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STANDARD REMEDIATION ACTION PLAN

CAPTAINS FLAT – PRIVATE LAND

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Definitions

The following terms are used in this Standard Remediation Action Plan (RAP) and have the following meanings:

CEnvP Scheme	Certified Environmental Practitioner through EIANZ.
Contractor	The Contractor is the person or company engaged to complete the remediation. The Contractor should have read and understood supporting material prepared by Ramboll for the remediation of lead contamination associated with the former lake George Legacy Mine.
CLM Act	NSW Contaminated Land Management Act 1997
DRNSW	Department of Regional NSW
Environmental Consultant	An Environmental Scientist/Engineer qualified through EIANZ CEnvP scheme or equivalent appointed to perform the functions of the Environmental Consultant in this Standard RAP. An Environmental Consultant with CEnvP for General Practice will have a minimum of 5 years' experience. An Environmental Consultant with CEnvP Site Contamination Specialist will have a minimum of 10 years' experience.
EIANZ	Environment Institute of Australia and New Zealand
EPA	Environmental Protection Authority of NSW
EP&A Act	NSW Environmental Planning and Assessment Act 1979
General Immobilisation Approval	A document prepared by NSW EPA for a particular waste type, as defined in the approval, identifying the mechanism by which the waste is immobilised and how this waste can be disposed with no further testing required for the contaminants listed in the approval.
General Solid Waste	A classification of waste (including soil) that is relevant to the lawful disposal of waste at appropriately licensed receiving facilities.
Groundwater surface	The standing water level where groundwater is present within the soil profile.
Long Term EMP	A report detailing management and monitoring requirements for remnant contamination into the future
NEPM (2013)	National Environment Protection (Assessment of Site Contamination) Measure 2013. NEPM (2013) includes generic health investigation levels for four different land uses (residential with access to soil; high density residential; recreational open space; commercial/ industrial) for common contaminants, including lead.
Remediation Action Plan (RAP)	A plan that outlines the nature and extent of contamination and how that contamination is to be managed. Validation requirements to demonstrate that contamination has been managed are to be included.
Remediation and Validation Report	A report that details the works completed to manage contamination at a site. Sampling results from the remediation works are compared against site criteria to validate that the remediation was successful in removing contamination.
Site Owner	The person or persons named on the Certificate of Title for the property
The Site	Either the whole lot or a portion of the lot to be remediated

EXECUTIVE SUMMARY

Throughout New South Wales, consent and certifying authorities are obliged to ensure that potential for contamination is properly assessed and, where risks associated with contamination are identified, that remediation is integrated with development of sites.

The Department of Regional NSW (DRNSW) has coordinated assessment of contamination in public spaces and remediation planning for land at Captains Flat affected by historic metalliferous mining and land-fill activities. Assessment identified contaminants of potential concern related to historic mining and land-fill activities are limited to metals. Lead was identified as the key driver of risk. Concurrent with the assessment of public spaces, the NSW EPA has completed assessment of private properties where requested by the community.

This Standard Remediation Action Plan (the Standard RAP) was coordinated by DRNSW in collaboration with Queanbeyan-Palerang Regional Council (QPRC).

The goal of remediation as described in the Standard RAP is to remove or manage human health risk from lead contamination such that the site is suitable for future land use and to ensure that development work does not result in an unacceptable exposure to lead.

Contaminants of potential concern that may be present on private properties in Captains Flat other than metals are excluded from the Standard RAP and must be considered in accordance with the otherwise applicable regulatory framework.

The Standard RAP provides an alternative to preparation of site-specific RAPs for the remediation of private land where lead contamination from historic mining or land-fill activities exists. The Standard RAP applies only to minor/smaller works (i.e. ancillary builds and extensions) on residential properties and to existing dwellings. The Standard RAP is not applicable to new dwellings, subdivisions or a vacant block of land (new builds).

The infographic presented as Figure 1 describes:

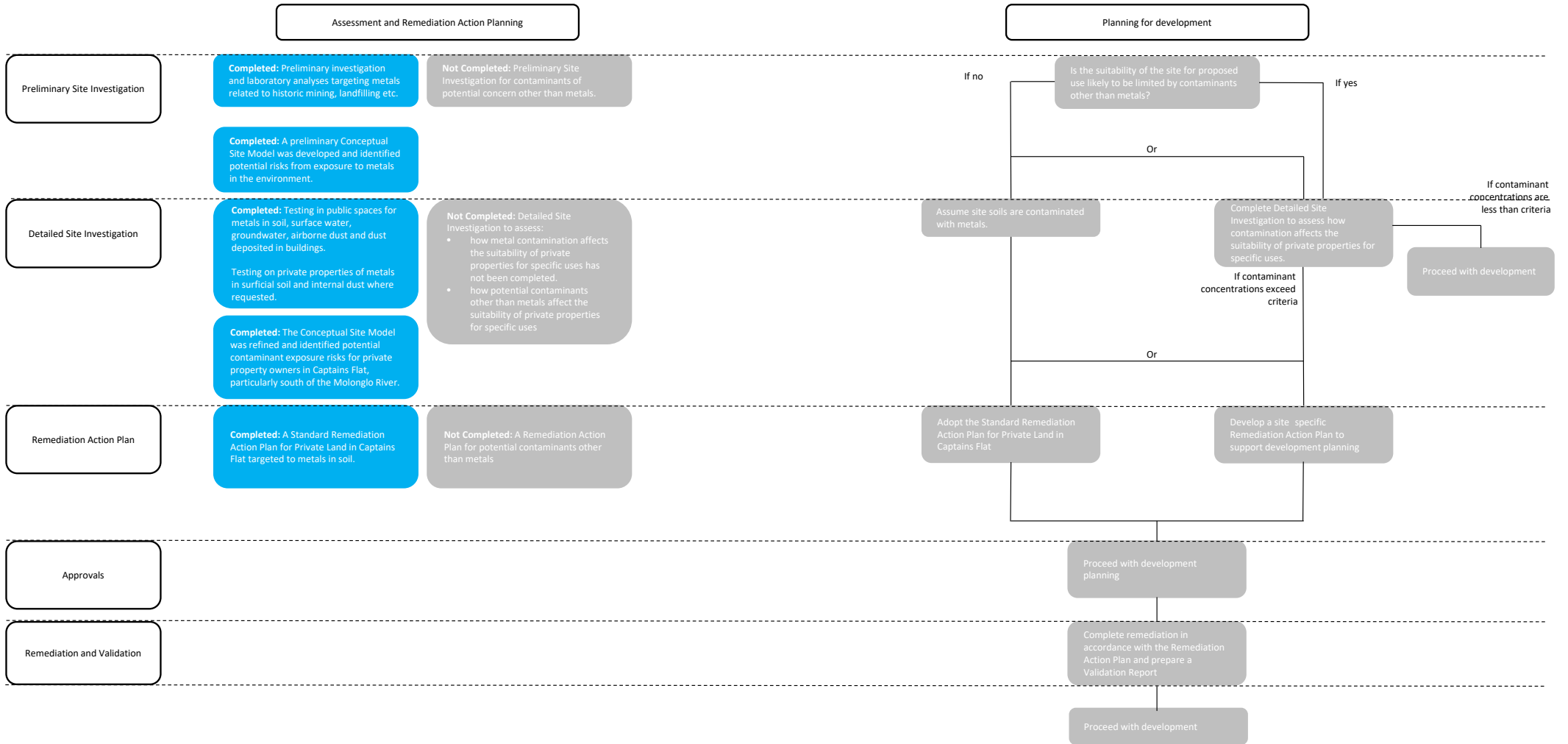
- the legislated pathway for assessment and remediation of contamination
- the assessment and remediation planning coordinated by DRNSW and the NSW Environment Protection Authority (EPA)
- remaining assessment and remediation planning that may be required by private property owners
- outstanding assessment, remediation planning and remediation that may be required during development of private land in Captains Flat.

Remediation strategies described in the Standard RAP for private properties at Captains Flat are:

- on-site capping followed by long term management and
- excavation followed by offsite disposal.

As the Standard RAP is likely to be used in conjunction with a request for approval for development, development consent of the remediation works will by default be approved through a development consent process.

Figure 1: Managing contamination through development of private property in Captains Flat



Note: All contaminated site investigations, Remedial Action Plans and Validation Reports must be prepared by suitably experienced and certified consultants.

1. INTRODUCTION

This Standard Remediation Action Plan (the Standard RAP) was coordinated by Department of Regional NSW (DRNSW) in collaboration with Queanbeyan-Palerang Regional Council (QPRC). The Standard RAP provides an alternative to preparation of site-specific RAPs for the remediation of private land within Captains Flat where lead contamination from historic mining or land-fill activities exists. The Standard RAP has been prepared for private properties within the Captains Flat Precinct as presented on Figure 3-1.

