. It is not possible or practical, to provide awareness induction to cover all types of potential unexpected finds. It is possible that indications of contamination not specifically covered by the induction may be encountered. In such cases, the precautionary principle of “if in doubt” will apply and the unexpected finds protocol will be implemented.

It is noted that some forms of potential contamination may not be associated with any visual or olfactory indicators in the field. The unexpected finds protocol will not provide protection against such finds.

Following completion of the construction of the capping layer over the mine site 3 area, all future intrusive workers conducting works in this area must be made aware of the SEMP and presence of the capping layer to enable appropriate practices of work to be planned and undertaken in this area.

4.7. Groundwater extraction

Groundwater extraction from beneath the Site is to be precluded other than for the purpose of environmental monitoring. While Coffey's assessment has been limited to the shallow aquifer, the term 'groundwater' here refers to all groundwater's beneath the site, irrespective of depth.

There are three groundwater monitoring wells located in and near vicinity of mine site area 3 (MW1 to MW3) these wells should be protected and retained to allow for future groundwater monitoring (as necessary). The location of the groundwater monitoring wells across the development have been surveyed with the surveying co-ordinates presented in Appendix C. Where groundwater wells are to be destroyed by the development they must be decommissioned by a licensed driller to ensure the pathway to the aquifer is sealed from any potential future contamination from the proposed development.

Should it be required to extract the groundwater for any beneficial use, then further assessment to determine the suitability of the groundwater for the proposed or all beneficial uses would be required to be undertaken by Coffey in accordance with the prevailing regulatory requirements and guidelines and reviewed by the appointed NSW EPA Auditor.

4.8. Imported Soils Criteria

Should soils or fill be required to add to the cap for maintenance purposes, or for adjustments to cap levels, then these materials should meet the following criteria:

Imported soils (if required onsite) shall be either:

1. Virgin Excavated Natural Material (VENM) as defined in the Protection for the Environment Operations Act 1997 where VENM is natural material (such as clay, gravel, sand, soil or rock fines):

    - that has been excavated or quarried from areas that are not contaminated with manufactured chemicals or process residues, as a result of industrial, commercial, mining or agricultural activities; and
    - that does not contain any sulphidic ores or soils or any other waste.

Or

2. Excavated Natural Material (ENM) as defined in Excavated Natural Material Exemption 2014, under the Protection of the Environment Operations (Waste) Regulation 2005. ENM is defined as naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

    - Been excavated from the ground, and
    - Contains at least 98% (by weight) natural material, and
    - Does not meet the definition of VENM

VENM or ENM should not include material that has been processed or contains acid sulphate soils or potential acid sulphate soils.

Classification as VENM material requires certainty that the material is not contaminated. Where this certainty cannot be demonstrated by other means, chemical assessment of the material is to be carried out. As a guide, chemical assessment is to be carried out at a minimum of 1 sample per 100m^3 of VENM material. Procedures for validation of imported VENM material are provided in the RAP Coffey 2010.

5. Roles and responsibilities

The CIC Project Director, Manager and Construction Manager are responsible for this document and its implementation until such time as the land is handed over to the future land custodian (community land strata association). Following handover of the land, the future land custodian shall be delegated the responsibility to ensure the SEMP is taken in practice for the appropriate management of the capping layer to be protective of future users of the site. All CIC employees, future land custodian and its employees, contractors and subcontractors undertaking work on the site are responsible for compliance with this document and for ensuring others do likewise.

The management structure for the implementation of this SEMP is summarised in Table 5.1.

Table 5.1 Contacts

Stakeholder	Contact Details
CIC (current land custodian)	CIC to provide Position Title & contact No.
Queanbeyan city council (compliance monitoring)	Queanbeyan City Council(QCC) to provide Position Title & contact No.
Community strata association (future Land Custodian)	Association to provide Position Title & contact No.
Environmental Consultant	Coffey Michael Carbone (02) 6260 7288

Table 5.2 Roles and Responsibilities

Stakeholder	Responsibilities
Current Land Custodian **CIC**	• Engage an Environmental Consultant to induct QCC Project Officer / Land Manager and Community association project officer to this SEMP prior to site handover. • Engage an Environmental Consultant to prepare generic induction protocol and generic SOPs for general landscape maintenance, tree surgery, tree removal, litter picking, land mowing, etc.
Compliance monitoring **QCC**	• Appoint an appropriately qualified and experienced Land Custodian's Project Officer / Land Manager to manage implementation of the SEMP. • Ensure that Land Custodian's Project Officer / Land Manager is effectively

	managing environmental responsibilities for any works. • Ensure any third parties commissioned to undertaken subsurface work are provided with this SEMP and required to adhere to its requirements
Land Custodian's **Community association** **Project Officer / Land Manager**	• Appoint appropriately qualified and experienced QCC staff/contractors to implement this SEMP. • Induct QCC staff/contractors working within the management area into this SEMP. • Ensure that any QCC staff/contractors undertaking working within the management area are aware of this SEMP and able to implement strategies described within this SEMP. • 12 monthly inspections of barrier mesh to demonstrate compliance with SEMP conditions • Maintain documentation of location of identification of contaminated area (mine site 3) and identification of 'unexpected finds' in site works. • Ensure groundwater is not abstracted for potable or other beneficial use • Annual reporting to the Project director within CIC / (QCC future land custodian) on the results of the 12-monthly inspections and compliance audits, including details also of any intrusive works undertaken triggering reference to the SEMP, and corrective actions arising from audits, inspections or arising in any other manner. • Provide adequate training to QCC staff/contractors, if required. • Update this SEMP, as required.
NSW EPA Auditor	• Endorse this SEMP. • Review amendments of this SEMP, if required.
Environmental Consultant	If required by Land Custodian: • Prepare generic induction protocol and generic SOPs for general landscape maintenance, tree surgery, tree removal, litter picking, land mowing, etc. as required by CIC and/or QCC. • Provide advice through Land Custodian or Land Custodian's Project Officer / Land Manager to persons working within the management area or persons with responsibility to implement this SEMP. • Assist in providing assessment of environmental risk on a case by case basis, if required. • Respond to environmental incidents. • Periodically review effectiveness of this SEMP and, with approval of the Land Custodian's Project Officer / Land Manager, revise the SEMP.
Principal Contractor	• Ensure that all subcontractors working within the management area are aware of this SEMP and able to implement strategies described within this SEMP. • Provide adequate training to subcontractors, if required. • Prepare Activity Specific Site Management Plan, Occupational Health and Safety Plan and Safe Work Method Statements in accordance with this SEMP.

5.1. Change of land ownership

If a change in property ownership or occupancy occurs the new owner/occupier must receive and be

notified of the SEMP and applicable restrictions and maintenance obligations. **A change in site use by either partial or full redevelopment will warrant review of this SEMP, as it applies specifically to the development as presented in the plans attached as Appendix B.**

6. Environmental Monitoring & Review

6.1. Routine Inspection and Maintenance of Capping

In order to manage risks regular routine inspection and maintenance of the site cap must be implemented to check the integrity of roadway, footpath, capping system and soil cover following completion of the construction of the depot.

The results of all regular routine inspections should be stored together in an appropriate but readily accessible location by the Land Custodian's Project Officer / Land Manager. These should be available for audit as required by this SEMP.

6.1.1. Frequency

The regular routine (post construction) inspection and maintenance monitoring should be done through a close visual inspection of the management area and must be undertaken on a bi-annual basis across the whole of the area.

In addition to the annual inspection (every 12 months) if there are any maintenance and/or repairs undertaken within the management area following intrusive activities, additional inspection should be undertaken at:

- Immediately following the completion of the works and reinstatement of ground conditions; and
- Approximately 3 months after the completion of the works and reinstatement of ground conditions.

6.2. Capping Monitoring Details & Maintenance and Repairs

The results of the regular routine inspections should be recorded at the time of the inspection. Observations must be recorded on a site capping inspection checklist and register and records kept.

Observations must include the following items:

- Integrity of the capping/cover in landscaped areas, particularly during gardening activities, dry weather, and poor growing seasons.
- Detection of any damage to the capping and location of the damage, which must be remediated (and documented in a non-conformance and corrective action report) as soon as possible. Site reinstatement must be in accordance with existing quality of cover.

It is recommended that a photographic log is recorded showing ground conditions at the time of the regular routine inspection. The photographic log should be kept with the recorded observations.

6.3. Activity Specific Monitoring

6.3.1. Frequency

Activity specific monitoring should be undertaken by the Land Custodian's Project Officer / Land Manager, who will provide input on the requirement of activity specific monitoring. The requirement of the activity specific monitoring should be specified in the activity specific site management plan.

6.3.2. Close Out Reporting

Reporting requirement for activity specific monitoring is to be provided in the activity specific site management plan.

6.4. Auditing

6.4.1. Routine Activity

The Land Custodian's Project Officer / Land Manager is responsible for undertaking audit of the capping inspections and documentation. The audit should focus on whether capping inspections are satisfactory and if not, whether any corrective action(s) has been undertaken and documented appropriately.

The audit should be undertaken at least every 2 years and documented.

6.4.2. Activity Specific

The Land Custodian's Project Officer / Land Manager is responsible for undertaking audit of any intrusive work within the management area, which requires implementation of this SEMP. This should be undertaken on at least annual basis, and should comprise auditing of excavation and intrusive work permit and register and non-conformance and corrective action report and register.

The audit should focus on:

- Whether documentations are completed appropriately
- Whether the second part of the excavation and intrusive work permit has been completed and to confirm if the work area has been reinstated appropriately
- Whether any non-conformance has been addressed and corrective action has been undertaken and documented appropriately

The audit should be appropriately documented.

7. Incidents, Corrective and Preventative Action

All incidents involving non-compliance with this SEMP, or causing actual or potential material harm to the environment, must be reported to the Land Custodian's Project Officer / Land Manager.

Corrective action shall be implemented to minimise harm to the environment.

All incidents shall be investigated to determine the root cause of the non-conformance, or incident, and to establish appropriate preventative action to minimise the potential for recurrence of the non-conformance or incident.

If an incident is assessed as having caused or threatened to cause material harm to the environment, the incident will be reported to the NSW EPA. A suitably experienced Environmental Consultant must be engaged to assess the incident. The Environmental Consultant must prepare a report of the findings of the assessment, which must be forwarded to NSW EPA for review and endorsement.

8. Emergency Response and Preparedness

The Land Custodian's Project Manager will be responsible for handling emergency responses. The emergency response and preparedness is to be included in the ASSMP.

In the event of any incident, the first priority will be the safety of personnel and the community in the immediate vicinity. Following this, all practical steps should be taken to minimise the risk of further environmental damage as soon as possible after the event. The situation should be stabilised by following the appropriate incident management or contingency plan procedures. The appropriate staff should be notified and emergency procedures enacted.

Typical first response actions with regards to environmental management may include:

- Containment of any pollution using booms, silt fences, absorbents, bunding or interception pits; and/or
- Controlling of any windblown dust using water sprays/water carts; and/or
- Temporary repair or isolation of failed plant/equipment component; and/or
- Sampling of impacted site media.

Follow-up action will include the development of a work plan to remediate the impacted site media, as/if required. The work plan would detail any sampling and analysis requirements to define the nature and extent of impact, methods for the recovery, handling, storage and treatment of impacted material, disposal and/or reuse options for impacted material, and health and safety requirements.

1. In the event of a serious emergency, the following procedure will be followed:
2. Stop work.
3. All personnel shall leave the work zone via established entry/exit routes.
4. Leave the management area and assemble at the emergency assembly area (as designated in the OH&S Plan).
5. Contact relevant service on the details of the emergency:

- Fire brigade (000)
- Ambulance (000)
- Police (000)
- NSW EPA (13 22 81)

6. Await further instructions from the Land Custodian Project Officer / Land Manager.

Records will be kept of any incidents, accidents, hazardous situations, unusual events and unsafe health exposures and the corrective action taken.

9. Review of SEMP

This SEMP is a working document, which must be reviewed and revised by Site Owner's Project Officer / Land Manager (with the assistance of a suitably experienced Environmental Consultant) as required.

The SEMP review should be undertaken at a minimum every 5 years or in accordance with the local regulatory requirements or direction of the NSW EPA Auditor. A review must be undertaken if:

- there has been a significant change in to the site: or
- there is any other evidence of which the person is, or should be, aware that the plan is no longer adequate for managing contamination risk at the site.

This SEMP is based on the open/space and roadway landuse of the management area and is based on the strategy of capping of impacted fill materials as detailed in this SEMP. Should details of the capping or the landuse change, a suitably experienced Environmental Consultant must be engaged to update the SEMP. The updated SEMP must be reviewed and endorsed by an appointed NSW EPA auditor prior to its implementation.

Should an update of the SEMP be required and/or details of the capping change a suitably experienced Environmental Consultant must be engaged to update the SEMP. The updated SEMP must be reviewed and endorsed by appointed NSW EPA auditor prior to its implementation.

10. Records

Records generated through implementation of this SEMP shall be held by the Land Custodian's Project Officer / Land Manager. Records will include (but may not be limited to):

- Excavation and intrusive work permit and register
- Non-conformance and corrective action report and register
- Capping inspection checklist and register
- Training records
- Induction records
- Complaints
- Communications
- Meeting minutes
- Incident & investigation reports
- Vehicle/materials tracking logs
- Third party certificates
- Audit reports
- Environmental Consultant reports

11. Important information about your Coffey Environmental Report

1. Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

2. Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination posed in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

3. Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey. The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

4. Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and

use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

5. Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

6. Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

7. Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

8. Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way. This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

9. Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

12. References

ANZECC (1999) Guidelines for the Assessment of Onsite Containment of Contaminated Soil.

Bureau of Mineral Resources, Geology and Geophysics (1980) 1:50,000 Geology of Canberra, Queanbeyan, and Environs, Canberra, ACT.

Bureau of Mineral Resources, Geology and Geophysics (1980) 1:100,000 Hydrogeology of ACT and Environs, Canberra, ACT.

Coffey, 2010 (draft) Stage 3 Contamination Assessment, Queanbeyan NSW, (Ref: ENVICANB0233AA-R01a), 12 January 2010.

Coffey, 2009 (draft), Remediation Action Plan, Sheep Dip Area, Jumping Creek, Queanbeyan NSW, (ref: ENVICANB00233AA-R02a), 21 October 2009;

Coffey, 2010 (draft), Remediation Action Plan, Whole of Site Area, Jumping Creek, Queanbeyan NSW, (ref: ENVICANB00233AA-R03a), 21 October 2010;

EGIS Consulting Australia, 2001. Fairlane (Canberra) Pty Ltd Jumping Creek Site, Queanbeyan, NSW, Summary Auditor Report, (Ref:VA0420) September 2001;

IT Environmental Pty Ltd (Australia), 1999. Stage 2 Environmental Investigation, Jumping Creek, Queanbeyan NSW, 2620, (Ref: J109217B dated 24 November 1999);

NEPC (1999). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM). NEPC, Canberra.

NSW Agriculture, (1996). Guidelines for the Assessment and Cleanup of Cattle Tick Dip Sites for Residential Purposes, Wollongbar Agricultural Institute, Wollongbar.

NSW Archaeology Pty Ltd, 2009.Draft Proposed Jumping Creek Rezoning Queanbeyan, NSW Aboriginal Archaeological Study, January 2009;

NSW Department of Natural Resources (2005) 1:100,000 Soil Landscape of The Sydney Sheet 9130. Third Edition. NSW Government.

NSW EPA (1995) Sampling Design Guidelines. ISBN 0-7310-3756-1.

NSW EPA (2000) Guidelines for Consultants Reporting on Contaminated Sites. ISBN 0 7310 3892 4

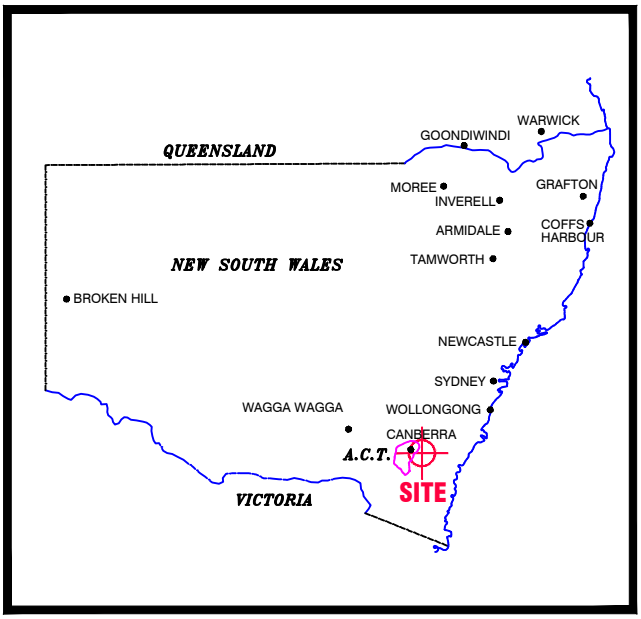
NSW DECC (2008) Waste Classification Guidelines: Part 1 Classifying Waste (Revision July 2009), ISBN 978 1 74232 224 7.