The Standard RAP has been prepared to provide a streamlined approach for the assessment of soil contamination, by assuming a level of contamination based on existing information, in order to reduce the cost of the development assessment process.

The Standard RAP outlines a standard remediation response that is designed to be appropriate for most development activities (i.e. developments where the nominated remediation strategies can be practically implemented) where contamination from lead has occurred via aerial deposition or the use of mine waste as fill material. The Standard RAP applies only to minor/smaller works (i.e. ancillary builds and extensions) on residential properties and to existing dwellings. The Standard RAP is not applicable to new dwellings, subdivisions or a vacant block of land (new builds). The goal of remediation as described in the Standard RAP is to remove or manage human health risk from lead contamination such that the site is suitable for future land use and to ensure that development work does not result in an unacceptable exposure to lead.

The Standard RAP addresses contamination of land and does not include contamination of buildings that may have occurred as a consequence of aerial fallout of lead oxide. The Standard RAP addresses only human health risks and does not address ecological risks to terrestrial ecology or groundwater dependent ecosystems. It is noted that elevated concentrations of other metals are co-located with lead and present potential risks particularly to ecology. Implementation of the Standard RAP could be expected to mitigate risks from other metals and the scope of long-term monitoring proposed for the Captains Flat Precinct under the Lead Management Plan (Ramboll 2022) is intended to inform evaluation of management outcomes related to ecological risk.

It is noted that contamination from the former mine site includes other heavy metals such as arsenic, cadmium and zinc. Lead is the driver for the management of contamination associated with the former mine and the clean-up of lead also manages the clean-up of other heavy metals.

Contaminants of potential concern that may be present on private properties in Captains Flat other than metals are excluded from the Standard RAP and must be considered in accordance with the otherwise applicable regulatory framework.

This Standard RAP includes:

Section 1 - Introduction

Section 2 - Background information on operations and environmental impacts of the former mine

Section 3 - Extent and use of land to which this Standard RAP applies

Section 4 - Description of the nature and extent of contamination

Section 5 - A Conceptual Site Model (CSM) detailing likely exposure routes for lead

Section 6 - Legislative and planning framework

Section 7 - Remediation, including remediation goal and remediation options

Section 8 - Remediation roles and responsibilities

Section 9 - Remediation Action Work Plan including environmental and health and safety requirements, protocols to deal with unexpected finds, and validation requirements.

2. BACKGROUND

The Captains Flat Lead Management Plan Precinct (the Precinct) encompasses built areas of the Captains Flat community, the legacy Lake George Mine site and the Molonglo River from upstream of the water supply dam to a waterhole approximately 1.5 km downstream of the mine. The Precinct includes roads accessing Captains Flat (to a distance of at least 400 m), the rail corridor (to a distance of 1 km) and bushland areas at the perimeters of the community where these may have been impacted by the mine operations.

Historic metalliferous mining (including subsequent processing, smelting and transport) and land-fill activities have contaminated Captains Flat. The NSW Department of Planning, Industry and Environment (DPIE) Contaminants and Risks Team (C&R), Environment, Energy and Science Branch (2021) developed a preliminary Conceptual Site Model (CSM) as a qualitative representation of contaminant sources, migration pathways and potential receptors for potential contaminants from the legacy Lake George Mine. Ramboll (2021) refined the preliminary CSM through extensive assessment of the degree and extent of contamination in a broad range of environmental media in public spaces within the Precinct.

2.1 Assessment of Public Spaces within the Captains Flat Precinct

Potential contaminant exposure risks for human health and the environment were identified in Ramboll (2021) based on assessment against site-specific trigger levels for soil and national criteria for other media relevant to the key exposure risks within the Precinct.

The Ramboll assessment targeted public spaces and findings indicate elevated metal concentrations are co-located and that lead is the key potential driver of risk. Specifically, out of a total of 683 fpXRF measurements in soil, 237 exceeded the health-based criteria for lead, 30 for arsenic and one for manganese, mercury and zinc. At all locations where arsenic concentrations exceeded human health criteria lead also exceeded. At locations where arsenic exceeded the HIL-C (300 mg/kg) it was on average 3.6 times greater (i.e. 1085 mg/kg). At locations where arsenic exceeded the HIL-C the average lead concentration (22,971 mg/kg) was 38.3 times greater than the HIL-C (600 mg/kg). Considering the data in this way supports the conclusion that, where potential risks to human health associated with arsenic in soil exist, lead presents a far greater potential risk. Within this context lead is considered to be the primary driver for potential risks to human health and addressing the risk associated with elevated lead will also address the risk associated with elevated arsenic.

Relative high, moderate and low potential risk areas within the Precinct were determined based on:

- The degree to which lead concentrations in soil exceed the relevant assessment criteria, i.e. the potential consequence of exposure
- Qualitative assessment of anticipated land use type and
- The duration and frequency of land use where elevated lead concentrations were observed, i.e. the likelihood of exposure.

Lead concentrations in low risk areas generally exceeded assessment criteria by 1 – 5 times, though in the bushland east of the Molonglo River at the southern end of town (which has lower potential for exposure) exceeded by 5 – 10 times. Moderate and high risk areas exceeded assessment criteria by > 5 times.

Potential human health risks for lead in soil are considered to be **high** in the following areas:

- The Old Mine Site and rail corridor
- Public spaces south of the Molonglo River including the former preschool, Foxlow Street and the eastern embankment of the Old Mine Site
- Areas where fill appears to have been applied north of the Molonglo River including flood berms adjacent the River and embankments beneath the tennis courts as well as Foxlow Parklet

Potential human health risks for lead in soil are considered to be **moderate** in the following areas:

- The Southern Smelter Area and Keatings Collapse
- Beneath the southern playing field off Foxlow Street
- The southern end of the school playing fields including the new preschool

Potential human health risks for lead in soil are considered to be **low** in the following areas:

- In natural soil to depths of greater than five metres beneath the northern end of Foxlow Street
- In shallow soils in bushland hillside east of the Molonglo River near the southern end of town
- At several other locations in surface soils north of the Molonglo River at concentrations which marginally exceed the health investigation levels
- In public buildings

2.2 Assessment of Private Properties within the Captains Flat Precinct

The NSW EPA conducted a residential sampling program in Captains Flat in 2021 which comprised of sampling over 40 properties using a portable XRF to a maximum depth of 5 cm. The data was provided to Ramboll summarised into two datasets – North and South of Molonglo Bridge (Intersection of Foxlow St and Braidwood Rd).

Key findings from the NSW EPA private residence testing include:

- The area north of Molonglo Bridge reported a maximum lead concentration of 4,000 mg/kg which is above the NEPM (2013) health-based soil investigation level for residential land use (HIL A) of 300 mg/kg and an average of 243 mg/kg.
- The area south of Molonglo Bridge reported a maximum lead concentration of 8,200 mg/kg and an average of 1,559 mg/kg which is above the HIL A
- The area south of Molonglo Bridge reported a maximum arsenic concentration of 230 mg/kg which is above the HIL A of 100 mg/kg and an average concentration of 42 mg/kg.
- The area north of Molonglo Bridge reported a maximum zinc concentration of 11,000 mg/kg which is above the HIL A of 8,000 mg/kg and an average concentration of 604 mg/kg.

Gaps identified in soil data include:

- The extended period of historic mining infers potential for a wide range of potentially contaminating activities
- The location and number of exceedances in the private residence testing data was not provided for confidentiality reasons therefore these details are unknown. A thorough assessment of contaminant concentrations within private properties remains a data gap
- Elevated lead concentrations in soil within the community have not been vertically delineated
- Bioavailability of metals in soils impacted by dust, ore, mine waste and slag was assessed for public spaces though has not been assessed for private properties.

3. EXTENT AND USE OF LAND TO WHICH THIS RAP APPLIES

3.1 Extent of Land to Which This RAP Applies

This Standard RAP applies to private properties within the Precinct that have been impacted by lead contamination related to historic metalliferous mining or use of contaminated material as fill. The Precinct boundaries are shown on **Figure 3-1** below.

The potential for contamination and appropriate management measures should be considered by the landowner and QPRC and in accordance with guidance endorsed by the NSW EPA and the Resilience and Hazards SEPP 2021 Chapter 4 – Remediation of Land (former SEPP 55).

The Standard RAP may be applied to a Site proposed for development. A Site will be defined in the development application submitted by the proponent. Where a landowner wishes, a site-specific RAP may be applied provided it is prepared in accordance with guidance endorsed by the NSW EPA.

3.2 Use of Land to Which This RAP Applies

This Standard RAP applies to private properties only and does not apply to childcare facilities or schools. It also does not apply to publicly owned properties, public spaces or roads.

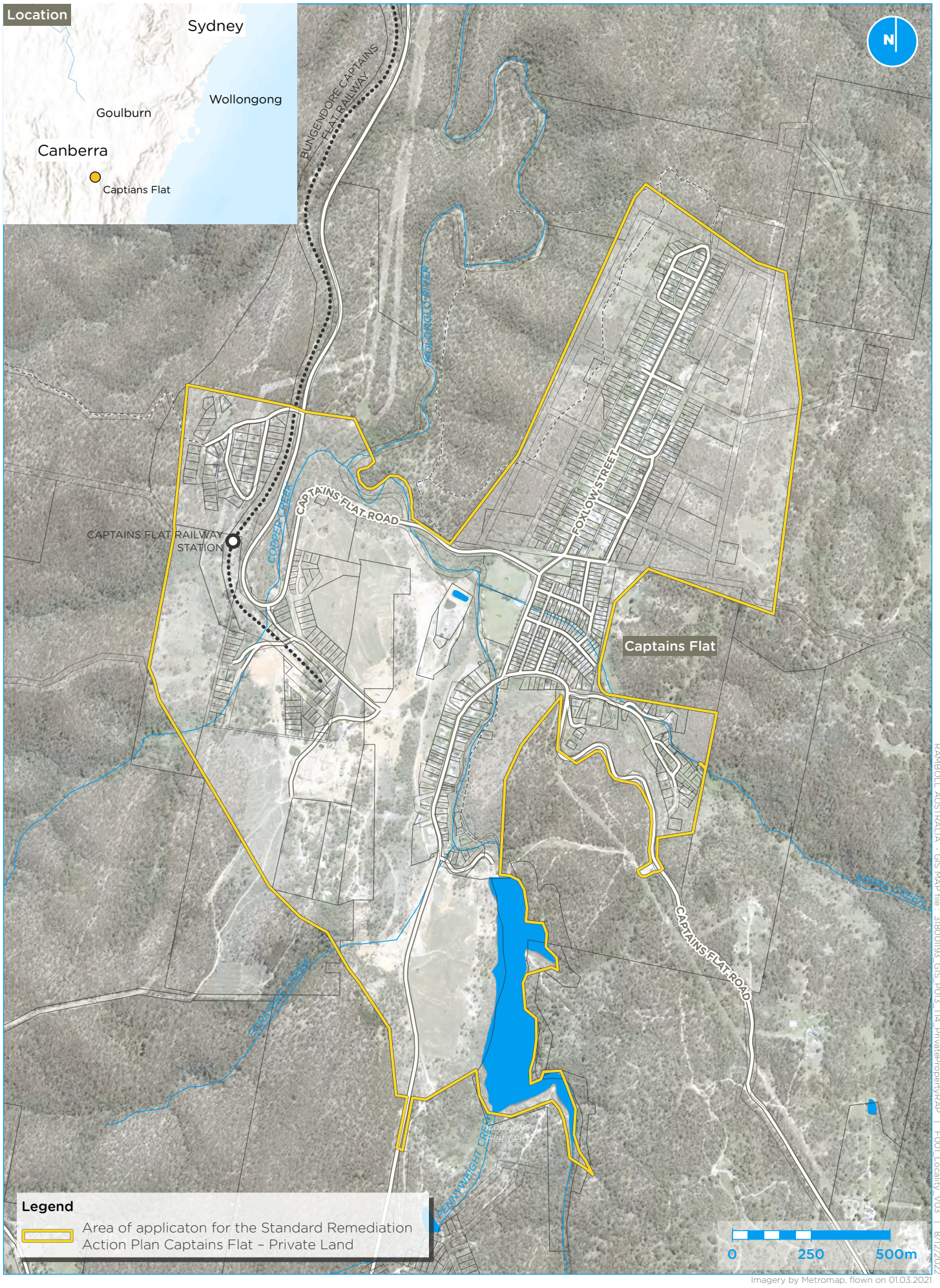


Figure 1 : Site location
Standard Remediation Action Plan Captains Flat - Private Land

3.3 Definition of the 'Site'

The property owner is to define the 'Site' to be remediated as part of this Standard RAP. The property owner shall attach a plan showing the area of the 'Site' to the template Figure presented as **Appendix 1** of this Standard RAP.

The 'Site' can be defined as follows:

- The entire Lot and DP of a private property; or
- The portion of the Lot to be developed

The property owner should note that where the 'Site' is defined as a portion of the Lot and contamination on the remainder of the Lot is not being addressed, the contamination status will not change. As a result, the notification of soil contamination for the affected Lot will remain on the Section 10.7 Certificate. Where the Site is a portion of the Lot it shall be defined by registered survey.

The Standard RAP applies to minor/smaller works (i.e. ancillary builds and extensions) on residential properties and to existing dwellings.

The Standard RAP is not applicable to new dwellings, subdivisions or a vacant block of land (new builds)..

4. SITE ACCEPTANCE CRITERIA

Contamination in NSW is assessed using National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013, known as NEPM (2013).

NEPM (2013) provides Health Investigation Levels (HIL), which are scientifically based, generic assessment criteria designed to be used to assess potential risks to human health from chronic exposure to contaminants. The Health Investigation Levels are intentionally conservative and based on a reasonable worst-case scenario for four generic land use settings. The relevant land use setting for each different land use in the Precinct area is:

- HIL A - Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.
- HIL B - Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
- HIL C - Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate.
- HIL D - Commercial/industrial, includes premises such as shops, offices, factories and industrial sites.

Note that HIL A excludes the keeping of poultry for egg consumption.

NEPM HILs for lead are presented in **Table 4-1** below and are the site acceptance criteria relevant to the assessment, remediation and validation of private land under the Standard RAP.

Table 4-1: Site Acceptance Criteria

Land Use Setting	Site Acceptance Criteria (Pb mg/kg)
HIL A	300
HIL B	1200
HIL C	600
HIL D	1500

5. CONCEPTUAL SITE MODEL

A CSM is a qualitative description of the source(s) of contamination, the pathway(s) by which contaminants may migrate through the environmental media, and the populations (human and / or ecological) that may be potentially exposed. This relationship is commonly known as a Source-Pathway-Receptor (SPR) linkage. Where one or more elements of the SPR linkage are missing, the exposure pathway is incomplete, and no further assessment is required. This CSM considers the potential SPR linkages for contamination associated with mining and historic land-filling in Captains Flat.

5.1 Environmental Setting

The Precinct contains a mix of residential, recreational and commercial/industrial areas surrounded by cleared agricultural land and natural bushland. The western portion of the Precinct is located within the Googong Dam Catchment and the southern portion of the Precinct around the Southern Smelter is located within the Captains Flat Dam Catchment. The Captains Flat Dam and surrounding surface water features that fall within the Precinct are presented on

. Surface water within the Precinct is retained in the Captains Flat Dam or flows to the Molonglo River and then in a northerly direction.

5.2 Contaminant Sources

The primary source of contamination within the Precinct was from mining activities including loading, processing and transport of ore and the application of fill to land. Findings from the Conceptual Site Model – Captains Flat Lead Management Plan (Ramboll 2021) and the summary of NSW EPA assessments provided in **Sections 2.1** and **2.2** describe contaminant distribution most concentrated within the southern part of Captains Flat (south of the Molonglo River). Contamination in fill in public spaces south of the Molonglo River extends to depths of greater than one metre below ground level.

Naturally occurring mineralised geology appears to be a lesser source of contamination.

5.3 Transport Mechanisms

Transport mechanisms identified include filling with mine waste (possibly including ore and slag), as well as airborne dust, erosion and sediment transport where contamination from the mine is present in surficial soils as well as potential dissolved metal transport through surface water and groundwater.

5.4 Contaminant Receptors

Human receptors comprise private land occupants, intrusive maintenance workers and visitors to private land.

5.5 Exposure Pathways

In order for a receptor to be exposed to a contaminant derived from a site, there should be an exposure pathway linking the source of contamination and the exposed population. An exposure pathway describes the course a chemical or physical agent takes from the source to the exposed individual.

The main exposure pathways for each matrix for human receptors are summarised below:

- Soil - incidental ingestion, direct contact (skin) and inhalation by site users
- Sediment - direct contact (skin) with recreational users
- Surface Water – direct contact (skin), potable use (drinking and cooking), incidental ingestion, extraction for stock watering and irrigation
- Groundwater – extraction for potable use, extraction for stock watering and irrigation
- Indoor dust – incidental ingestion, direct contact (skin), inhalation

5.6 Frequency of Exposure

Exposure frequency could be expected to align proportionally with the probably duration that each receptor group could be expected to spend on private properties. That is residents could be expected to have a higher frequency of exposure compared to workers or visitors.