NSW EPA (1998) Guidelines for the NSW Site Auditor Scheme. ISBNo0-7313 0177 3

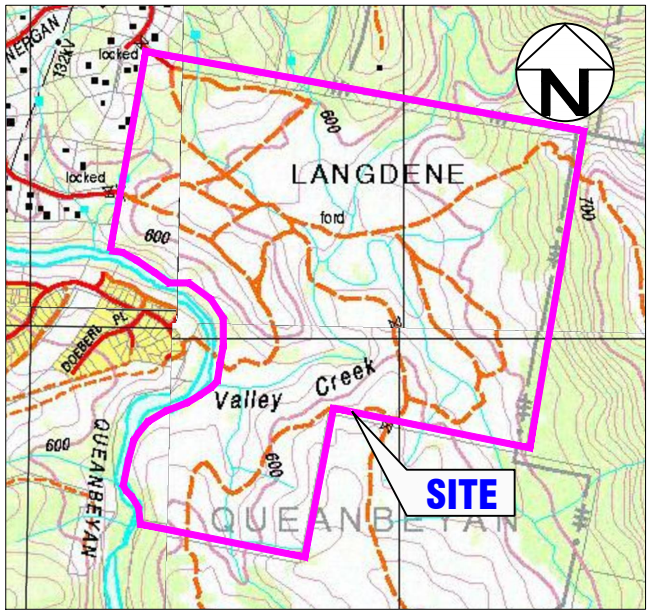
Parsons Brickerhoff Australia Pty Ltd, 2007. Jumping Creek Supplementary Contamination Assessment, (Ref: 2111525/PR_6551), September 2007;

Queanbeyan City Council (2007). Map of Current Land Zonings in the Queanbeyan City Council Area. Accessed online: http://www.qcc.nsw.gov.au/Documents/XYDMJZJFCHC.pdf

Appendix A - Figures

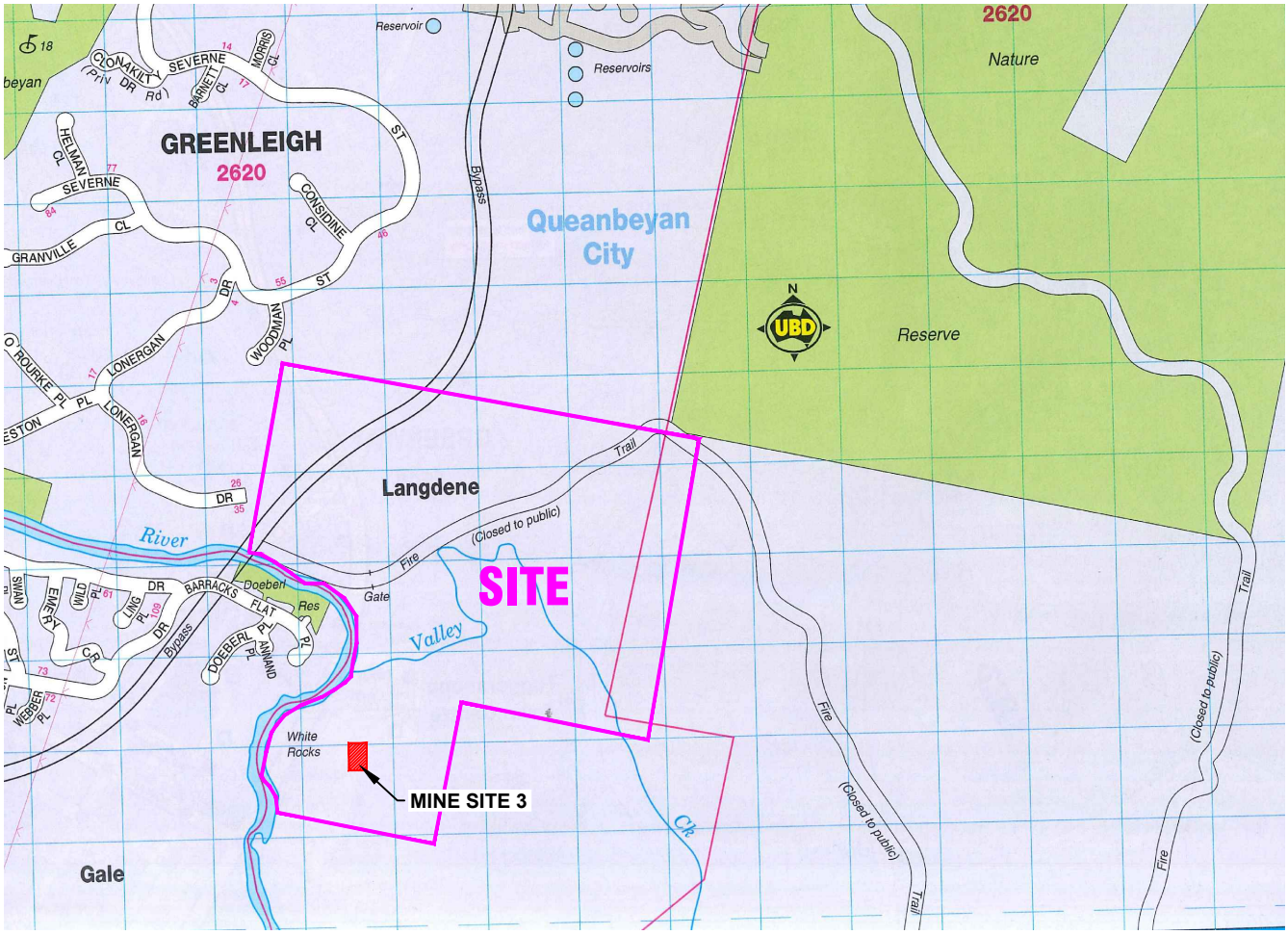


GENERAL AREA MAP



REGIONAL AREA MAP

SOURCE: TOPOVIEW RASTER VIEW 2009 CANBERRA, BUNGENDORE, TUGGERANONG & HOSKINGSTOWN



LOCAL AREA MAP

200 0 200 600 1000

Scale (metres) 1:20 000

SOURCE: UBD STREET DIRECTORY GREGORYS CANBERRA, ACT, 16TH EDITION, 2012, MAP: 82

drawn	MV
approved	MC
date	02/08/15
scale	AS SHOWN
original size	A4

coffey

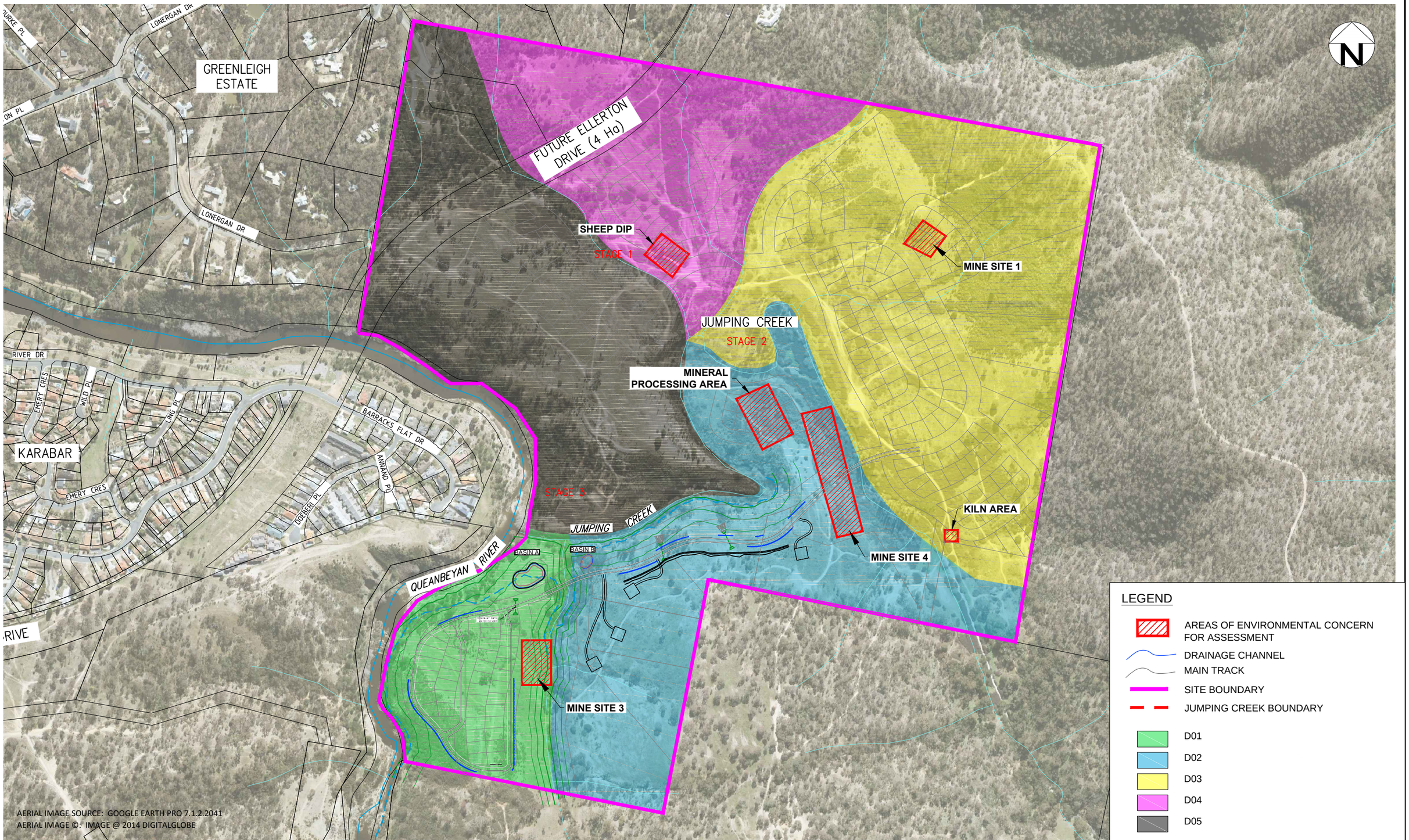
client: CANBERRA INVESTMENT CORPORATION

project: JUMPING CREEK DEVELOPMENT
SITE ENVIRONMENTAL MANAGEMENT PLAN- MINE SITE AREA 3
LONERGAN DRIVE, GREENLEIGH (QUEANBEYAN), NSW

title: SITE LOCATION PLAN

project no: ENAURHOD04774AA-R01 | figure no: FIGURE 1 | rev: A

PLOT DATE: 7/08/2015 11:37:54 AM DWG FILE: F:\ENV\PROJECT\ENAURHOD\ENAURHOD04 GOVIND\ENAURHOD04700-04799\ENAURHOD04744 CIC AUSTRALIA LIMITED\ENAURHOD04744AA JUMPING CREEK - SITE EMP\DRAWINGS\ENAURHOD04744AA-R01-D01.DWG



revision no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

NOTE:
ALL LOCATIONS ARE APPROXIMATE
DIMENSIONS IN METRES.

0 60 120 180 240 300
SCALE 1:6000 (A3) METRES

drawn	MV
approved	MC
date	16/10/15
scale	AS SHOWN
original size	A3

coffey

client: CANBERRA INVESTMENT CORPORATION

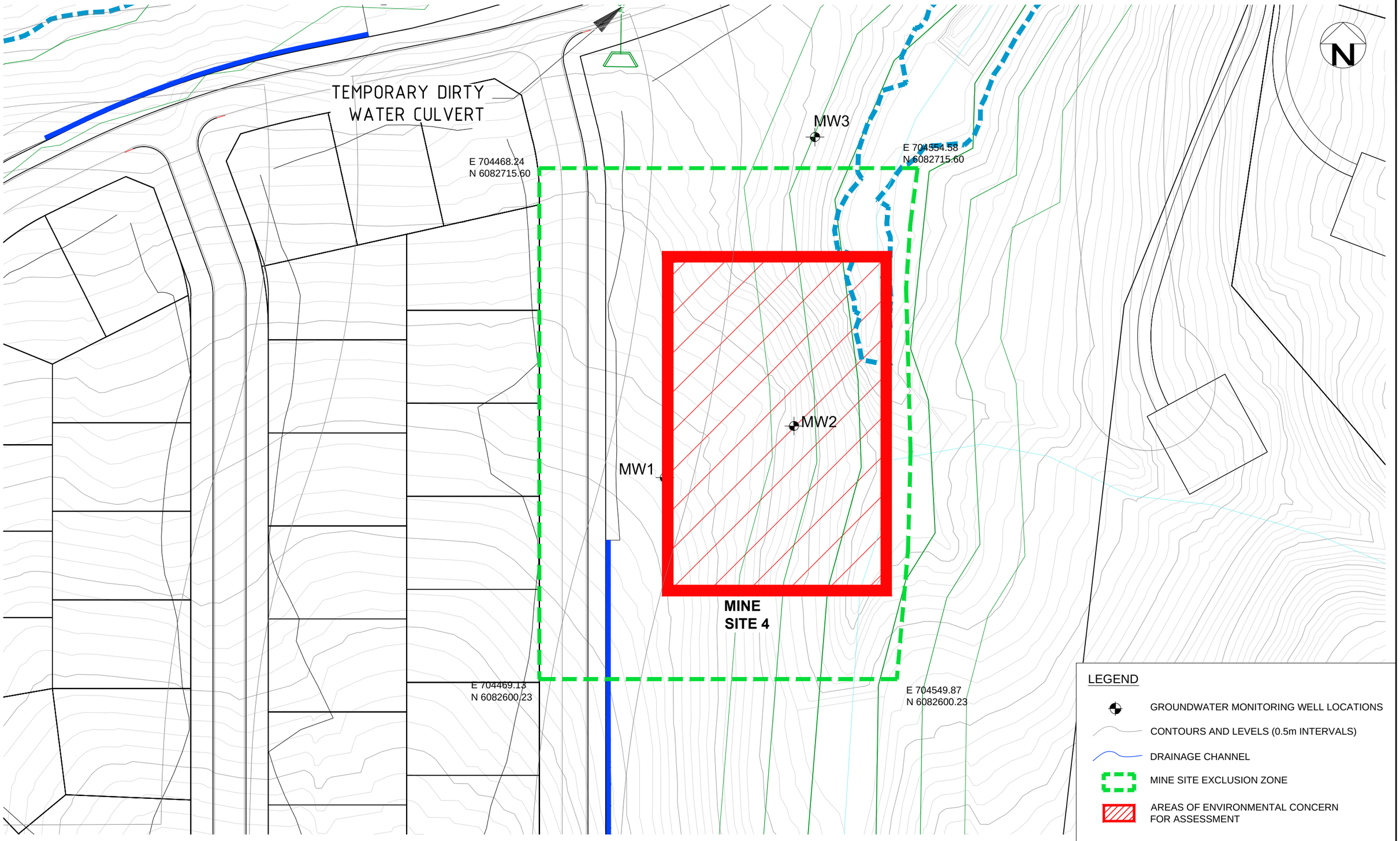
project: JUMPING CREEK DEVELOPMENT
SITE ENVIRONMENTAL MANAGEMENT PLAN- MINE SITE AREA 3
LONERGAN DRIVE, GREENLEIGH (QUEANBEYAN), NSW

title: MINE SITE EXCLUSION ZONES

project no: ENAURHOD04744AA-R01-D03 | figure no: FIGURE 2 | rev: A

PLOT DATE: 27/10/2015 12:53:41 PM
DWG FILE: F:\ENV\PROJECTS\ENAURHOD\ENAURHOD004 GOVIND\ENAURHOD04700-04799\ENAURHOD04744 CIC AUSTRALIA LIMITED\ENAURHOD04744AA JUMPING CREEK - SITE EMP\DRAWINGS\CAD\ENAURHOD04744AA-R01-D03_MS3.DWG

PLOT DATE: 27/10/2015 12:59:57 PM DWG FILE: F:\ENVIPROJECTS\ENAURHOD\ENAURHOD04 GOVINDI\ENAURHOD04700-04799\ENAURHOD04744 CIC AUSTRALIA LIMITED\ENAURHOD04744AA JUMPING CREEK - SITE EMP\DRAWINGS\CAD\ENAURHOD04744AA-R01-D03_MS3.DWG



revision no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

NOTE:
ALL LOCATIONS ARE APPROXIMATE
DIMENSIONS IN METRES.