5.7 Private Property Risk Characterisation

Relative high, moderate and low potential risk areas within public areas of the Precinct (described under **Section 2.1**) were informed by lead concentrations that were consistently high south of the Molonglo River and comparatively low north of the Molonglo River. Similar contaminant distribution trends could generally be expected across private properties in these areas. Complete SPR linkages between lead in soil and users of private properties are considered likely south of the Molonglo River and possibly north of the Molonglo River.

The absence of thorough assessment of contaminant concentrations within private properties limits capacity to refine remediation strategies for specific sites. In the absence of site specific contaminant characterisation, standardised provisions for remediation should conservatively assume widespread contamination is present.

6. REGULATORY APPROVALS AND LICENSING

Table 6-1 outlines the regulatory requirements applicable at the time of preparation of the Standard RAP. Whilst the Standard RAP has been prepared in accordance with the regulatory requirements below, additional regulations may require review depending on the property particulars. These are tabulated in **Table 6-2**.

Table 6-1: Key Relevant Legislation and Regulations

Legislation or Regulation	Relevance
<i>Resilience and Hazards State Environmental Planning Policy 2021 Chapter 4 – Remediation of Land (former SEPP 55)</i>	<p>Under the SEPP (Resilience and Hazards) (2021), remediation works are permissible in any zone, regardless of any provision in another environmental planning instrument (such as a local environmental plan). The SEPP (Resilience and Hazards) (2021) also establishes:</p> <p>Category 1 remediation works: remediation that requires development consent. This includes remediation that is: designated development; likely to have a significant impact on ecological values; deemed as requiring development consent by another SEPP; within a sensitive land zone under a local environmental plan; or not consistent with a contaminated land planning guideline made by the relevant council.</p> <p>Category 2 remediation works: remediation which does not require development consent. This is any remediation that is not deemed category 1 remediation works. While development consent is not required, the Council is required to receive written notification of the proposed remediation at least 30 days prior to the commencement of remediation.</p> <p>The works completed under this RAP are likely to be Category 2 remediation works, however as this RAP is likely to be used in conjunction with a request for approval for development, development consent of the remediation works will by default be approved through a development consent process.</p>
<i>Contaminated Land Management Act 1997 (CLM Act)</i>	<p>Under the CLM Act, EPA regulates contaminated sites where the contamination is significant enough to warrant regulation. Contaminated sites that are not regulated by EPA are managed by local councils through land use planning processes.</p> <p>Private properties within the Precinct may meet the triggers to report contamination.</p>
<i>Protection of the Environment Operations Act 1997 (POEO Act)</i>	<p>The POEO Act is the primary legislation for the management and control of pollution of the environment. This includes the licensing of premises that are listed as scheduled premises under Schedule 1 of the POEO Act.</p> <p>The POEO Act requires licensing of sites where more than 30,000 cubic metres of contaminated soil is stored or where an aggregate of more than 3 hectares of contaminated soil is disturbed. It is not expected that these conditions would be met for private properties within the Precinct following this Standard RAP and therefore licencing of the works under the POEO Act is not required.</p> <p>Under the POEO Act it is an offense to pollute waters. Where dewatering is required as part of the development works, the water needs to be of appropriate quality for discharge. Advice should be sought from the Environmental Consultant.</p>

Legislation or Regulation	Relevance
<p><i>Protection of the Environment Operations (Waste) Regulation 2014 (the Regulation)</i></p>	<p>The Regulation makes requirements relating to non-licensed waste activities and waste transporting. The Regulation also exempts certain waste streams from the full waste tracking and record keeping requirements.</p> <p>Part 1 of Schedule 1 of the Regulation lists wastes transported within NSW or interstate and required to be tracked. This includes “Lead; lead compounds” and “Soils contaminated with a substance or waste that is referred to in this Part”. These tracking requirements apply to soils excavated within the Captains Flat Precinct.</p>
<p><i>Palerang Development Control Plan (DCP) 2012</i></p>	<p>The Palerang DCP includes specific information pertaining to development in rural zones, residential zones, business zones, industrial, business park and infrastructure zones, recreation and tourist zones and environment protection zones. It also provides information on development for subdivisions, specific land uses, town centre area plans, precinct area plans and heritage areas.</p>
<p><i>Environmental Planning and Assessment Act 1979 (EP&A Act)</i></p>	<p>The EP&A Act establishes the land use controls and the development approval process in New South Wales. Under the EP&A Act, a Section 10.7(2) Planning Certificate is mandatory when purchasing a property. It is a certificate that details the development potential of a parcel of land including planning restrictions that apply. A Section 10.7(2) Planning Certificate details the contaminated land status of a property in the QPRC area in accordance with Palerang DCP (2012).</p> <p>The SEPP (Resilience and Hazards) (2021) is an environmental planning instrument under the EP&A Act. Any remediation that is deemed a category 1 remediation works under the SEPP (Resilience and Hazards) (2021) would require development consent under Part 4 of the EP&A Act. In the event that any remediation was determined to be category 1 remediation works it is expected to be of a scale that would require a development application to be submitted to QPRC.</p>
<p><i>Palerang Local Environment Plan (LEP) 2014</i></p>	<p>The Palerang LEP is the key local land use planning document for the Queanbeyan-Palerang local government area. The LEP aims to make local environmental planning provisions for land in the Queanbeyan-Palerang area in accordance with the relevant standard environmental planning instrument under Section 33A of the EP&A Act. The LEP outlines permitted and prohibited development, exempt and complying development and includes principal development standards.</p>
<p><i>General Approval of The Immobilisation of Contaminants in Waste (2009/07)</i></p>	<p>Category 2 remediation works are permissible without consent however the SEPP (Resilience and Hazards) (2021) requires notification to Council, as outlined above.</p> <p>In accordance with Part 10 and Clause 101 of the <i>Protection of the Environment Operations (Waste) Regulation 2014</i>, NSW EPA has issued a General Immobilised Contaminants Approval (2009/07) for “metallurgical furnace slag or metallurgical furnace slag contaminated natural materials”.</p> <p>The Approval indicates that the waste is naturally immobilised and provides information on packaging requirements, waste assessment requirements, disposal restrictions, waste management requirements and waste tracking and</p>

Legislation or Regulation	Relevance
	<p>notification requirements. This Approval is relevant to waste materials from within the Captains Flat Precinct where slag is the primary contaminant source.</p> <p>A copy of this Approval is included in Appendix 2.</p>

Table 6-2: Other Relevant Legislation and Regulations that may apply

Legislation or Regulation	Relevance
<i>Water Management Act 2000</i>	<p>A controlled activity approval is required for works in or within 40 metres of a natural watercourse. Each proponent should assess whether their property is within 40 metres of a natural watercourse. If so, controlled activity approval will be required.</p>
<i>Water Act 1912</i>	<p>A groundwater interception licence is required for works that intercept groundwater. However minor temporary dewatering activities that are estimated to be less than three megalitres per year (including both construction dewatering and subsequent managed inflows) will generally not require a licence or approval from the Office of Water. Groundwater is not expected to be intercepted during residential development likely at the private properties. In the unlikely event it is intercepted, it is likely to require dewatering of less than three megalitres per year. It is therefore unlikely that a water access licence would be required for any sites remediated following this Standard RAP.</p>

7. REMEDIATION

7.1 Remediation Objective

In the absence of site-specific assessment, private properties within the Precinct are assumed to have lead concentrations in soil exceeding NEPM (2013) HIL A of 300 mg/kg.

Remediation is required to reduce human health risks associated with lead contamination. The objective of the remediation is to render the Site suitable for future land use and to ensure that development work does not result in an unacceptable exposure to lead.

The Standard RAP applies only to minor/smaller works (i.e. ancillary builds and extensions) on residential properties and to existing dwellings. The Standard RAP is not applicable to new dwellings, subdivisions or a vacant block of land (new builds).

7.2 Remediation Options

The remediation goal may be met via three options:

1. Excavation and off-site disposal of contaminated soil
2. Capping of contaminated soil and implementation of a Long-Term Environmental Management Plan (EMP). This option may include consolidation of contaminated soil below the cap.
3. A combination of off-site disposal and on-site management

7.2.1 Excavation and Off-site Disposal

Excavation and off-site disposal involves the excavation of lead contaminated surface soils and/or mine waste and disposal to a landfill licensed to accept the waste. This option involves the removal of lead contamination from the site. Once the remediation has been completed and it has been demonstrated via validation sampling that validation protocols have been met, the site will be considered to be suitable for future land use.