SCALE 1:800 (A3) METRES (0 8 16 24 32 40)

drawn	MV
approved	MC
date	16/10/15
scale	AS SHOWN
original size	A3

coffey

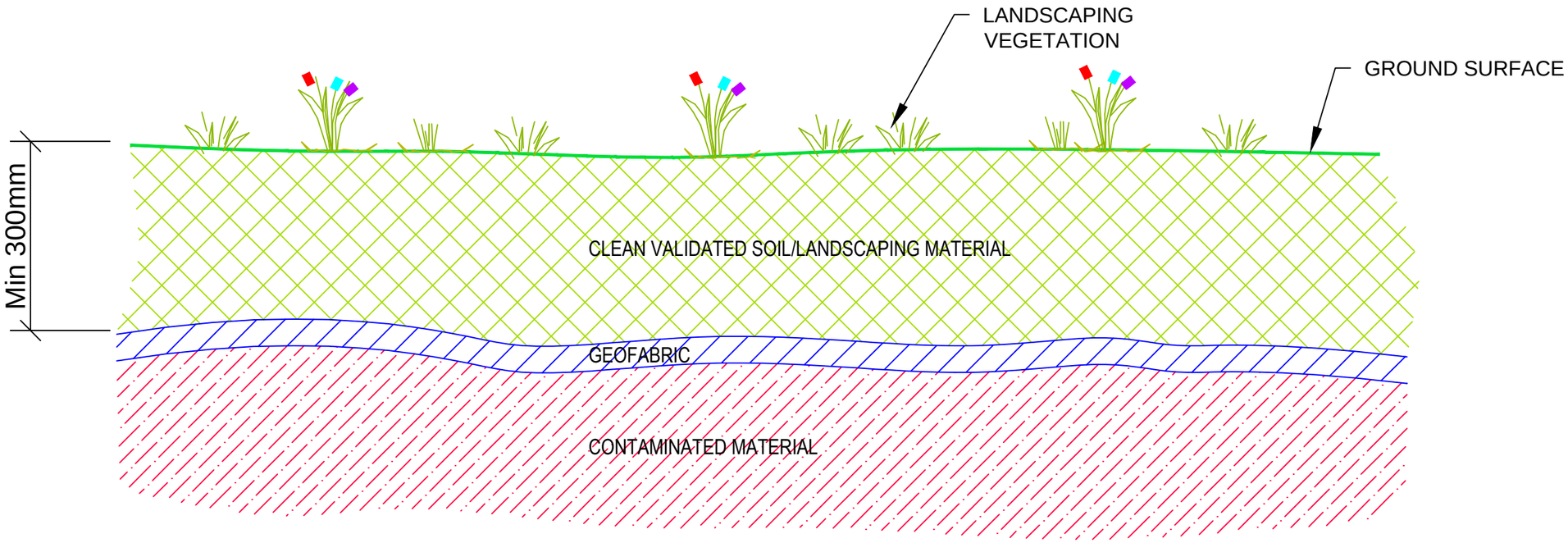
client: CANBERRA INVESTMENT CORPORATION

project: JUMPING CREEK DEVELOPMENT
SITE ENVIRONMENTAL MANAGEMENT PLAN- MINE SITE AREA 3
LONERGAN DRIVE, GREENLEIGH (QUEANBEYAN), NSW

title: MINE SITE EXCLUSION ZONES - MINE SITE 3

project no: ENAURHOD04744AA-R01-D03 | figure no: FIGURE 3 | rev: A

SCHEMATIC CROSS SECTION OF REMEDIATION CAPPING LAYER - MINE SITE AREA 3



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

NOTE:
ALL LOCATIONS ARE APPROXIMATE
DIMENSIONS IN METRES.

drawn	MV
approved	MC
date	02/08/15
scale	NTS
original size	A3

coffey

client: CANBERRA INVESTMENT CORPORATION

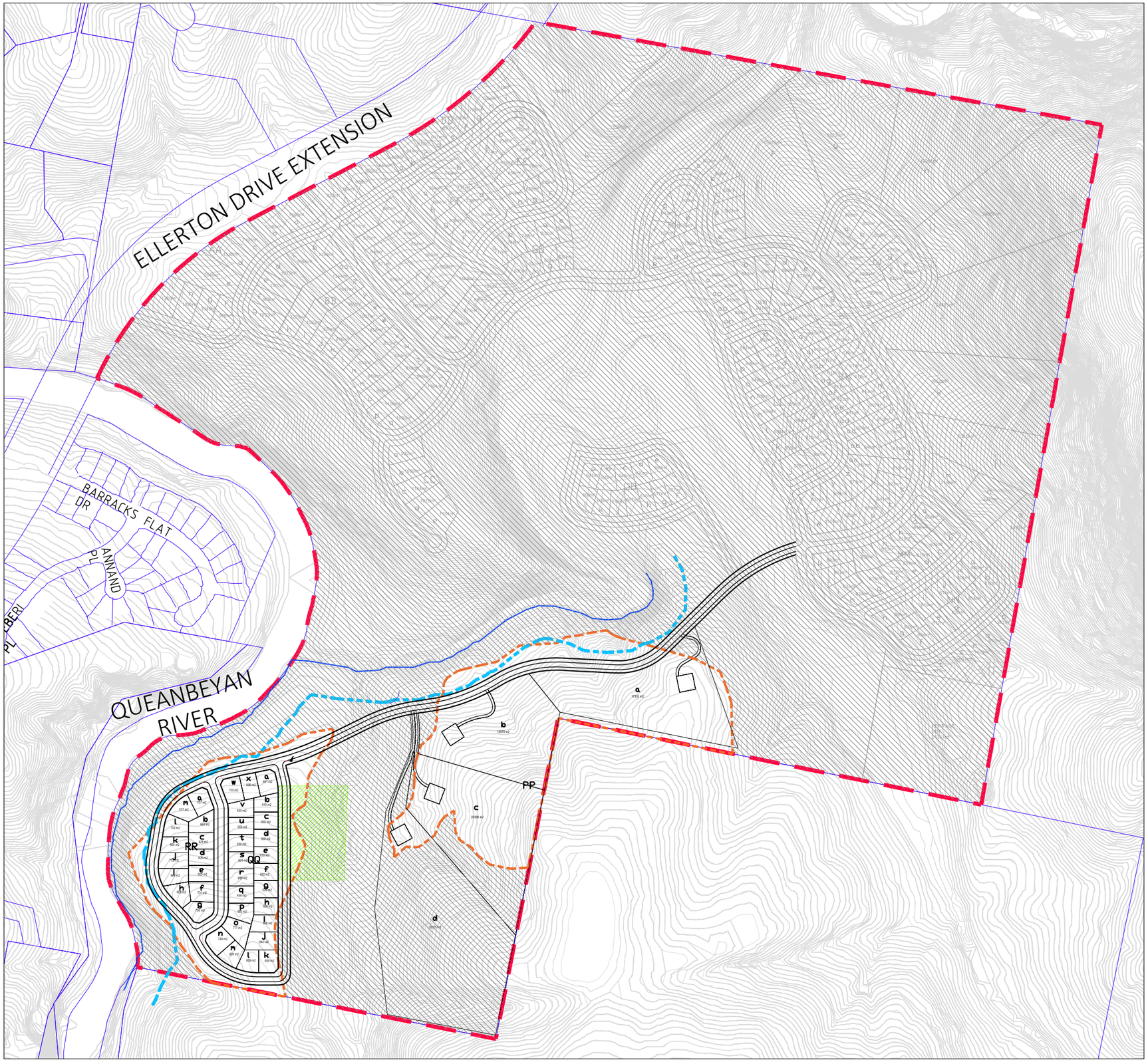
project: JUMPING CREEK DEVELOPMENT
SITE ENVIRONMENTAL MANAGEMENT PLAN- MINE SITE AREA 3
LONERGAN DRIVE, GREENLEIGH (QUEANBEYAN), NSW

title: SCHEMATIC CROSS SECTION OF REMEDIATION CAPPING LAYER - MINE SITE AREA 3

project no: ENAURHOD04774AA-R01 | figure no: FIGURE 4 | rev: A

PLOT DATE: 6/08/2015 11:38:42 AM DWG FILE: F:\ENVIPROJECTS\ENAURHOD\ENAURHOD04 GOVIND\ENAURHOD04700-04799\ENAURHOD04744 CIC AUSTRALIA LIMITED\ENAURHOD04744AA JUMPING CREEK - SITE EMP\DRAWINGS\ENAURHOD04744AA-R01-D01.DWG

Appendix B – Proposed development plans



LEGEND

- JUMPING CREEK BOUNDARY
- BLOCK BOUNDARY
- ### m2 BLOCK AREA
- QQ SECTION IDENTIFIER
- e BLOCK IDENTIFIER
- DRIVEWAY
- LARGE LOT BUILDING ENVELOPE
- 1M CONTOURS
- DEFERRED AREA
- ENVIRONMENTAL EXCLUSION AREA
- TOP OF BANK
- 40M CREEK OFFSET

NOTE
Preliminary engineering works shown on these drawings are for site context only and are indicative. Subject to change based on this assessment.

NOT FOR CONSTRUCTION

ISSUE	REASON FOR ISSUE	DATE	DESIGN	DRAWN	CHECKED	APPROVED FOR ISSUE
A	PRELIMINARY	19/10/2015	JE/MR	MR	GR	CS

DRAWING STATUS
Warning unless there is an authorised SPACELAB signature in the approved for issue column, this drawing is notapproved for issue.

COPYRIGHT
This drawing remains the property of SPACELAB Studio It may be used for the purpose for which it was commissioned & in accordance with the terms of engagement for that commission. Unauthorised use of the drawing is prohibited.

CLIENT
CIC AUSTRALIA

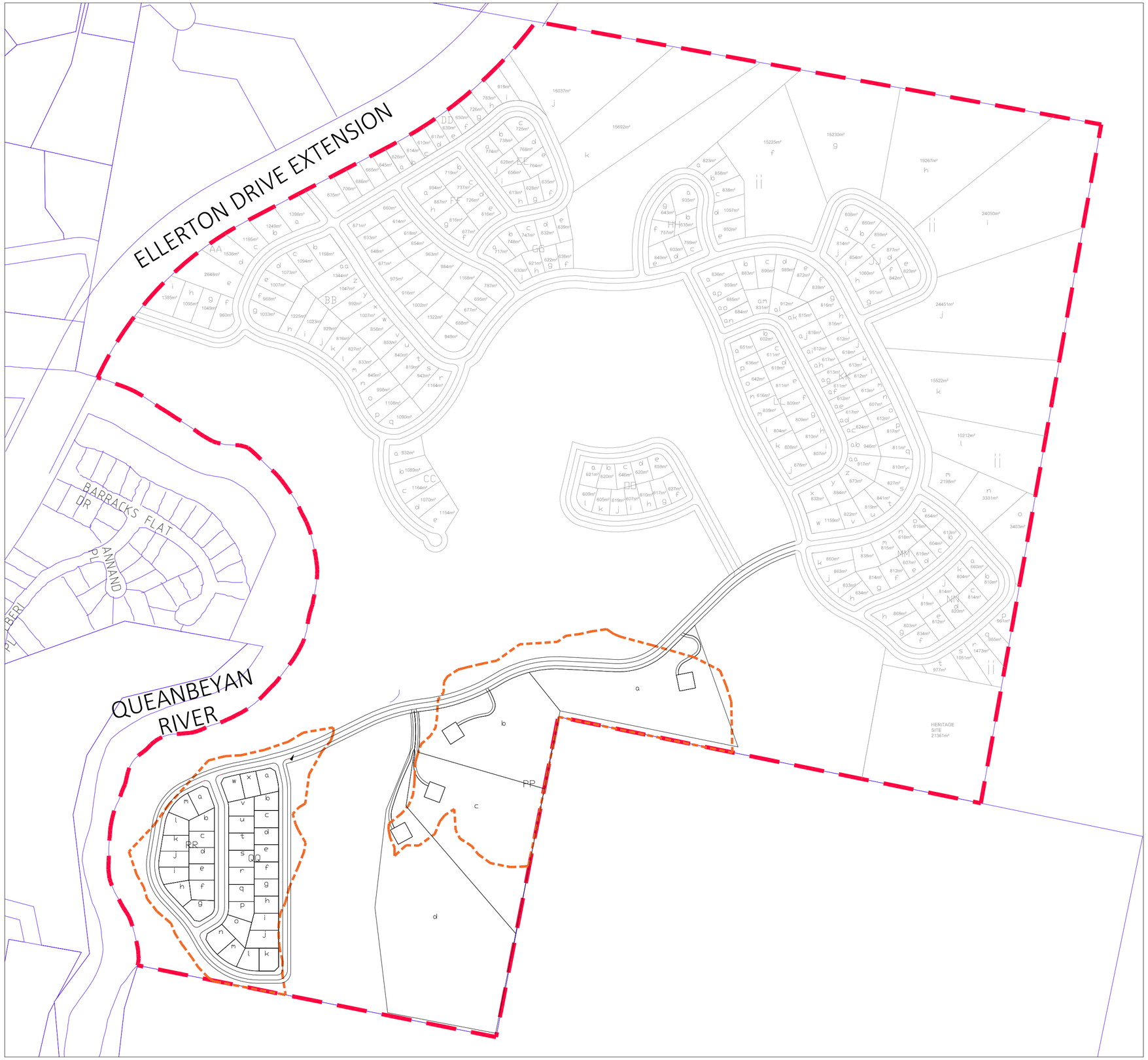
CONSULTANTS
SPACELAB CREATING TIMELESS PLACES
calibre CONSULTING

PROJECT
JUMPING CREEK DEFERRED AREA

DRAWING
CONCEPT LAYOUT

20 10 0 30 50 100m
SCALE @ A1 1:2500
SCALE @ A3 1:5000

PROJECT No	DRAWING No	ISSUE	REVISION
15/1118	P01.1	PRELIMINARY	A



LEGEND

- JUMPING CREEK BOUNDARY
- BLOCK BOUNDARY
- ### m2 BLOCK AREA
- QQ SECTION IDENTIFIER
- e BLOCK IDENTIFIER
- DRIVEWAY
- LARGE LOT BUILDING ENVELOPE
- 1M CONTOURS
- DEFERRED AREA
- ENVIRONMENTAL EXCLUSION AREA
- TOP OF BANK
- 40M CREEK OFFSET

NOTE
Preliminary engineering works shown on these drawings are for site context only and are indicative. Subject to change based on this assessment.

NOT FOR CONSTRUCTION

ISSUE	REASON FOR ISSUE	DATE	DESIGN	DRAWN	CHECKED	APPROVED FOR ISSUE
A	PRELIMINARY	19/10/2015	JE/MR	MR	GR	CS

DRAWING STATUS
Warning unless there is an authorised SPACELAB signature in the approved for issue column, this drawing is notapproved for issue.

COPYRIGHT
This drawing remains the property of SPACELAB Studio It may be used for the purpose for which it was commissioned & in accordance with the terms of engagement for that commission. Unauthorised use of the drawing is prohibited,

CLIENT
CIC AUSTRALIA

CONSULTANTS
SPACELAB CREATING TIMELESS PLACES
calibre CONSULTING

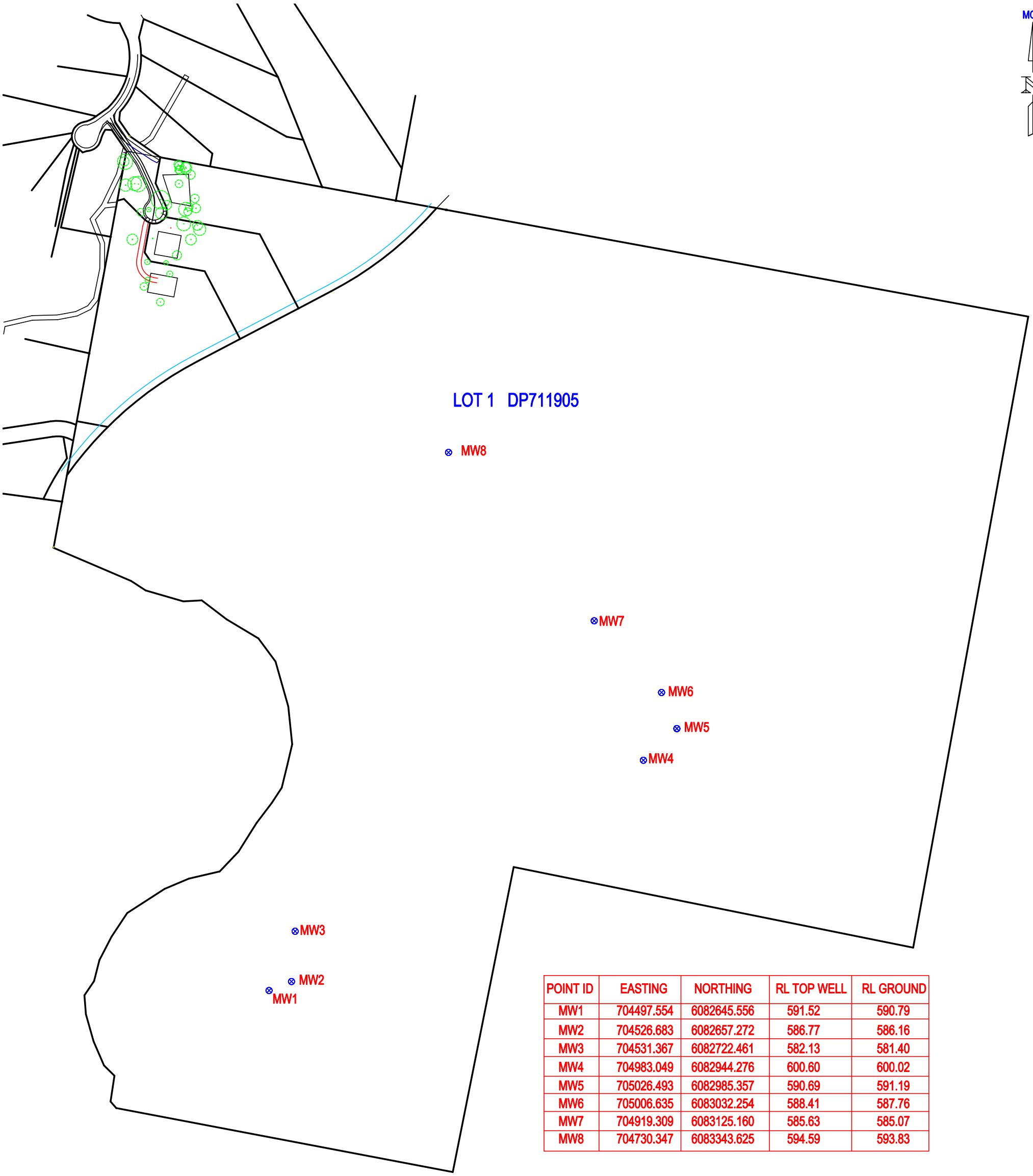
PROJECT
JUMPING CREEK DEFERRED AREA

DRAWING
CONCEPT LAYOUT

20 10 0 30 50 100m
SCALE @ A1 1:2500
SCALE @ A3 1:5000

PROJECT No	DRAWING No	ISSUE	REVISION
15/1118	P01.1	PRELIMINARY	A

Appendix C – Monitoring well survey plan



POINT ID	EASTING	NORTHING	RL TOP WELL	RL GROUND
MW1	704497.554	6082645.556	591.52	590.79
MW2	704526.683	6082657.272	586.77	586.16
MW3	704531.367	6082722.461	582.13	581.40
MW4	704983.049	6082944.276	600.60	600.02
MW5	705026.493	6082985.357	590.69	591.19
MW6	705006.635	6083032.254	588.41	587.76
MW7	704919.309	6083125.160	585.63	585.07
MW8	704730.347	6083343.625	594.59	593.83

IMPORTANT NOTE

This plan is prepared for COFFEY ENVIRONMENTS from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey.

Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services. This note is an integral part of the plan.

Copyright © 4D Surveying
This plan and the information it contains are copyright and remain the property of 4D Surveying Pty Ltd.
4D Surveying Pty Ltd grants to the client named a licence to use the information hereon for the purpose for which we were engaged to perform the work.
Use of the plan and information for any other purpose is not permitted unless prior written approval has been obtained from 4D Surveying Pty Ltd.
This notice must not be erased.

Peter Williams
Registered Surveyor

4D SURVEYING
The Extra Dimension
PO Box 528
Unit 1/30 Ross Road
Queanbeyan NSW 2620
T 02 6297 3518
F 02 6297 9748
ABN 30 035 481 400
www.4Dsurveying.com.au

SCALE 1:5000 A3	AMENDMENTS	CLIENT: COFFEY ENVIRONMENTS	SHEET No. 1
ORIGIN OF LEVELS PM55022 RL654.022		SURVEY OF MONITORING WELLS LOT 1 DP 711905 JUMPING CREEK	No. OF SHEETS:
			DATE: 22.10.2009
DATUM: MGA & AHD71			PLAN No. 17021 Wells.dwg

This page has been left intentionally blank

CIC Australia Pty Ltd

Jumping Creek Development - Site Environmental Management Plan

Mine Site Area 4

2 November 2015



When you think with a global mind problems get smaller

This page has been left intentionally blank

Jumping Creek Development - Site Environmental Management Plan

Prepared for
CIC Australia Pty Ltd

Prepared by
Coffey Environments Australia Pty Ltd
16 Mildura Street
Fyshwick ACT 2609 Australia
t: 02 6260 7288 f: 02 6260 7211
ABN: 65 140 765 902

2 November 2015

ENAURHOD04744AA-R02

Quality information

Revision history

Revision	Description	Date	Originator	Reviewer	Approver
V0	Draft	10/8/2015	Michael Carbone	Gary Bagwell	Gary Bagwell
V1	Final	02/11/2015	Michael Carbone	Gary Bagwell	Gary Bagwell

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Final	1	PDF	CIC – Malcolm Leslie	02/11/2015

Table of contents

1. Introduction 1
    1.1. Background 1
    1.2. Objectives 1
    1.3. Scope of work 1
    1.4. Previous environmental assessments 2
2. Site details 3
    2.1. Site area details 3
    2.2. Zoning 3
    2.3. Historical Land Use 3
    2.4. Site condition and surrounding environment 4
        2.4.1. Site Description and Condition 4
3. Mine Site 3 – contamination condition 5
    3.1. Contaminants of potential concern 5
        3.1.1. Mine Site 4 Area 5
    3.2. Remediation carried out in Mine Site 4 area 5
4. Soil cap management 6
    4.1. Capping layout 6
    4.2. Excavation/Intrusive Work 6
    4.3. Vegetation and tree plantings 7
        4.3.1. Planting of shallow rooted vegetation and/or trees within a growing medium above the geotextile membrane 7
        4.3.2. Planting of deep rooted vegetation and/or trees within the fill beneath the geotextile membrane 8
        4.3.3. Landscape Architecture, Furniture and Related Infrastructure 9
    4.4. Mitigation controls and off-site disposal waste classification 10
        4.4.1. Materials tracking 10
    4.5. Managing unexpected finds 10
    4.6. Training and Induction of Personnel 11
    4.7. Groundwater extraction 12
    4.8. Imported Soils Criteria 12
5. Roles and responsibilities 13
    5.1. Change of land ownership 14
6. Environmental Monitoring & Review 15
    6.1. Routine Inspection and Maintenance of Capping 15
        6.1.1. Frequency 15

6.2. Capping Monitoring Details & Maintenance and Repairs 15
6.3. Activity Specific Monitoring 16
6.3.1. Frequency 16
6.3.2. Close Out Reporting 16
6.4. Auditing 16
6.4.1. Routine Activity 16
6.4.2. Activity Specific 16
7. Incidents, Corrective and Preventative Action 16
8. Emergency Response and Preparedness 17
9. Review of SEMP 18
10. Records 18
11. Important information about your Coffey Environmental Report 19
12. References 21

Tables (in text)

Table 5.1 Contacts
Table 5.2 Roles and Responsibilities

Figures

Figure 1 Site location plan
Figure 2 Site domains of investigation and mine site exclusion zones
Figure 3 Mine site 3 exclsuion zone
Figure 4 Schematic of capping layer

Appendices

Appendix A – Figures
Appendix B – Proposed development plans
Appendix C – Monitoring well survey plan

1. Introduction

1.1. Background

Canberra Investment Corporation Pty Ltd (CIC) intends to develop the site known as Jumping Creek, located near Lonergan Drive, Greenleigh (Queanbeyan) NSW, for residential subdivision development.

Various environmental investigations have been carried out over 1999 to 2007, prior to Coffey Environments Pty Ltd (Coffey) performing environmental assessment and remediation planning of the site in 2009 and 2010. Site assessment informed a contaminated land audit conducted by Environmental Strategies Pty Ltd (Mr Rod Harwood). The site audit was carried out to support partial rezoning of the site.

A Remediation Action Plan (RAP) prepared for the site in 2010 (Coffey, 2010), describes remediation requirements for two former mine site areas, Mine Site 3 and Mine Site 4. Included in the remediation strategy for these areas is implementation of a clean cap over areas containing elevated levels of heavy metals (mainly arsenic, copper, lead and zinc), to enable public open space use within the development. The capped areas are to be managed in accordance with a Site Environmental Management Plan. The site auditor confirmed the requirement for a SEMP.

1.2. Objectives

The objective of the SEMP is to facilitate effective management of the capping structure installed on the Mine Site 4 area to ensure continued protection of site occupants from site contamination associated with natural mineralisation which remain beneath the cap.

The SEMP supports the draft planning proposal for the development and enables the local Council (Queanbeyan City Council) to appreciate the remediation and post remediation management requirements within the Mine Site 4 area.

1.3. Scope of work

This SEMP has been prepared in general accordance with the relevant NSW EPA approved guidelines, particularly the *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW OEH, 2011).

The SEMP has been prepared to address:

- A summary of contamination remaining on the site that requires on-going management;
- Site plans and work as executed drawings showing the extent of the cap and its construction (note as built construction plans are pending at the time of compiling the report);
- An outline of maintenance requirements for the capping structure, including a monitoring/inspection program;
- The application of controls on future excavations in the area of the cap,
- An outline of management requirements for contaminated soils and rock beneath the cap, should these be required to be disturbed, including:

  - Health and safety requirements for construction/maintenance workers and other site personnel, together with environmental management requirements, in the event that maintenance work in the vicinity of the cap is required,
  - Requirements for management of surplus soils, and
  - Contingency plans.
- An outline of responsibilities for implementation of the SEMP and enforcement mechanisms.

It is considered that the SEMPs should be sufficient to allow for 'close out' of the site audit, as required following the implementation of the RAP and associated validation of the remedial works. It is envisaged that these works may be conducted as part of the subdivision works, post development approval.

1.4. Previous environmental assessments

This SEMP is supported by information from previous assessments carried out for the site listed below and summarised in the RAP Coffey 2010.

- IT Environmental Pty Ltd (Australia), 1999. Stage 2 Environmental Investigation, Jumping Creek, Queanbeyan NSW, 2620, (Ref: J109217B dated 24 November 1999);
- EGIS Consulting Australia, 2001. Fairlane (Canberra) Pty Ltd Jumping Creek Site, Queanbeyan, NSW, Summary Auditor Report, (Ref:VA0420) September 2001;
- Parsons Brickerhoff Australia Pty Ltd, 2007. Jumping Creek Supplementary Contamination Assessment, (Ref: 2111525/PR_6551), September 2007;
- NSW Archaeology Pty Ltd, 2009.Draft Proposed Jumping Creek Rezoning Queanbeyan, NSW Aboriginal Archaeological Study, January 2009;
- Coffey Environments Pty Ltd, 2010 (draft) Stage 3 Contamination Assessment, Queanbeyan NSW, (Ref: ENVICANB0233AA-R01a), 12 January 2010.
- Coffey Environments Pty Ltd, 2009, Remediation Action Plan, Sheep Dip Area, Jumping Creek, Queanbeyan NSW, (ref: ENVICANB00233AA-R02a), 15 December 2009; and
- Coffey Environments Pty Ltd, 2010 (draft), Remediation Action Plan, Whole of Site Area, Jumping Creek, Queanbeyan NSW, (ref: ENVICANB00233AA-R03a), 4 June 2010.
- Environmental Strategies, 2010, Site Audit Report, Jumping Creek Queanbeyan NSW (Ref: 9014 SAR 146), 20 August 2010.

2. Site details

2.1. Site area details

This SEMP for Mine Site 3 applies to the site identified below.

Table 2.1 Site details

Item	Details
Site Owner	CIC Australia Pty Ltd
Site Address	Closest road: Lonergan Drive, Greenleigh NSW
Lot and DP No.	Lot 1 of DP711905
Local Government Area	Queanbeyan City Council
Coordinates	E 704742 S 6083175
Site Location Plan	Refer to Figures 1
Site Layout	Refer to Figure 2
Total Site Area	109 Ha, approx.
Mine Site Area 4	19,700 m^2 approx. (exclusion zone)
Site Elevation (mAHD)	590 to 600mAHD
Previous Land Use:	Rural and mining
Current Land Use:	No current authorised land use
Proposed Land Use:	Low density residential and public open space

AHD – Australian Height Datum

A plan of the Jumping Creek Site, showing the indicative Mine Site 4 area within the overall development is shown in Figure 2 (Site Layout Plan).

2.2. Zoning

The site was formerly zoned in the Queanbeyan City Council (2007) LEP zoning plans as 1 (a) Rural "A" Zone. A review of council records at that time (Queanbeyan, 2007) indicates that the site has not been previously zoned for any other land uses.

The QCC LEP 2012 zoning plans, indicates the site encompasses the following current zones: E2 - Environment Conservation, E4 - Environmental Living and RE2 - Private Recreation, DM - Deferred Matter.

2.3. Historical Land Use

Previous land uses have been adequately documented in (IT Environmental 1999) and (PB 2007), and are summarised as follows:

The Site has been previously used for a variety of land uses including:

- Mining of lead, copper, zinc and possibly gold;
- Possible minerals processing activities;
- Limestone quarry and processing kiln; and
- Pastoral activities, including one known remnant sheep dip.

2.4. Site condition and surrounding environment

Site condition and environment information for Mine Site 3 is provided in previous reports, particularly Coffey (2010). The following provide a brief summary of relevant information for the SEMP.

2.4.1. Site Description and Condition

The Site is located to the south east of the suburb of Greenleigh, Queanbeyan and covers an area of approximately 109 Ha. The site lies in an enclosed valley within the Queanbeyan River corridor, with the Queanbeyan River to the west and high country to the east. The Site is highly undulating (described below), and is dissected by Jumping Creek, ridgelines, gullies and associated drainage channels.

The Site is bound by Queanbeyan River to the south west and low density residential allotments to the south west and west and by undeveloped land to the north, east and south.

The Site is predominantly vegetated, with mature trees, shrubs, grasses and including invasive species (weeds, including significant blackberry). There are many unsealed access tracks, as well as evidence that the land has been previously cleared giving the Site a rural outlook. The Site is secured by a fence and gate at the end of Lonergan Drive. However un-authorized users of the Site were observed during previous investigations, suggesting there were other access points. Observed unauthorized uses included motorbike riding, four wheel driving and bushwalking.

For the purposes of previous assessment, the site has been divided into 5 geographical sub-areas defined by the ridges and gullies of Jumping Creek and its tributaries. These have been described as Domains of Interest (DOI1 to DOI5). The DOI's, as well as remnant anthropological features associated with the site as identified by previous assessment, are shown in Figure 2, and are described as follows.

Table 2.2 Domains of interest

Feature	Sub-area	Description
Mine Site 1	DOI 3	Mine shaft?
Mine Site 3	DOI 1	1 mine shaft > 6m depth, surrounded by tailings stockpile
Mine Site 4	DOI 2	2 open pits, adit and mine shaft, and a number of tailings stockpiles
Former Minerals Processing Area	DOI 2	A number of structures including a concrete pad, wooden posts, concrete troughs sumps, and drainage structures
Former Kiln	DOI 3	An old brick faced kiln, along with evidence of shallow clay extraction and limestone quarrying.
Former Sheep Dip	DOI 4	Located on the plateau of a small hill. Contains a concrete sheep dip run, concrete pad, considered to have been the base of the drainage pen; general waste, corrugated iron and old wood footings. This area is dealt with in a separate RAP for this area (Coffey, 2009) and is not discussed further in this document.

3. Mine Site 3 – contamination condition

3.1. Contaminants of potential concern

Based on the review of previous investigations (Coffey 2010), the following contaminants of concern (CoCs) for remediation in soils have been identified:

- Arsenic, cadmium, copper, zinc, mercury and lead;

The above set of CoC's for remediation are based on the contaminants exceeding either the relevant environmental or human health investigation levels in the previous investigations.

Site contamination relating to Mine Site area 4 will only be considered in this SEMP detailed within this report.

3.1.1. Mine Site 4 Area

Cadmium, lead and zinc were detected at Mine Site 4 in surface and subsurface soils exceeding the HIL-A criteria. Arsenic and copper were also recorded at some locations only exceeding the EIL criteria. Similar to Mine Site 3, the contaminants in this area are considered to be associated with natural mineral bearing rock present within the Mine Site 4 area, as well as weathered material and skeletal soils at the surface. An estimate of the area considered to be affected by elevated metals concentrations is in Figure 3, and is estimated to be 7,120m^2 with the entire exclusion zone of approximately 19,700 m^2.

Inspection of Mine Site 4 area identified 1 mine shaft, 1 mine adit, clay quarry area, 2 open cut mine areas and 4 stockpiles of clayey material. Specific sampling of the stockpiles of clayey material in this area identified significantly elevated levels of arsenic, copper, lead and zinc, and it is likely that all stockpiles of materials in this area contain elevated concentrations as they would have been derived from mineral bearing rock. It is understood that these materials have been retained within the mine shaft under the remediation and capping, discussed in the next section.

3.2. Remediation carried out in Mine Site 4 area

The following general scope tasks have been applied to the remediation of mine site area 4:

1. Removal and offsite disposal of any loose demolition or building wastes;
2. Conduct weed removal, or weed suppression over the 'remediation area 4', as well as implement tree protection to significant native trees or plants;
3. Management of stockpiled or disturbed materials by either:
   - Placement within the mine shaft at Mine Site 4; and/ or
   - Consolidation of remaining stockpiled and disturbed contaminated materials into a mound or depression within 'remediation area 4';
4. Placement of a geofabric marker layer over the consolidated contaminated materials. The purpose of the geofabric marker layer is to provide interim erosion control of these areas prior to completion of capping, as well as a marker of the location of these materials for on-going management;
5. Capping of Remediation Area 4 with suitable barrier, a physical separation/water exclusion barrier, as defined in the ANZECC Guidelines for the Assessment of Onsite Containment of

Contaminated Soil September 1999, shall be built. The barrier should consist of the any or a combination of the following:

- A layer of clean validated soil/ landscaping materials to a minimum thickness of 300mm; or
- Engineered pavement.
- The area which is capped should be recorded by survey, for validation purposes; and

6. Stabilisation of the Site by revegetation with suitable plantings, in accordance with a landscaping plan.

In addition, where stockpiled or disturbed material cannot be accommodated on-site under the cap, then they are to be disposed to a licensed landfill following waste characterisation. Other works may also be required in order to satisfactorily address physical hazards at the Site (for example, completely filling or otherwise restricting access to the mine shaft), however these works are considered to be outside the scope of the RAP.