7.2.2 On-site Capping

On-site capping involves the placement of a cap over lead contaminated surface soil. As the soil contamination remains on-site, long term management is required to prevent exposure to the contaminated soil and a record of the contamination will remain on the Section 10.7 Planning Certificate.

The cap shall include a marker layer comprising high visibility (orange or similar) geotextile material followed by a minimum 0.1 m thickness of one of the following:

- Concrete slab
- Permanent hardstand paving

It is not anticipated under the Standard RAP that other capping types such as clay or geosynthetic clay layer (GCL) would be used. Additionally, it is not anticipated that concrete or other permanent hardstand paving will be appropriate across large areas (e.g.: greater than 200 m²). In the event that large areas require remediation or capping types other than permanent hardstand are to be used, a site-specific remediation strategy is required.

The following principles are to be followed for on-site capping:

- 1. On-site capping of lead impacted soils is not a suitable remediation strategy where contamination extends below the groundwater surface. For conservatism, contamination should not extend to within 0.5 m above the encountered groundwater surface.**
- 2. Contaminated soils are not to be capped within 900 mm of a boundary i.e. the edge of the capped area must be >900 mm from the boundary.** This restriction means that where contamination exists within 900 mm of a boundary, excavation and offsite disposal or a site-specific RAP will be required.

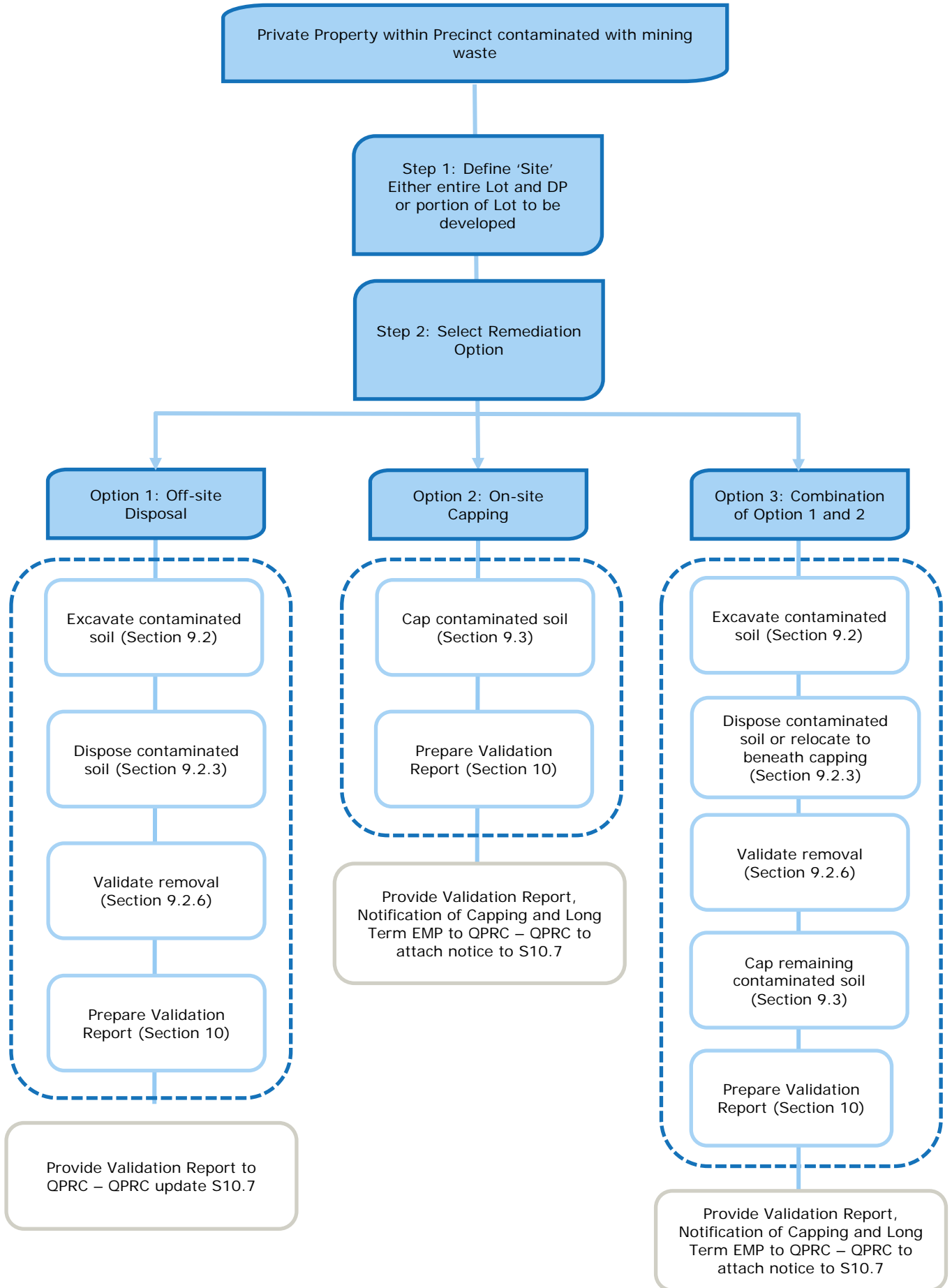
A Notification of Capping is required to allow notification of the capped contaminated soil on the planning certificate held with Council. The existence of the capping will be included on the Section 10.7 Certificate.

Long term management will be via a Long-Term EMP, which will detail management requirements. The existence of the capping and the Long-Term EMP will be included on the Section 10.7 Certificate for the property.

This option does not remove lead contamination from the site and a legacy remains that will be recorded on the Section 10.7 Planning Certificate for the property.

7.3 Remediation Outcomes

There are different outcomes with each remediation option. The property owner should consider which outcome is most suitable to their property and their situation. The remediation outcomes are presented in the flow chart below.



8. REMEDIATION ROLES AND RESPONSIBILITIES

The property owner is to engage a suitably qualified and experienced Contractor and Environmental Consultant to complete the remediation works. Roles and responsibilities to implement either remediation option are outlined in **Table 8-1**.

Table 8-1: Roles and Responsibilities for Remediation of Lead Contaminated Soil

Entity	Role	Responsibilities
Property Owner	To coordinate remediation works	<ul style="list-style-type: none"> Engage Contractor to complete remediation works Engage Environmental Consultant to validate remediation works Provide documentation of remediation works (Remediation and Validation Report) to QPRC Coordinate waste classification through engagement of a suitably experienced and certified consultant Provide Long Term EMP to QPRC Manage capped contamination in accordance with Long Term EMP Notify neighbours before commencing remediation Prepare and submit Development Application integrating specialist consultants as required
QPRC	To provide development approval and to maintain contaminated land database	<ul style="list-style-type: none"> Maintain a contaminated land database Review the RAP provided in conjunction with the development application Document completed remediation works on contaminated land database Document the property status on the Section 10.7 Certificate Provision of development approval as / where appropriate. Assign development consent conditions requiring ongoing implementation of an LTEMP if capping based remediation options are adopted.
Suitably qualified and experienced Contractor	To complete remediation works	<ul style="list-style-type: none"> Read and understand supporting material prepared by QPRC for the remediation of lead contamination associated with the former mine. Liaise with Property Owner to complete remediation works – site establishment, excavation of contaminated soil, waste disposal and reinstatement Identify appropriately licensed waste management facility to dispose of lead contaminated soil. Liaise with waste management facility prior to disposal. Provide appropriately experienced and certified contaminated land consultant with dockets for waste disposal
Appropriately experienced and certified Environmental Consultant	To complete validation works and reporting	<ul style="list-style-type: none"> To provide contractor supervision and advice to the land-owner as required through remediation Completion of validation sampling Preparation of Remediation and Validation Report

9. REMEDIATION ACTION WORK PLAN

Remediation works are to be completed by a suitably qualified and experienced Contractor with support from an appropriately experienced and certified contaminated land consultant.

9.1 Site Establishment

The Contractor shall mobilise to site and set up required plant, personnel and environmental (see **Section 9.5**) and health and safety (See **Section 9.4**) controls. Environmental and health and safety controls may include, but are not limited to:

- Locate and isolate all overhead and underground services in proximity of the works
- Assess traffic control requirements
- Implement stormwater runoff and sediment controls, such as sediment fencing

9.2 Remediation Methodology – Excavation and Off-site Disposal

9.2.1 Surface Soil Impacted by Lead

Lead contaminated surface soils require excavation and off-site disposal. All accessible surface soil on a private property is considered to be contaminated and requires excavation unless sampling indicates otherwise.

Surface soils are to be excavated to a nominal depth of 0.1 m, however the final depth would depend on validation sampling. Surface soils shall be stockpiled within the excavation footprint for direct-loading into trucks for disposal.

9.2.2 Soil impacted by contaminated fill originating from the mine site

Where mine waste has been used as fill material, remediation will include excavation and off-site disposal. Excavation shall continue until the full lateral and vertical extent of the contaminated soil has been identified and removed. It is noted that this methodology may be complicated in the southern part of town where the depth of contaminated soil has not been conclusively delineated (> 0.5 m) and groundwater is shallow.

Mine waste includes a range of materials such as:

- Ore concentrate – usually comprising a grey/green fine silty/sandy gravelly material
- Waste rock – typically comprises waste rock material from the overlying strata including sandstone, shale and minor amounts of quartz.
- Slag – typically comprising fine to coarse angular gravel, grey – black, vitreous with rounded voids (bubbles) indicative of former molten state.

9.2.3 Waste Classification and Disposal

9.2.3.1 Soils for off-site disposal generated within the Precinct

Lead contaminated waste at residential, educational or childcare facilities is pre-classified as general solid waste however classification of waste following the NSW EPA Waste Classification Guidance is required for lead contaminated soils originating from other locations.

Where waste is not pre-classified, classification will be required in accordance with the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014). Wastes not pre-classified include those where contaminants of potential concern other than metals may be present.

Private property owners should contact the relevant landfill prior to the start of excavation works to confirm the procedures for disposal of excavated soil impacted by lead.

9.2.3.2 Slag for off-site disposal generated within the Precinct

General Immobilisation Approval 2009/07 applies to metallurgical furnace slag or natural materials contaminated by metallurgical furnace slag and can be used to aid in determining the waste classification for these materials where they occur on private land within the Precinct that is not otherwise described under Section 9.2.3.1.

The general immobilisation allows metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials can be classified according to their leachable concentration (TCLP) values alone with respect to Beryllium, Chromium (VI), Lead, Nickel and Benzo(a)pyrene.

9.2.4 Disposal Verification

The Contractor shall report the disposal of the waste material to the appropriate landfill by providing the appropriately experienced and certified contaminated land consultant with landfill dockets documenting the tonnage of waste disposed. The landfill dockets must be included in the Remediation and Validation Report.

9.2.5 Imported Fill

All fill imported to the site shall be documented by the Contractor, including landscaping materials. All soils and landscaping materials shall be validated by the contaminated land consultant PRIOR to being received at the site to confirm these are Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM) or compliant with the NSW EPA Resource Recovery framework described in the POEO (Waste) Regulation (e.g.: for topsoil). Where materials are sourced from a landscape supplier the supplier should provide certification that the material has been generated in accordance with the POEO Act and regulations and is appropriate for use in landscaping.

VENM must meet the definition of VENM provided on <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material>.

ENM must meet the requirements of the Resource Recovery Order under Part 9, Clause 93 of the POEO (Waste) Regulation 2014, The Excavated Natural Material Order 2014. A copy of this order can be found at <https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/current-orders-and-exemption>.

9.2.6 Validation of Remediation

An appropriately experienced and certified contaminated land consultant shall complete validation sampling and arrange analysis. Validation samples shall be collected from the base of the remediation excavation prior to backfilling as necessary.

The number of validation samples to be collected shall be determined by Table A in NSW EPA (1995) Sampling Design Guidelines, which is based on minimum number of sampling points required to detect a contamination hot spot.

Validation samples shall be collected and analysed as follows:

- On a grid-based pattern across the base of the remediation excavation
- From the walls of the remediation excavation if the depth of the wall exceeds 200 mm
- Either directly from the surface by hand or with the use of hand tools i.e. trowel
- Wearing dedicated disposable nitrile gloves, which are to be changed between sampling locations
- Where hand tools or other equipment is used, decontamination by washing the equipment with a phosphate-free detergent and rinsing in potable water should be undertaken
- Collected into laboratory-supplied acid-rinsed glass jars with Teflon® lined lids
- One intra-laboratory duplicate sample is to be collected for analysis at the primary laboratory
- One inter-laboratory duplicate sample is to be collected for analysis at a secondary laboratory
- Validation samples shall be stored in an ice-filled cooler box for transportation to the laboratory
- Validation samples shall be transported to the laboratory under Chain of Custody conditions
- Laboratory analysis shall be completed for lead by a laboratory NATA accredited for this analysis

Lead concentrations within the validation samples shall be compared to NEPM (2013) HIL guidelines for the appropriate land use as detailed in Section 4 (300 mg/kg lead for residential

properties). In the event that validation samples are below the HIL guidelines, the remediation will be considered to be complete.

In the event that the 95% upper confidence limit (UCL) of the mean of the lead concentration in the validation samples exceeds the relevant guideline, the remediation will be considered to have failed and additional excavation would be required.

9.3 Remediation Methodology – On-site Capping

9.3.1 Area to be Capped

The Contractor shall identify the area to be capped and complete capping works (construction of a building slab or hardstand paving). A marker layer such as brightly coloured plastic is required over the contaminated soil to define the capped area and provide a marker to future users should the slab or capping be removed.

Where cut and fill is required to facilitate capping works excess soils can be disposed from the site following the guidance outlined in **Section 9.2**.

9.3.2 Notification of Capping

The Notification of Capping details where contamination remains permanently capped on site. A template for the Notification of Capping is included in **Appendix 3**. The Notification of Capping includes details of the nature of the marker layer and capping material. The capped area is to be marked on a site plan. A survey of the capped area and thickness (minimum 0.1 m) is required for the Notification of Capping in circumstances where the location of the cap cannot be visually identified.

9.3.3 Long Term Environmental Management Plan

The Long-Term EMP details where contamination remains on the site and the management measures to be implemented by the site owner that are in place to manage risk associated with the on-site retention of contaminants. Requirements for a Long-Term EMP are included in **Section 12**. A template for the Long-Term EMP is included in **Appendix 4**.

9.3.4 Validation of Remediation

An appropriately experienced and certified contaminated land consultant shall complete validation of the capping works. Validation is to include:

- Description of the capping system i.e. concrete or permanent paving
- Photographic evidence of the capping works completed
- Description marked on a plan of the area capped or a survey of the capped area where the location of the cap cannot be visually identified.

9.4 Work Health and Safety Plan

The sections below incorporate a Work Health and Safety Plan, which is to be developed and implemented by the Contractor during the remediation works. The purpose of the Work Health and Safety Plan is to:

- Apply standard procedures that reduce risks resulting from site works
- Ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner
- Have procedures to protect other site workers and the general public

A generic Safe Work Method Statement for lead remediation on a private property has been included in **Appendix 5**.

9.4.1 Assignment of Responsibilities

The Contractor is to assign responsibilities for occupational health and safety during remediation works.

New employees shall be given induction training on safety issues and responsibilities. A record of inductions will be reported by the Contractor in final documentation.

9.4.2 Personal Protective Equipment

The following personal protective equipment (PPE) is required during remediation works:

- Long sleeved shirts and long pants
- Steel capped boots
- Hard hat when working around operating plant such as excavators and back hoes
- Eye protection
- Gloves when handling soil or equipment

The following PPE shall be considered:

- P2 dust masks when excavating lead impacted surface soils where conditions are dusty

Personnel should practice good hygiene and ensure hands are washed prior to meals, other hand to mouth actions such as smoking and leaving the site.

9.5 Construction Environmental Management Plan

The sections below incorporate a Construction Environmental Management Plan, which is to be implemented during the remediation works. The purpose of the CEMP is to reduce impacts to the environment from remediation activities.

9.5.1 Site Access

During remediation works, access to the site being remediated shall be limited to the Contractor completing the works. The Contractor should set up an exclusion zone to limit access to the area being remediated. Temporary fencing may be required.

9.5.2 Hours of Operation

The Contractor shall only undertake remediation works that may generate an audible noise during the following hours unless under direction from a relevant authority for safety reasons or in the event of an emergency:

- 7.00 am to 6.00 pm, Monday to Friday
- 8.00 am to 6:00 pm on Saturdays
- At no time on Sundays or public holidays

9.5.3 Air Controls

9.5.3.1 Dust Control

The Contractor shall manage remediation works to avoid dust generation that could impact on neighbours or rainwater tanks. The following dust control procedures should be implemented:

- Securely covering all loads entering or exiting the work site
- Use of a garden hose or similar for dust control on unsealed areas of the work site
- Temporarily ceasing an activity that generates dust during inclement weather
- Covering of on-site stockpiled materials

NSW Department of Health provides rainwater tank guidance

(<https://www.health.nsw.gov.au/environment/water/Pages/rainwater.aspx>). If rainwater tank owners wish to have some water tested the local Public Health Unit can help them find a NATA accredited laboratory.

9.5.3.2 Odour

Given the nature and extent of the lead-impacted material, there is a low potential for odours to be emitted. Odour controls are not considered to be required.