4. Soil cap management

4.1. Capping layout

Whenever intrusive works and or maintenance works are planned to be performed in this area the SEMP must be consulted to ensure the capping is protected and maintained and also to provide adequate protection to the health of works undertaking these works.

The contaminated area that is capped is approximately 7,120m^2 and presented in Figure 3. Based on the laboratory testing the chemical nature of the underlying soil indicates it is inconsistent with the proposed residential land use. Therefore the remedial method agreed with the site contamination auditor was to remediate this area such that it would be acceptable within the broader development. The agreed approach involved designating this area for open space within the development and creating a barrier (capping layer) to prevent direct or incidental access to the impacted soils.

The contaminated materials within mine area 4 were covered with a layer of geofabric and a layer of 30 mm square barrier mesh (the latter marked with warning tape), both overlain with a 300 mm thickness of clean validated soil or appropriate landscaping materials, to lessen the potential for direct contact with the underlying soil. Shallow root grasses/plants or other similar vegetation were utilised to landscape this area. A schematic of the general capping layout (cross section view) that was achieved is presented in Figure 4.

In some portions of the designated area of mine site 3, access roads or pathways were positioned. In these areas the capping layer (geofabric and minimum capping thickness) was still adhered to. In the roadway areas, roadbase materials were applied in lieu of the validated soils or landscaping materials to maintain the minimum 300mm capping layer thickness.

4.2. Excavation/Intrusive Work

The following hazard mitigation measures apply for the above area for any intrusive works other than general landscaping maintenance at the surface (ie above geofabric layer):

- Generic site induction;

- Use of generic Standard Operating Procedures (SOPs), Occupational Health and Safety (OH&S) Plan and/or Safe Work Method Statements (SWMS) for the works to be undertaken, where applicable.

For any other subsurface intrusive work within the management area, not covered by generic SOPs, OHSPs and/or SWMS, the following is to be prepared:

- An OHSP and/or SWMS; and
- Activity Specific Site Management Plan (ASSMP).

These documents are to address health and safety requirements and environmental management requirements for undertaking the task and for handling potentially contaminated soil material..

- A copy of the OH&S Plan and/or SWMS and the ASSMP is to be provided to the Land Custodian's Project Officer / Land Manager for review and approval prior to commencing any works within the management area.

Obtain an excavation and intrusive works permit from the Land Custodian's Project Officer / Land Manager prior to undertaking the works.

Any contractor undertaking any intrusive works including but not limited to:

- Landscaping;
- Gardening;
- Maintenance & repairs;
- Utility works; and
- Excavation / construction;

In the designated open space area contractors must be made aware of the presence of the barrier layer and the requirement for it to be preserved, and for a minimum 300 mm thickness of validated soil cover / landscaping materials to be maintained.

In the event that intrusive excavation is to be undertaken into the underlying contaminated soil (ie below the geotextile layer), the top cover soil/landscaping material is to be stockpiled separately from the underlying contaminated soils. All excavated contaminated soil from below the geotextile barrier stockpiled on surface must be placed on 200 micron plastic sheet and then the stockpile cover by plastic sheet to prevent introducing contamination at depth to the surface.

At the completion of excavation works, the excavated soils must be returned for backfill to their point of origin (for example contaminated soil returned at depth below the geotextile layer followed by the geotextile layer and then the validated cover soil / landscaping materials). No excavated contaminated soil is to be moved / placed outside of the designated remediation area.

Where any soil is excavated for removal from the site, soils must be disposed off-site to licensed landfill in accordance with NSW EPA waste disposal regulations and guidelines prevailing at the time.

4.3. Vegetation and tree plantings

4.3.1. Planting of shallow rooted vegetation and/or trees within a growing medium above the geotextile membrane

New shallow rooted vegetation and/or trees can be planted above the geotextile membrane after placement of growing medium. This option is applicable to shallow rooted vegetation and/or trees whose roots are unlikely to extend beyond the growing medium. Vegetation or trees with deeper root systems may disrupt the geotextile membrane impairing its function or and/or result in the root system growing laterally rather than vertically potentially affecting the long term stability of the vegetation/tree.

It may be necessary to seek advice from an experienced landscape architect and a suitably experienced Environmental Consultant.

Under this option the suitable growing medium would be placed above the geotextile membrane; either directly on top of the geotextile membrane or on top of previously placed growing medium. If it is necessary to remove previously placed soils above the geotextile membrane, care should be taken when removing the soils not to penetrate or damage the integrity of the geotextile membrane.

If the work results in damage of the geotextile membrane and/or penetration through the geotextile membrane, advice from a suitably experienced Environmental Consultant regarding requirement for placement of additional geotextile membrane is to be sought.

A sketch diagram showing this option is presented below in Figure 4.1.

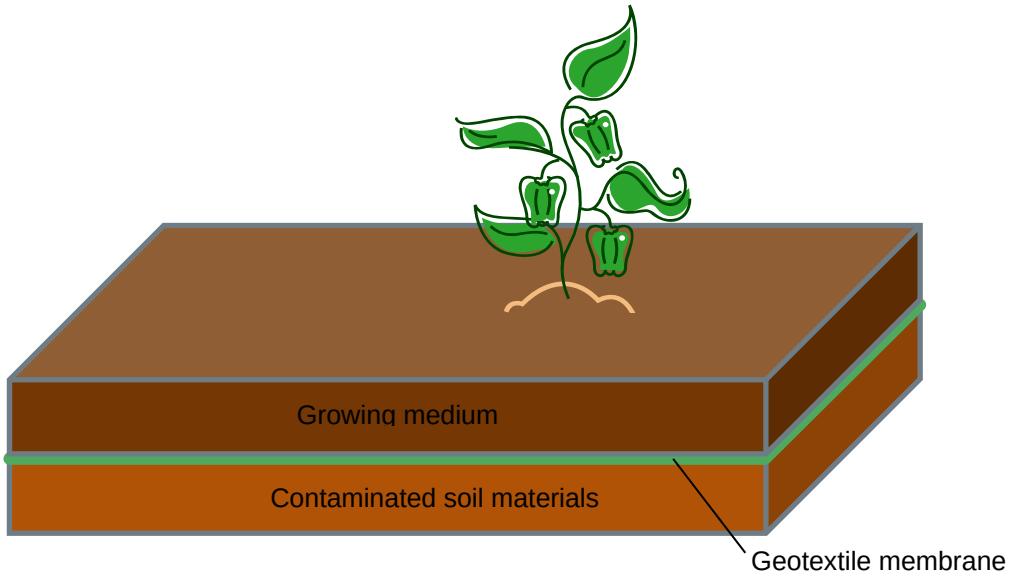


Figure 4.1 Shallow Rooted Vegetation And Tree Plantings Above The Geotextile Membrane

4.3.2. Planting of deep rooted vegetation and/or trees within the fill beneath the geotextile membrane

New deep rooted vegetation and/or trees can be planted beneath the geotextile membrane. This option is applicable to deep rooted vegetation and/or trees with deep root systems that could disrupt, disturb or damage the function of the geotextile membrane, if planted above it.

Under this option the existing soils overlying the geotextile membrane in the area of the tree planting must be removed carefully to avoid penetrating or damaging the integrity of the geotextile membrane.

Once exposed the geotextile membrane is to be cut to allow for planting of the vegetation/tree. The cut must be made in a shape of a cross (or similar), so that the cut flap can be placed back on the soil after the tree is planted (see Figure 4.2).

Under this option the deeper tree roots can be planted directly into the fill beneath the geotextile membrane or the fill can be removed and replaced by growing medium. Care should be taken in the

handling and management of any of the underlying fill removed (either temporarily or permanently) as the fill may contain asbestos. Any surplus fill from beneath the geotextile membrane that is disposed offsite, must be done in accordance with Section 4.4 below and NSW EPA requirements to a facility licensed to receive the contaminated soil waste.

Once the vegetation and/or tree has been planted the geotextile membrane must be placed around the tree. Growing medium is to be placed on top of the geotextile membrane to natural ground level.

An activity specific site management plan (ASSMP), as described in Section 8 below, must be prepared to appropriately manage the works, where the geotextile membrane is to be breached and disturbance of material below the cap is to be carried out. The ASSMP is to be reviewed by a suitably experienced Environmental Consultant to ensure that the plan includes provision for appropriate reinstatement of the geotextile membrane and that the proposed work does not result in asbestos contamination in the material above the geotextile membrane.

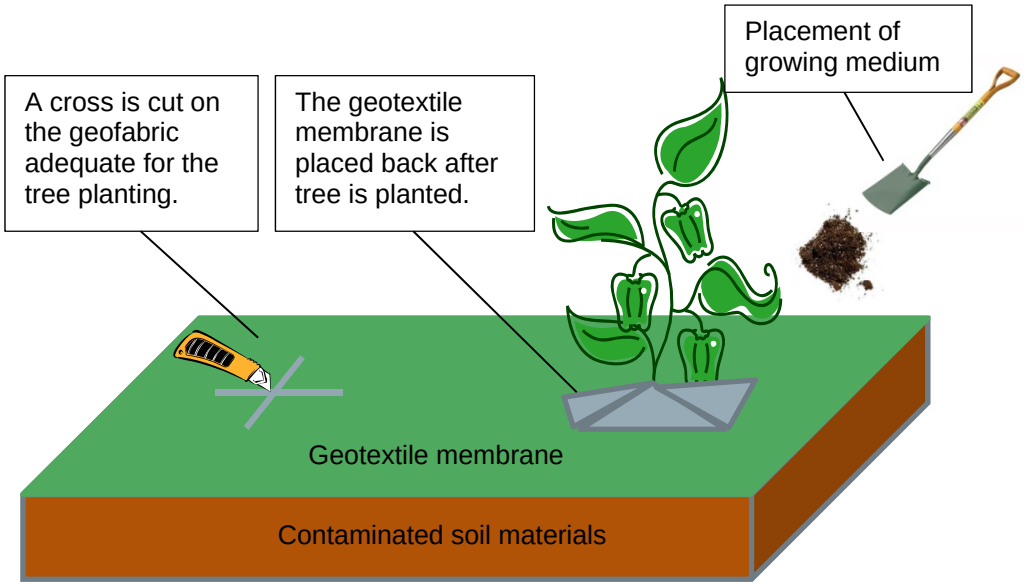


Figure 4.2 Deep Rooted Vegetation and Tree Plantings Below The Geotextile Membrane

4.3.3. Landscape Architecture, Furniture and Related Infrastructure

For any other landscape architecture / furniture (bollards, etc.) and related infrastructure, a similar management strategy for tree planting and vegetation presented above (sections 4.3.1 and 4.3.2) can be adopted. Similar to vegetation plantings the control measures for this outdoor infrastructure, furniture is dependent on whether the related infrastructure is to be installed above or below the geotextile layer. It is important that the correct control measures are followed to reduce the risk to workers and future users of the open space.

4.4. Mitigation controls and off-site disposal waste classification

All wastes removed from the Mine Site 4 area (such as previously unidentified contaminated soils) shall be transported in accordance with relevant road and transportation regulatory requirements. Wastes that are required to be classified prior to disposal shall include appropriate waste classification documents.

Where necessary, all site workers shall be equipped with appropriate personal protection equipment (PPE) prior to handling of waste materials including contaminated soils.

4.4.1. Materials tracking

All materials movements onto and offsite should be appropriately tracked to record source and fate of all materials related to specific activities. The material movements should be documented in an appropriate report on the works undertaken and should include for each material type a summary of volumes of material movements onto and off site, details of source locations and/or placement onsite, details of validation or waste classification and the fate of the materials. Copies of all relevant dockets should also be included in the report.

4.5. Managing unexpected finds

If during the site management work, material is encountered which appears to be potentially contaminated and appears to be different from the soils described in the previous assessment reports, the following procedures should apply:

- Excavation works at that part of the site where the suspicious material (soil) was encountered should cease until inspection is carried out by the project environmental consultant;
- Where materials have been disturbed or stockpiled, controls should be put in place to prevent erosion or dusts, which may include covering the materials with polythene sheet;
- Based on visual inspection, the project environmental consultant will provide interim advice on health and safety of remedial works, soil storage and soil disposal to allow remediation to proceed if possible; and
- Based on sampling and analysis of the material, the project environmental consultant will provide advice as to remedial requirements for the material.

Based on the previous contamination assessments, potential ‘unexpected finds’ which could reasonably be possible within the management area may include fill materials or soils that exhibit indicators of potential contamination (including anthropogenic inclusions including building rubble).

Other unexpected finds below are possible but considered unlikely:

- Unusual odour
- Soil staining
- Hydrocarbon
- Drums
- asbestos

Should unexpected finds of contamination or potential contamination be found onsite, the following protocols will be adopted:

1. Stop work in the potentially hazardous area as soon as it is safe to do so and move to a designated meeting point.
2. Assess the potential risk to human health posed by the unexpected find and assess if evacuation or emergency services need to be contacted.
3. Delineate an exclusion/quarantine zone around the affected area using fencing and/or appropriate barriers and signage.
4. Contact the suitably experienced Environmental Consultant (Coffey) for advice and request a site visit to undertake an assessment of the unexpected find. The Environmental Consultant will decide if it is necessary to contact WorkSafe NSW (this could involve consultation with Land Custodian), the NSW EPA Auditor and/or others relevant parties/authorities.
5. The Environmental Consultant will assess the unexpected find and provide advice on:
   - the preliminary assessment of the contamination and need for immediate management controls (if any);
   - what further assessment and/or remediation works may be required and how such works should be undertaken;
   - requirements for a remedial action plan (if necessary) and associated validation works;
   - if necessary or appropriate the Environmental Consultant will advise and/or liaise with NSW EPA Auditor on the unexpected find and appropriate actions.
6. Works are not to recommence in the area affected by the unexpected find until appropriate advice has been obtained from the Environmental Consultant and the find has been managed/remediated.
7. The Environmental Consultant will validate the management/remediation of the find and provide advice on recommencing works in the affected area and liaise with NSW EPA Auditor as appropriate.
8. Removal of any material suspected of containing asbestos must be undertaken by a suitably licenced NSW Asbestos Removalist.

All validation reports assessing the site suitability for its permitted uses following remediation and validation works must be forwarded to NSW EPA Auditor for review and endorsement.

4.6. Training and Induction of Personnel

All personnel conducting intrusive works (see section 4.2) and follow-up / ongoing maintenance works on the site will be inducted during remedial construction/excavation activities on the awareness of the SEMP in particular in regards to the capping layout, identification of potential unexpected finds of contamination. The induction will be undertaken at the time of the general site induction, with additional information provided during the works via toolbox meetings.

Site personnel will have general competencies to identify unexpected finds of contamination in the field and that these competencies will be used in good faith during earthworks. It is not possible or practical, to provide awareness induction to cover all types of potential unexpected finds. It is possible that indications of contamination not specifically covered by the induction may be encountered. In such cases, the precautionary principle of “if in doubt” will apply and the unexpected finds protocol will be implemented.

It is noted that some forms of potential contamination may not be associated with any visual or olfactory indicators in the field. The unexpected finds protocol will not provide protection against such finds.

Following completion of the construction of the capping layer over the mine site 4 area, all future intrusive workers conducting works in this area must be made aware of the SEMP and presence of the capping layer to enable appropriate practices of work to be planned and undertaken in this area.

4.7. Groundwater extraction

Groundwater extraction from beneath the Site is to be precluded other than for the purpose of environmental monitoring. While Coffey's assessment has been limited to the shallow aquifer, the term 'groundwater' here refers to all groundwater's beneath the site, irrespective of depth.

There are three groundwater monitoring wells located in and near vicinity of mine site area 4 (MW4 to MW6) these wells should be protected and retained to allow for future groundwater monitoring (as necessary). The location of the groundwater monitoring wells across the development has been surveyed with the surveying co-ordinates presented in Appendix C. Where groundwater wells are to be destroyed by the development they must be decommissioned by a licensed driller to ensure the pathway to the aquifer is sealed from any potential future contamination from the proposed development.

Should it be required to extract the groundwater for any beneficial use, then further assessment to determine the suitability of the groundwater for the proposed or all beneficial uses would be required to be undertaken by Coffey in accordance with the prevailing regulatory requirements and guidelines and reviewed by the appointed NSW EPA Auditor.

4.8. Imported Soils Criteria

Should soils or fill be required to add to the cap for maintenance purposes, or for adjustments to cap levels, then these materials should meet the following criteria:

Imported soils (if required onsite) shall be either:

1. Virgin Excavated Natural Material (VENM) as defined in the Protection for the Environment Operations Act 1997 where VENM is natural material (such as clay, gravel, sand, soil or rock fines):

    - that has been excavated or quarried from areas that are not contaminated with manufactured chemicals or process residues, as a result of industrial, commercial, mining or agricultural activities; and
    - that does not contain any sulphidic ores or soils or any other waste.

Or

2. Excavated Natural Material (ENM) as defined in Excavated Natural Material Exemption 2014, under the Protection of the Environment Operations (Waste) Regulation 2005. ENM is defined as naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

    - Been excavated from the ground, and
    - Contains at least 98% (by weight) natural material, and
    - Does not meet the definition of VENM

VENM or ENM should not include material that has been processed or contains acid sulphate soils or potential acid sulphate soils.