9.5.4 Noise Control

The remediation works shall comply with the "Interim Construction Noise Guideline" (DECC, 2009). This would include remediation works being restricted to the hours described in **Section 9.5.2**.

The following noise control measures shall be implemented:

- Construction vehicles and machinery should be selected with appropriate level of noise emissions. Equipment should be fitted with appropriate silencers (where applicable) and be maintained in accordance with manufacturer's requirements. Machines found to produce excessive noise compared to typical noise levels should be removed and replaced or repaired or modified prior to recommencing works.
- Where possible construction vehicles and machinery would be turned off or throttled down when not in use.

9.5.5 Erosion and Sediment Control

Erosion and sediment controls that prevent dispersion of contaminated soil shall be implemented whenever soil is exposed onsite until the site is completely covered/stabilised or revegetated.

The following erosion and sediment control measures shall be implemented in the following order:

- Diversion of surface water upslope of the excavation and stockpile areas.
- Stockpile soil on flat land where possible and out of any drainage lines.
- Line the base of stockpiles with plastic to prevent contamination of underlying soils.
- Cover stockpiled material completely to prevent wind-blown dust or sediment runoff during rainfall events.
- Install sediment fence down slope of completely covered soil stockpiles to capture any runoff.
- Inspect the erosion and sediment controls weekly, before and immediately following rain events and maintain controls as required.
- Inspect each vehicle before it leaves site and remove all excess soil
- Inspect vehicle access point after each vehicle leaves site and remove any material tracked offsite and place back onsite in a location where it cannot cause water pollution.
- The Contractor is to keep themselves informed of weather conditions and the potential for rain events and proactively manage the site.
- Refer to the NSW Blue Book for details and diagrams at <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Water-quality/managing-urban-stormwater-soils-construction-volume-1-fourth-edition.pdf>

Sediment controls should be determined based on consideration of site specific conditions and anticipated sediment loads however Figures SD 6-7 to SD 6-12 presented in the Blue Book may be appropriate for the scale of remediation undertaken under this RAP.

9.5.6 Surface Water and Groundwater Control

9.5.6.1 Surface water

Surface water quality shall be managed by the Contractor. It is assumed that any water collected within excavations is not contaminated as contaminated material has been removed. Where water collects in an excavation containing contaminated material or from contaminated material i.e. an improperly covered stockpile, the Contractor shall seek advice from an appropriately experienced and certified contaminated land consultant prior to discharge of such water offsite.

The following control measures shall be implemented:

- Erosion and sediment controls outlined in **Section 9.5.5**
- Water collected within excavations shall be directed through at least one sediment trap prior to flowing offsite or being discharged.
- The water shall have a Total Suspended Solids measurement of less than or equal to 50 mg/L and a pH between 6.5 and 8.5. The Contractor is responsible for ensuring all water discharged or flowing offsite complies and shall be able to provide proof of compliance where requested by a Regulator.
- Refer to the NSW Blue Book for details and diagrams of sediment traps at <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Water-quality/managing-urban-stormwater-soils-construction-volume-1-fourth-edition.pdf>

9.5.6.2 Groundwater

Groundwater is unlikely to be encountered during the remediation of surface soils in the upper 1 m of the soil profile at properties within the Captains Flat Precinct. In the event that groundwater is encountered during remediation works, an appropriately experienced and certified contaminated land consultant shall be contacted for advice.

9.5.7 Traffic Control

The Contractor shall identify haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site that meet the following objectives:

- Comply with road traffic rules
- Minimise noise, vibration and odour to adjacent premises
- Maximise travel on state and arterial roads and avoid use of local roads

In addition, the Contractor should consider the following measures:

- Deliveries of soil, materials, equipment or machinery are to occur during standard construction hours (refer to **Section 9.5.2**)
- Securely cover all loads to prevent any dust emissions during transportation
- Vehicles are not to track soil, mud or sediment onto the road

9.5.8 Spill Response

The Contractor shall have a spill response procedure to respond to spills that may occur during remediation works.

Examples where spills could occur are:

- Transport of contaminated material from the site, involving loss of load anywhere including private and public property
- Fuel spill during machinery use or refuelling that occurs anywhere including private or public property

9.5.9 Waste Materials

The Contractor shall limit the amount of waste generated during the remediation works. Waste materials generated during the remediation works shall be recycled where possible or lawfully disposed of.

9.6 Material Tracking

All excavation spoil and material imported during remediation is to be tracked to verify appropriate movement and handling. The system will track materials from cradle-to-grave, and will provide detailed information on the origin, quantity and fate of all materials during remediation. Records will be maintained by Contractor site personnel defining origin, material types and material fate. These records shall be consolidated digitally according to the tracking spreadsheet attached as **Appendix 6**. Where materials are imported, tracking records shall be supported by certification that demonstrates suitability for proposed use (per requirements in **Section 9.2.5**). Where materials are disposed of offsite, tracking records shall be supported by waste classification (per requirements in **Section 9.2.3**) and include dockets confirming disposal at an appropriately licensed receiving facility.

9.7 Community Relations Plan

The requirement for a community relations plan must be explicitly considered during remediation planning and development applications based on the scope of site-specific remediation and potential community impacts.

9.8 Contingency Plan

The environmental controls described in **Section 9.5** are designed to be sufficiently protective under the normal range of site conditions. The contingencies presented in **Table 9-1** are to be implemented where unexpected site conditions or circumstances arise. The Contractor is responsible for recognising when contingencies are required.

Table 9-1: Contingency Plan

Contingency Event	Contingency
Receipt of a noise complaint	Identify noise source and implement noise control measures
Receipt of a dust complaint	Identify dust source and implement dust control measures
Flooding event/ sediment laden discharge	Assess and improve sediment control measures and stockpile management measures
Validation of excavation is not achieved	Complete further excavation and repeat validation
Unexpected contamination identified	Contact an appropriately experienced and certified Contaminated Land Consultant

9.9 Emergency Response Plan

An emergency situation may arise during the remediation works, such as:

- Rupturing of underground gas line
- Contact with an overhead or underground powerline that causes electrocution
- Fire within equipment or machinery

In an emergency situation, the Contractor is to stop work and contact emergency services:

- Ring 000
- Speak slowly and clearly. Do not hang up first, let the dispatcher end the call
- Provide the following information:
 - Your location
 - Your name and phone number
- Describe the nature of the incident
 - Emergency medical incident
 - How many victims
 - Type of incident – physical, electrocution, medical episode
 - Assessment of victims' condition (if known) (whether victim is conscious/ unconscious, breathing/ not breathing, pulse/ no pulse, nature of injuries, first aid measures used)
 - Where incident occurred
 - Fire
 - Location of fire
 - Whether it is known if people have been unable to escape fire
 - Hazardous materials incident
 - Type of incident (fire, explosion, spill)
 - Type of material (specific chemicals or general description)
 - Whether there is also a medical emergency

10. VALIDATION REPORTING

A Remediation and Validation Report is to be prepared by an appropriately experienced and certified contaminated land consultant detailing the completed remediation works and validation sampling undertaken. The report shall be prepared in accordance with NSW EPA (2020) Contaminated Land Guidelines: Guidelines for Consultants Reporting on Contaminated Land.

For the off-site disposal option, the Remediation and Validation Report shall include:

- Scope of work
- Site description
- Description of lead contamination
- Remediation activities undertaken, including extent of excavation works and photographic records
- A clear statement that all materials imported to site were fit for purpose and that all materials exported from site were disposed of or otherwise managed lawfully. Supporting material tracking shall be provided as relevant including:
 - site plans marked with 5 x 5 m grid reference marked with excavation areas and material import areas
 - the material tracking spreadsheet presented as **Appendix 6** (completed with site specific details),
 - certification demonstrating imported materials were fit for use onsite,
 - waste receiving facility dockets
- Validation sampling including comparison of lead concentrations to NEPM (2013) HIL guidelines for the appropriate land use
- A statement indicating the suitability of the site for the future land use.

For the on-site containment option, the Remediation and Validation Report shall include:

- Scope of work
- Site description
- Description of lead contamination
- Capping activities undertaken, including extent of marker layer, capped area and type of capping
- Survey record or area marked on a plan showing capped area
- Notification of Capping (completed using template in **Appendix 3**)
- That the capped area shall be notated on a planning certificate issued under Section 10.7 of the Environmental Planning and Assessment Act
- A statement indicating the suitability of the site for the future land use.
- The Long-Term EMP (**Appendix 4**).

11. NOTIFICATION OF CAPPING

To document the presence of capped materials on site a 'Notification of Capping' form is to be completed and submitted to Council at the completion of works. Council will record the notification of capping on the Section 10.7 Certificate for the site.