Classification as VENM material requires certainty that the material is not contaminated. Where this certainty cannot be demonstrated by other means, chemical assessment of the material is to be carried out. As a guide, chemical assessment is to be carried out at a minimum of 1 sample per 100m^3 of VENM material. Procedures for validation of imported VENM material are provided in the RAP Coffey 2010.

5. Roles and responsibilities

The CIC Project Director, Manager and Construction Manager are responsible for this document and its implementation until such time as the land is handed over to the future land custodian (community land strata association). Following handover of the land, the future land custodian shall be delegated the responsibility to ensure the SEMP is taken in practice for the appropriate management of the capping layer to be protective of future users of the site. All CIC employees, future land custodian and its employees, contractors and subcontractors undertaking work on the site are responsible for compliance with this document and for ensuring others do likewise.

The management structure for the implementation of this SEMP is summarised in Table 5.1.

Table 5.1 Contacts

Stakeholder	Contact Details
CIC (current land custodian)	CIC to provide Position Title & contact No.
Queanbeyan city council (compliance monitoring)	Queanbeyan City Council(QCC) to provide Position Title & contact No.
Community strata association (future Land Custodian)	Community association to provide Position Title & contact No.
Environmental Consultant	Coffey Michael Carbone (02) 6260 7288

Table 5.2 Roles and Responsibilities

Stakeholder	Responsibilities
Current Land Custodian **CIC**	• Engage an Environmental Consultant to induct QCC Project Officer / Land Manager and Community association project officer to this SEMP prior to site handover. • Engage an Environmental Consultant to prepare generic induction protocol and generic SOPs for general landscape maintenance, tree surgery, tree removal, litter picking, land mowing, etc.
Compliance monitoring	• Appoint an appropriately qualified and experienced Land Custodian's Project Officer / Land Manager to manage implementation of the SEMP.

Stakeholder	Responsibilities
QCC	• Ensure that Land Custodian's Project Officer / Land Manager is effectively managing environmental responsibilities for any works. • Ensure any third parties commissioned to undertaken subsurface work are provided with this SEMP and required to adhere to its requirements
Land Custodian's (community association) **Project Officer / Land Manager**	• Appoint appropriately qualified and experienced staff/contractors to implement this SEMP. • Induct QCC staff/contractors working within the management area into this SEMP. • Ensure that any QCC staff/contractors undertaking working within the management area are aware of this SEMP and able to implement strategies described within this SEMP. • 12 monthly inspections of barrier mesh to demonstrate compliance with SEMP conditions • Maintain documentation of location of identification of contaminated area (mine site 3) and identification of 'unexpected finds' in site works. • Ensure groundwater is not abstracted for potable or other beneficial use • Annual reporting to the Project director within CIC / (QCC future land custodian) on the results of the 12-monthly inspections and compliance audits, including details also of any intrusive works undertaken triggering reference to the SEMP, and corrective actions arising from audits, inspections or arising in any other manner. • Provide adequate training to QCC staff/contractors, if required. • Update this SEMP, as required.
NSW EPA Auditor	• Endorse this SEMP. • Review amendments of this SEMP, if required.
Environmental Consultant	If required by Land Custodian: • Prepare generic induction protocol and generic SOPs for general landscape maintenance, tree surgery, tree removal, litter picking, land mowing, etc. as required by CIC and/or QCC. • Provide advice through Land Custodian or Land Custodian's Project Officer / Land Manager to persons working within the management area or persons with responsibility to implement this SEMP. • Assist in providing assessment of environmental risk on a case by case basis, if required. • Respond to environmental incidents. • Periodically review effectiveness of this SEMP and, with approval of the Land Custodian's Project Officer / Land Manager, revise the SEMP.
Principal Contractor	• Ensure that all subcontractors working within the management area are aware of this SEMP and able to implement strategies described within this SEMP. • Provide adequate training to subcontractors, if required. • Prepare Activity Specific Site Management Plan, Occupational Health and Safety Plan and Safe Work Method Statements in accordance with this SEMP.

5.1. Change of land ownership

If a change in property ownership or occupancy occurs the new owner/occupier must receive and be

notified of the SEMP and applicable restrictions and maintenance obligations. **A change in site use by either partial or full redevelopment will warrant review of this SEMP, as it applies specifically to the development as presented in the plans attached as Appendix B.**

6. Environmental Monitoring & Review

6.1. Routine Inspection and Maintenance of Capping

In order to manage risks regular routine inspection and maintenance of the site cap must be implemented to check the integrity of roadway, footpath, capping system and soil cover following completion of the construction of the depot.

The results of all regular routine inspections should be stored together in an appropriate but readily accessible location by the Land Custodian's Project Officer / Land Manager. These should be available for audit as required by this SEMP.

6.1.1. Frequency

The regular routine (post construction) inspection and maintenance monitoring should be done through a close visual inspection of the management area and must be undertaken on a bi-annual basis across the whole of the area.

In addition to the annual inspection (every 12 months) if there are any maintenance and/or repairs undertaken within the management area following intrusive activities, additional inspection should be undertaken at:

- Immediately following the completion of the works and reinstatement of ground conditions; and
- Approximately 3 months after the completion of the works and reinstatement of ground conditions.

6.2. Capping Monitoring Details & Maintenance and Repairs

The results of the regular routine inspections should be recorded at the time of the inspection. Observations must be recorded on a site capping inspection checklist and register and records kept.

Observations must include the following items:

- Integrity of the capping/cover in landscaped areas, particularly during gardening activities, dry weather, and poor growing seasons.
- Detection of any damage to the capping and location of the damage, which must be remediated (and documented in a non-conformance and corrective action report) as soon as possible. Site reinstatement must be in accordance with existing quality of cover.

It is recommended that a photographic log is recorded showing ground conditions at the time of the regular routine inspection. The photographic log should be kept with the recorded observations.

6.3. Activity Specific Monitoring

6.3.1. Frequency

Activity specific monitoring should be undertaken by the Land Custodian's Project Officer / Land Manager, who will provide input on the requirement of activity specific monitoring. The requirement of the activity specific monitoring should be specified in the activity specific site management plan.

6.3.2. Close Out Reporting

Reporting requirement for activity specific monitoring is to be provided in the activity specific site management plan.

6.4. Auditing

6.4.1. Routine Activity

The Land Custodian's Project Officer / Land Manager is responsible for undertaking audit of the capping inspections and documentation. The audit should focus on whether capping inspections are satisfactory and if not, whether any corrective action(s) has been undertaken and documented appropriately.

The audit should be undertaken at least every 2 years and documented.

6.4.2. Activity Specific

The Land Custodian's Project Officer / Land Manager is responsible for undertaking audit of any intrusive work within the management area, which requires implementation of this SEMP. This should be undertaken on at least annual basis, and should comprise auditing of excavation and intrusive work permit and register and non-conformance and corrective action report and register.

The audit should focus on:

- Whether documentations are completed appropriately
- Whether the second part of the excavation and intrusive work permit has been completed and to confirm if the work area has been reinstated appropriately
- Whether any non-conformance has been addressed and corrective action has been undertaken and documented appropriately

The audit should be appropriately documented.

7. Incidents, Corrective and Preventative Action

All incidents involving non-compliance with this SEMP, or causing actual or potential material harm to the environment, must be reported to the Land Custodian's Project Officer / Land Manager.

Corrective action shall be implemented to minimise harm to the environment.

All incidents shall be investigated to determine the root cause of the non-conformance, or incident, and to establish appropriate preventative action to minimise the potential for recurrence of the non-conformance or incident.

If an incident is assessed as having caused or threatened to cause material harm to the environment, the incident will be reported to the NSW EPA. A suitably experienced Environmental Consultant must be engaged to assess the incident. The Environmental Consultant must prepare a report of the findings of the assessment, which must be forwarded to NSW EPA for review and endorsement.

8. Emergency Response and Preparedness

The Land Custodian's Project Manager will be responsible for handling emergency responses. The emergency response and preparedness is to be included in the ASSMP.

In the event of any incident, the first priority will be the safety of personnel and the community in the immediate vicinity. Following this, all practical steps should be taken to minimise the risk of further environmental damage as soon as possible after the event. The situation should be stabilised by following the appropriate incident management or contingency plan procedures. The appropriate staff should be notified and emergency procedures enacted.

Typical first response actions with regards to environmental management may include:

- Containment of any pollution using booms, silt fences, absorbents, bunding or interception pits; and/or
- Controlling of any windblown dust using water sprays/water carts; and/or
- Temporary repair or isolation of failed plant/equipment component; and/or
- Sampling of impacted site media.

Follow-up action will include the development of a work plan to remediate the impacted site media, as/if required. The work plan would detail any sampling and analysis requirements to define the nature and extent of impact, methods for the recovery, handling, storage and treatment of impacted material, disposal and/or reuse options for impacted material, and health and safety requirements.

1. In the event of a serious emergency, the following procedure will be followed:
2. Stop work.
3. All personnel shall leave the work zone via established entry/exit routes.
4. Leave the management area and assemble at the emergency assembly area (as designated in the OH&S Plan).
5. Contact relevant service on the details of the emergency:

- Fire brigade (000)
- Ambulance (000)
- Police (000)
- NSW EPA (13 22 81)

6. Await further instructions from the Land Custodian Project Officer / Land Manager.

Records will be kept of any incidents, accidents, hazardous situations, unusual events and unsafe health exposures and the corrective action taken.

9. Review of SEMP

This SEMP is a working document, which must be reviewed and revised by Site Owner's Project Officer / Land Manager (with the assistance of a suitably experienced Environmental Consultant) as required.

The SEMP review should be undertaken at a minimum every 5 years or in accordance with the local regulatory requirements or direction of the NSW EPA Auditor. A review must be undertaken if:

- there has been a significant change in to the site: or
- there is any other evidence of which the person is, or should be, aware that the plan is no longer adequate for managing contamination risk at the site.

This SEMP is based on the open/space and roadway landuse of the management area and is based on the strategy of capping of impacted fill materials as detailed in this SEMP. Should details of the capping or the landuse change, a suitably experienced Environmental Consultant must be engaged to update the SEMP. The updated SEMP must be reviewed and endorsed by an appointed NSW EPA auditor prior to its implementation.

Should an update of the SEMP be required and/or details of the capping change a suitably experienced Environmental Consultant must be engaged to update the SEMP. The updated SEMP must be reviewed and endorsed by appointed NSW EPA auditor prior to its implementation.

10. Records

Records generated through implementation of this SEMP shall be held by the Land Custodian's Project Officer / Land Manager. Records will include (but may not be limited to):

- Excavation and intrusive work permit and register
- Non-conformance and corrective action report and register
- Capping inspection checklist and register
- Training records
- Induction records
- Complaints
- Communications
- Meeting minutes
- Incident & investigation reports
- Vehicle/materials tracking logs
- Third party certificates
- Audit reports
- Environmental Consultant reports

11. Important information about your Coffey Environmental Report

1. Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

2. Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination posed in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

3. Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey. The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

4. Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and

use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

5. Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

6. Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

7. Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

8. Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way. This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

9. Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

12. References

ANZECC (1999) Guidelines for the Assessment of Onsite Containment of Contaminated Soil.

Bureau of Mineral Resources, Geology and Geophysics (1980) 1:50,000 Geology of Canberra, Queanbeyan, and Environs, Canberra, ACT.

Bureau of Mineral Resources, Geology and Geophysics (1980) 1:100,000 Hydrogeology of ACT and Environs, Canberra, ACT.

Coffey, 2010 (draft) Stage 3 Contamination Assessment, Queanbeyan NSW, (Ref: ENVICANB0233AA-R01a), 12 January 2010.

Coffey, 2009 (draft), Remediation Action Plan, Sheep Dip Area, Jumping Creek, Queanbeyan NSW, (ref: ENVICANB00233AA-R02a), 21 October 2009;

Coffey, 2010 (draft), Remediation Action Plan, Whole of Site Area, Jumping Creek, Queanbeyan NSW, (ref: ENVICANB00233AA-R03a), 21 October 2010;

EGIS Consulting Australia, 2001. Fairlane (Canberra) Pty Ltd Jumping Creek Site, Queanbeyan, NSW, Summary Auditor Report, (Ref:VA0420) September 2001;

IT Environmental Pty Ltd (Australia), 1999. Stage 2 Environmental Investigation, Jumping Creek, Queanbeyan NSW, 2620, (Ref: J109217B dated 24 November 1999);

NEPC (1999). National Environmental Protection (Assessment of Site Contamination) Measure (NEPM). NEPC, Canberra.

NSW Agriculture, (1996). Guidelines for the Assessment and Cleanup of Cattle Tick Dip Sites for Residential Purposes, Wollongbar Agricultural Institute, Wollongbar.

NSW Archaeology Pty Ltd, 2009.Draft Proposed Jumping Creek Rezoning Queanbeyan, NSW Aboriginal Archaeological Study, January 2009;

NSW Department of Natural Resources (2005) 1:100,000 Soil Landscape of The Sydney Sheet 9130. Third Edition. NSW Government.

NSW EPA (1995) Sampling Design Guidelines. ISBN 0-7310-3756-1.

NSW EPA (2000) Guidelines for Consultants Reporting on Contaminated Sites. ISBN 0 7310 3892 4

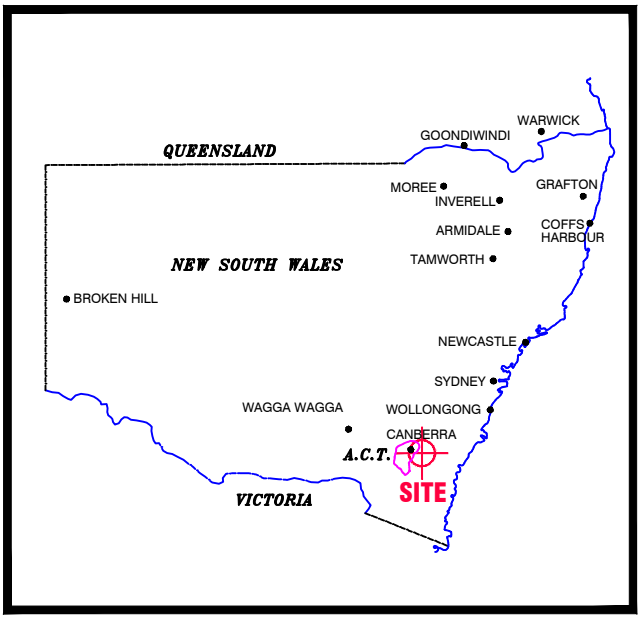
NSW DECC (2008) Waste Classification Guidelines: Part 1 Classifying Waste (Revision July 2009), ISBN 978 1 74232 224 7.

NSW EPA (1998) Guidelines for the NSW Site Auditor Scheme. ISBNo0-7313 0177 3

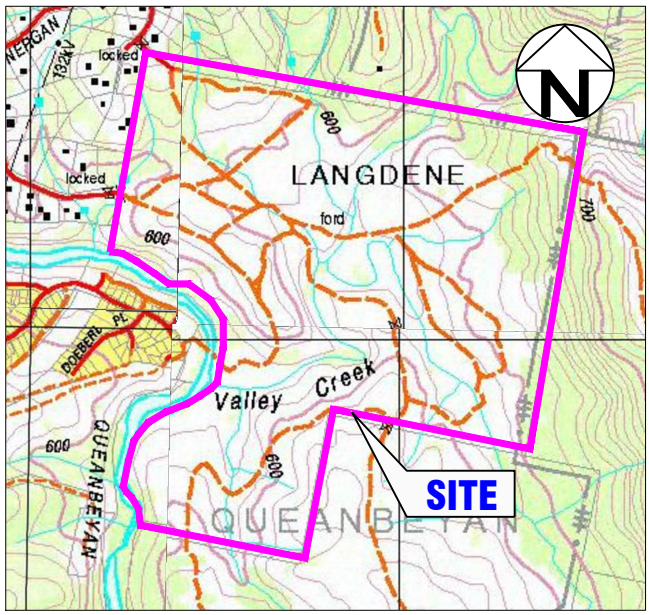
Parsons Brickerhoff Australia Pty Ltd, 2007. Jumping Creek Supplementary Contamination Assessment, (Ref: 2111525/PR_6551), September 2007;

Queanbeyan City Council (2007). Map of Current Land Zonings in the Queanbeyan City Council Area. Accessed online: http://www.qcc.nsw.gov.au/Documents/XYDMJZJFCHC.pdf

Appendix A – Figures

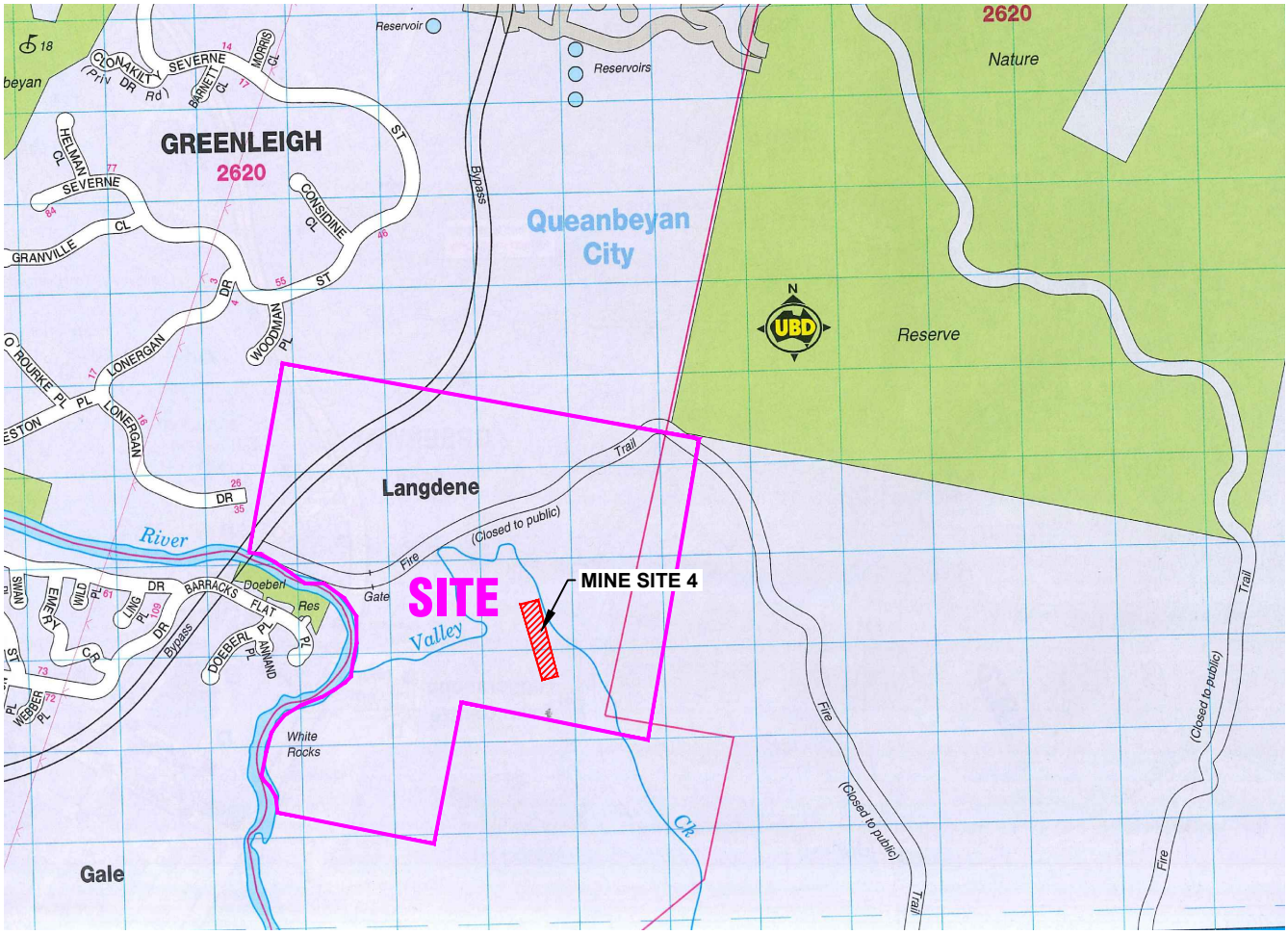


GENERAL AREA MAP



REGIONAL AREA MAP

SOURCE: TOPOVIEW RASTER VIEW 2009 CANBERRA, BUNGENDORE, TUGGERANONG & HOSKINGSTOWN



LOCAL AREA MAP

200 0 200 600 1000

Scale (metres) 1:20 000

SOURCE: UBD STREET DIRECTORY GREGORYS CANBERRA, ACT, 16TH EDITION, 2012, MAP: 82

drawn	MV
approved	MC
date	02/08/15
scale	AS SHOWN
original size	A4

coffey

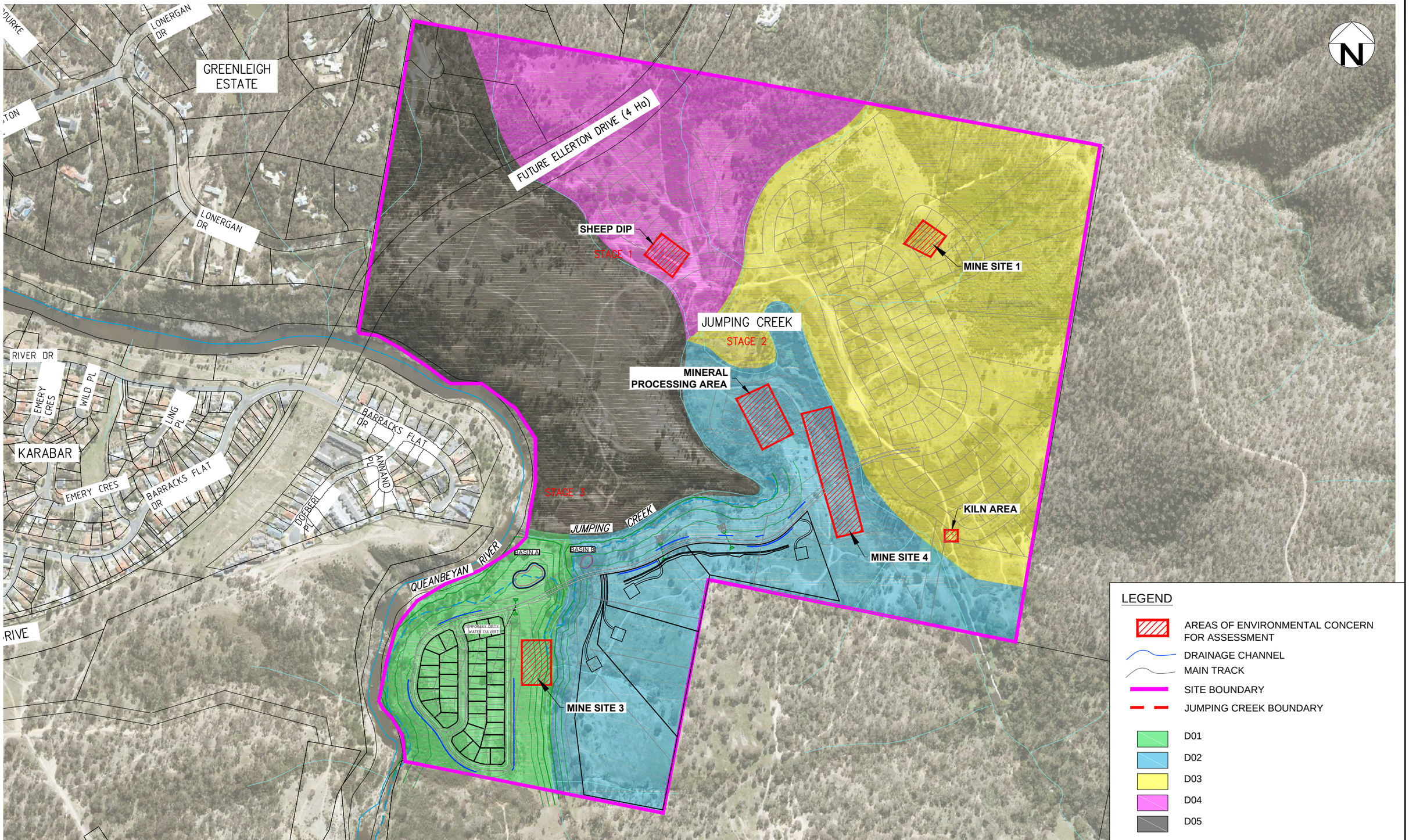
client: CANBERRA INVESTMENT CORPORATION

project: JUMPING CREEK DEVELOPMENT
SITE ENVIRONMENTAL MANAGEMENT PLAN- MINE SITE AREA 4
LONERGAN DRIVE, GREENLEIGH (QUEANBEYAN), NSW

title: SITE LOCATION PLAN

project no: ENAURHOD04774AA-R01 | figure no: FIGURE 1 | rev: A

PLOT DATE: 7/08/2015 11:36:42 AM DWG FILE: F:\ENV\PROJECTS\ENAURHOD\ENAURHOD04 GOVIND\ENAURHOD04700-04799\ENAURHOD04744 CIC AUSTRALIA LIMITED\ENAURHOD04744AA JUMPING CREEK - SITE EMP\DRAWINGS\ENAURHOD04744AA-R01-D02.DWG



revision no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

NOTE:
ALL LOCATIONS ARE APPROXIMATE
DIMENSIONS IN METRES.

0 60 120 180 240 300
SCALE 1:6000 (A3) METRES

drawn	MV
approved	MC
date	16/10/15
scale	AS SHOWN
original size	A3

coffey

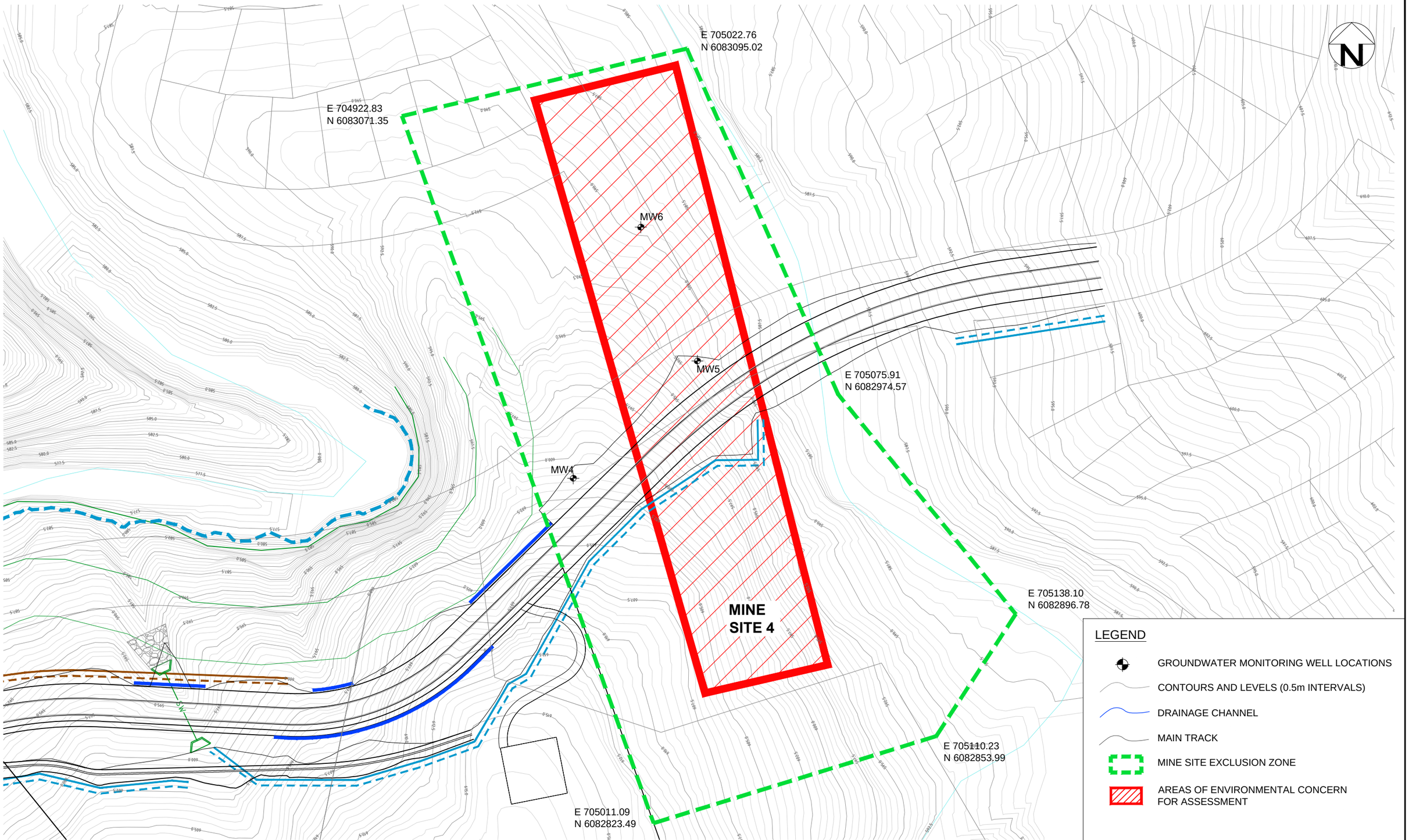
client: CANBERRA INVESTMENT CORPORATION

project: JUMPING CREEK DEVELOPMENT
SITE ENVIRONMENTAL MANAGEMENT PLAN- MINE SITE AREA 4
LONERGAN DRIVE, GREENLEIGH (QUEANBEYAN), NSW

title: MINE SITE EXCLUSION ZONES

project no: ENAURHOD04744AA-R01-D03 | figure no: FIGURE 2 | rev: A

PLOT DATE: 27/10/2015 1:04:54 PM DWG FILE: F:\ENVIPROJECTS\ENAURHOD\ENAURHOD04 GOVIND\ENAURHOD04700-04799\ENAURHOD04744 CIC AUSTRALIA LIMITED\ENAURHOD04744AA JUMPING CREEK - SITE EMP\DRAWINGS\CAD\ENAURHOD04744AA-R01-D03_MS4.DWG



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

NOTE:
ALL LOCATIONS ARE APPROXIMATE
DIMENSIONS IN METRES.

0 12.5 25 37.5 50 62.5
SCALE 1:1250 (A3) METRES

drawn	MV
approved	MC
date	16/10/15
scale	AS SHOWN
original size	A3

coffey

client: CANBERRA INVESTMENT CORPORATION

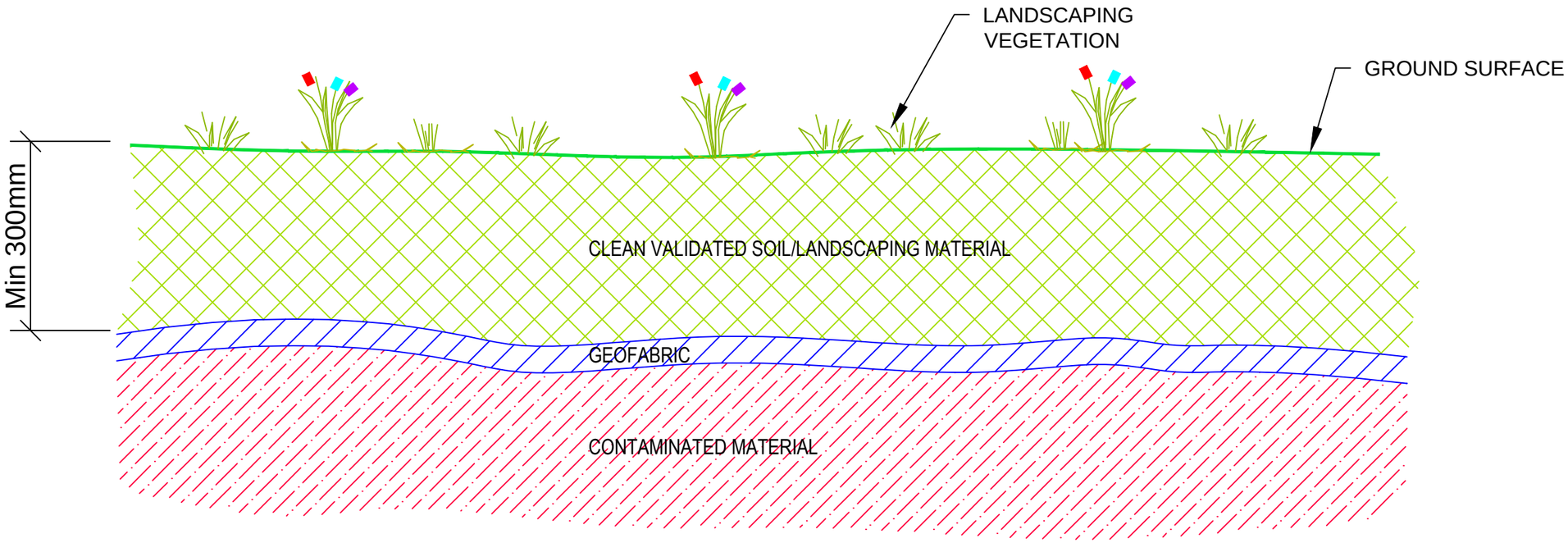
project: JUMPING CREEK DEVELOPMENT
SITE ENVIRONMENTAL MANAGEMENT PLAN- MINE SITE AREA 4
LONERGAN DRIVE, GREENLEIGH (QUEANBEYAN), NSW

title: 4MINE SITE EXCLUSION ZONES - MINE SITE 4

project no: ENAURHOD04744AA-R01-D03 | figure no: FIGURE 3 | rev: A

PLOT DATE: 27/10/2015 1:04:29 PM DWG FILE: F:\ENV\PROJECTS\ENAURHOD\ENAURHOD04 GOVIND\ENAURHOD04700-04799\ENAURHOD04744 CIC AUSTRALIA LIMITED\ENAURHOD04744AA JUMPING CREEK - SITE EMP\DRAWINGS\CAD\ENAURHOD04744AA-R01-D03_MS4.DWG

SCHEMATIC CROSS SECTION OF REMEDIATION CAPPING LAYER - MINE SITE AREA 4



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

NOTE:
ALL LOCATIONS ARE APPROXIMATE
DIMENSIONS IN METRES.

drawn	MV
approved	MC
date	02/08/15
scale	NTS
original size	A3

coffey

client: CANBERRA INVESTMENT CORPORATION

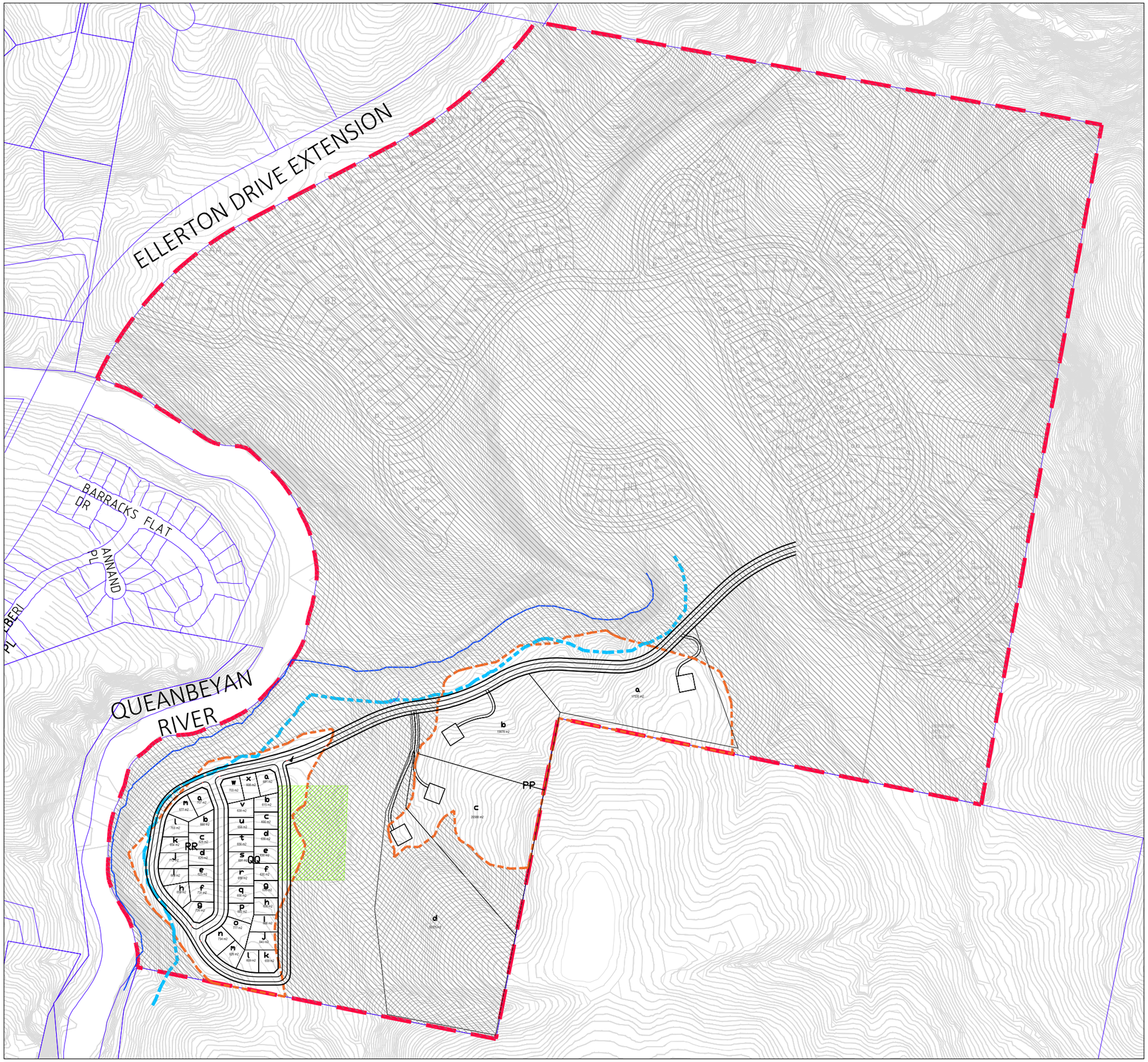
project: JUMPING CREEK DEVELOPMENT
SITE ENVIRONMENTAL MANAGEMENT PLAN- MINE SITE AREA 4
LONERGAN DRIVE, GREENLEIGH (QUEANBEYAN), NSW

title: SCHEMATIC CROSS SECTION OF REMEDIATION CAPPING LAYER - MINE SITE AREA 4

project no: ENAURHOD04774AA-R01 | figure no: FIGURE 4 | rev: A

PLOT DATE: 7/08/2015 11:37:03 AM DWG FILE: F:\ENVIPROJECTS\ENAURHOD\ENAURHOD04 GOVIND\ENAURHOD04700-04799\ENAURHOD04744 CIC AUSTRALIA LIMITED\ENAURHOD04744AA JUMPING CREEK - SITE EMP\DRAWINGS\ENAURHOD04744AA-R01-D02.DWG

Appendix B – Proposed development plans



LEGEND

- JUMPING CREEK BOUNDARY
- BLOCK BOUNDARY
- ### m2 BLOCK AREA
- QQ SECTION IDENTIFIER
- e BLOCK IDENTIFIER
- DRIVEWAY
- LARGE LOT BUILDING ENVELOPE
- 1M CONTOURS
- DEFERRED AREA
- ENVIRONMENTAL EXCLUSION AREA
- TOP OF BANK
- 40M CREEK OFFSET

NOTE
Preliminary engineering works shown on these drawings are for site context only and are indicative. Subject to change based on this assessment.

NOT FOR CONSTRUCTION

ISSUE	REASON FOR ISSUE	DATE	DESIGN	DRAWN	CHECKED	APPROVED FOR ISSUE
A	PRELIMINARY	19/10/2015	JE/MR	MR	GR	CS

DRAWING STATUS
Warning unless there is an authorised SPACELAB signature in the approved for issue column, this drawing is notapproved for issue.

COPYRIGHT
This drawing remains the property of SPACELAB Studio It may be used for the purpose for which it was commissioned & in accordance with the terms of engagement for that commission. Unauthorised use of the drawing is prohibited.

CLIENT
CIC AUSTRALIA

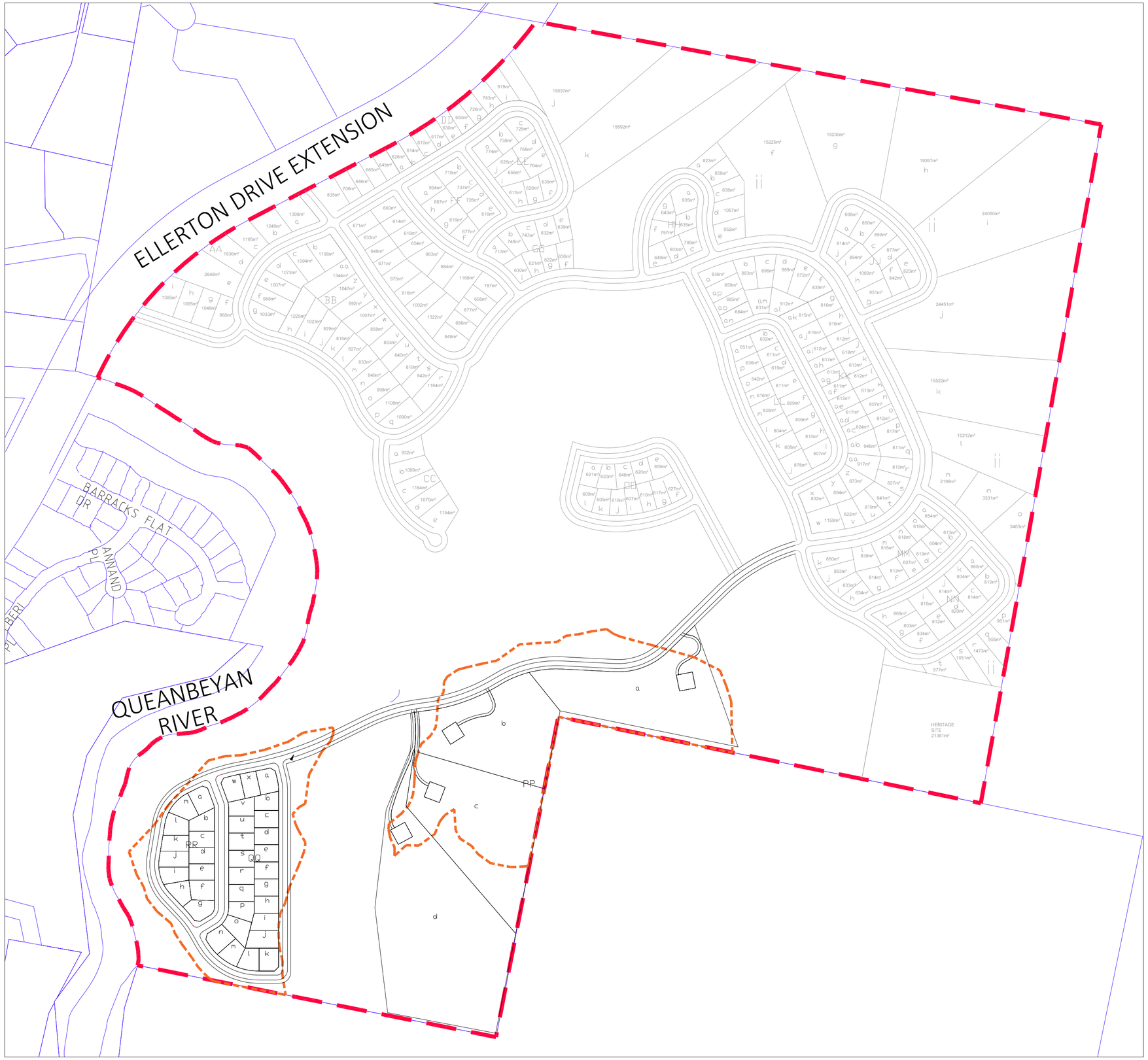
CONSULTANTS
SPACELAB CREATING TIMELESS PLACES
calibre CONSULTING

PROJECT
JUMPING CREEK DEFERRED AREA

DRAWING
CONCEPT LAYOUT

20 10 0 30 50 100m
SCALE @ A1 1:2500
SCALE @ A3 1:5000

PROJECT No	DRAWING No	ISSUE	REVISION
15/1118	P01.1	PRELIMINARY	A



LEGEND

- JUMPING CREEK BOUNDARY
- BLOCK BOUNDARY
- ### m2 BLOCK AREA
- QQ SECTION IDENTIFIER
- e BLOCK IDENTIFIER
- DRIVEWAY
- LARGE LOT BUILDING ENVELOPE
- 1M CONTOURS
- DEFERRED AREA
- ENVIRONMENTAL EXCLUSION AREA
- TOP OF BANK
- 40M CREEK OFFSET

NOTE
Preliminary engineering works shown on these drawings are for site context only and are indicative. Subject to change based on this assessment.

NOT FOR CONSTRUCTION

ISSUE	REASON FOR ISSUE	DATE	DESIGN	DRAWN	CHECKED	APPROVED FOR ISSUE
A	PRELIMINARY	19/10/2015	JE/MR	MR	GR	CS

DRAWING STATUS
Warning unless there is an authorised SPACELAB signature in the approved for issue column, this drawing is notapproved for issue.

COPYRIGHT
This drawing remains the property of SPACELAB Studio It may be used for the purpose for which it was commissioned & in accordance with the terms of engagement for that commission. Unauthorised use of the drawing is prohibited,

CLIENT
CIC AUSTRALIA

CONSULTANTS
SPACELAB CREATING TIMELESS PLACES
calibre CONSULTING

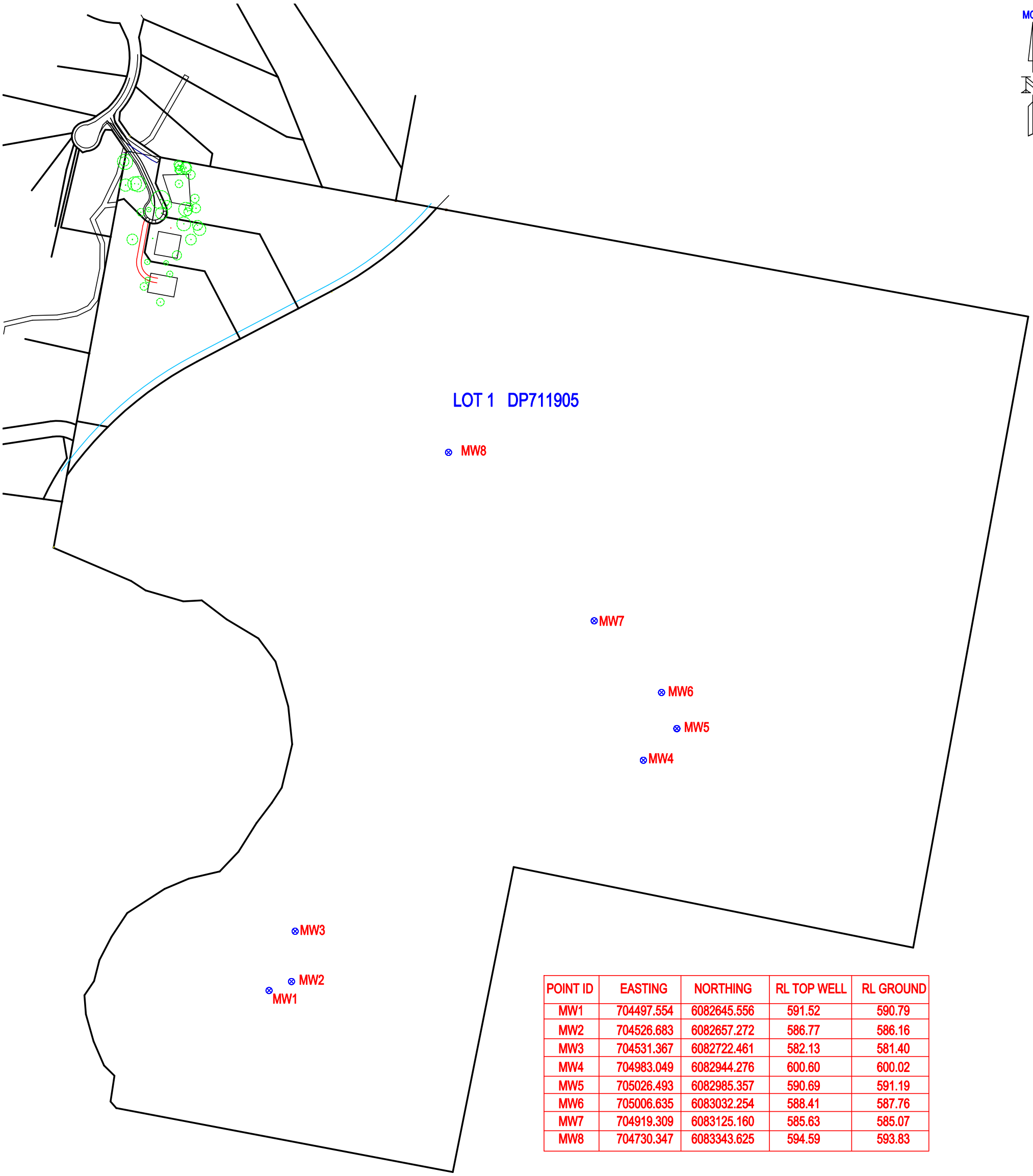
PROJECT
JUMPING CREEK DEFERRED AREA

DRAWING
CONCEPT LAYOUT

20 10 0 30 50 100m
SCALE @ A1 1:2500
SCALE @ A3 1:5000

PROJECT No	DRAWING No	ISSUE	REVISION
15/1118	P01.1	PRELIMINARY	A

Appendix C – Monitoring well survey plan



POINT ID	EASTING	NORTHING	RL TOP WELL	RL GROUND
MW1	704497.554	6082645.556	591.52	590.79
MW2	704526.683	6082657.272	586.77	586.16
MW3	704531.367	6082722.461	582.13	581.40
MW4	704983.049	6082944.276	600.60	600.02
MW5	705026.493	6082985.357	590.69	591.19
MW6	705006.635	6083032.254	588.41	587.76
MW7	704919.309	6083125.160	585.63	585.07
MW8	704730.347	6083343.625	594.59	593.83

IMPORTANT NOTE

This plan is prepared for COFFEY ENVIRONMENTS from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose. The title boundaries shown hereon were not marked by the author at the time of survey.

Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services. This note is an integral part of the plan.

Copyright © 4D Surveying
This plan and the information it contains are copyright and remain the property of 4D Surveying Pty Ltd.
4D Surveying Pty Ltd grants to the client named a licence to use the information hereon for the purpose for which we were engaged to perform the work.
Use of the plan and information for any other purpose is not permitted unless prior written approval has been obtained from 4D Surveying Pty Ltd.
This notice must not be erased.

Peter Williams
Registered Surveyor

4D SURVEYING
The Extra Dimension
PO Box 528
Unit 1/30 Ross Road
Queanbeyan NSW 2620
T 02 6297 3518
F 02 6297 9748
ABN 30 035 481 400
www.4Dsurveying.com.au

SCALE 1:5000 A3	AMENDMENTS	CLIENT: COFFEY ENVIRONMENTS	SHEET No. 1
ORIGIN OF LEVELS PM55022 RL654.022		SURVEY OF MONITORING WELLS LOT 1 DP 711905 JUMPING CREEK	No. OF SHEETS:
			DATE: 22.10.2009
DATUM: MGA & AHD71			PLAN No. 17021 Wells.dwg

This page has been left intentionally blank