The Notification of Capping is to:

- Succinctly describe the nature and location of contamination remaining on the site
- State who will be responsible for implementation of the cap
- State the response to be implemented should the cap be disturbed

A template of the Notification of Capping for the on-site containment option is included in **Appendix 3**. This template is to be updated by property owners at the completion of capping.

12. LONG TERM ENVIRONMENTAL MANAGEMENT PLAN TEMPLATE

The Long-Term EMP is to be a stand-alone document. The objective of the Long-Term EMP is to prevent users of the site from exposure to the contamination remaining on the site and to advise users on the management requirements to maintain the cap effectiveness.

The Long-Term EMP shall:

- Succinctly describe the nature and location of contamination remaining on the site
- State how these contaminants are to be managed
- State who will be responsible for implementation of the plan
- State over what time frame the plan needs to be implemented

A template of the Long-Term Management Plan for the on-site capping option is included in **Appendix 4**. This template is to be updated by property owners at the completion of capping. The property owner must also notify OPRC that a Long-Term EMP applies to the property. The existence of the Long-Term EMP will be listed on the property's Section 10.7 Certificate.

13. PROTOCOLS TO REVIEW AND UPDATE RAP

Review of this Standard RAP by QPRC shall be triggered by the following:

- Change in Council Policy Managing Contaminated or Potentially Contaminated Land in the Queanbeyan-Palerang Council Region
- Review or update of Palerang LEP (2014) or Palerang DCP (2012) when relevant to contaminated land management
- Review or update of EPA endorsed guidelines or policies, including a change to HIL A
- Review or update of relevant NSW legislation
- Update to NSW EPA General Immobilisation Approvals

If otherwise not triggered by the events above, the Standard RAP will be reviewed every two years at a minimum, as per QPRC policy. Guidelines referenced here-in will be specifically reviewed to ensure that the Standard RAP complies with current regulations.

14. CONCLUSIONS AND RECOMMENDATIONS

The Standard RAP provides an alternative to preparation of site-specific RAPs for the remediation of private land within Captains Flat where lead contamination from historic mining or land-fill activities exists.

Contaminants of potential concern that may be present on private properties in Captains Flat other than metals are excluded from the Standard RAP and must be considered in accordance with the otherwise applicable regulatory framework.

Remediation strategies described in the Standard RAP for private properties at Captains Flat are:

- on-site capping followed by long term management and
- excavation followed by offsite disposal.

Competent implementation of the Standard RAP will remove or manage human health risk from lead contamination such that the site is suitable for future land use will ensure that development work does not result in an unacceptable exposure to lead.

15. REFERENCES

National Environment Protection Council (NEPC), National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)

NSW Department of Health (2022) Rainwater Tanks accessed at <https://www.health.nsw.gov.au/environment/water/Pages/rainwater.aspx> 20/07/2022

NSW Department of Planning, Industry and Environment (DPIE) Contaminants and Risks Team (C&R), Environment, Energy and Science Branch (EES) April 2021. Nature and extent of contamination in the Captains Flat Region, NSW

NSW EPA (1995) Sampling Design Guidelines

NSW EPA (2009) General Approval of The Immobilisation of Contaminants in Waste (2009/07)

NSW EPA (2020) Contaminated Land Guidelines: Guidelines for Consultants Reporting on Contaminated Land

NSW EPA (2014) The Excavated Natural Material Order 2014

NSW EPA (2014) Waste Classification Guidelines

NSW Govt (1912) Water Act 1912

NSW Govt (1979) Environmental Planning and Assessment Act 1979 (EP&A Act)

NSW Govt (1997) Contaminated Land Management Act 1997

NSW Govt (1997) Protection of the Environment Operations Act 1997

NSW Govt (2000) Water Management Act 2000

NSW Govt (2014) Protection of the Environment Operations (Waste) Regulation 2014

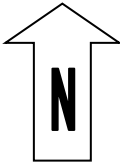
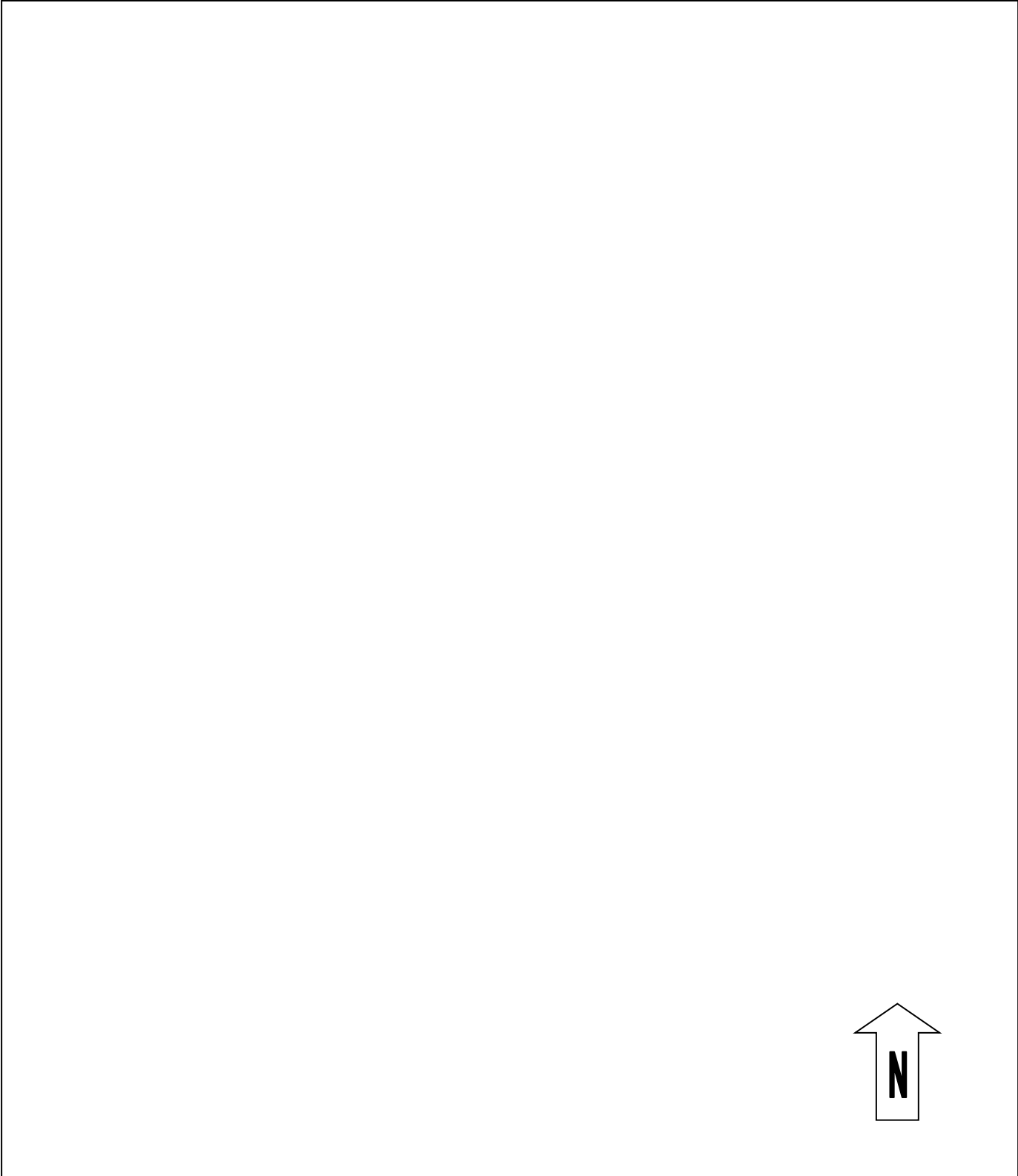
NSW Govt (2021) Resilience and Hazards State Environmental Planning Policy 2021

Queanbeyan-Palerang Regional Council (2012) Palerang Development Control Plan 2012

Ramboll (2021) Conceptual Site Model – Captains Flat Lead Management Plan

Ramboll (2022) Captains Flat Lead Management Plan

APPENDIX 1
TEMPLATE SITE FEATURES PLAN



Site Owner:

Lot and DP:

Figure 1: Site Location Plan

Include a plan showing the site location above

APPENDIX 2
IMMOBILISATION APPROVAL 2009/07

GENERAL APPROVAL OF THE IMMOBILISATION OF CONTAMINANTS IN WASTE

Pursuant to the provisions in Clause 28 of the *Protection of the Environment Operations (Waste) Regulation 1996* the New South Wales Environment Protection Authority has authorised the following general approval of the immobilisation of contaminants in waste:

A) APPROVAL NUMBER

2009/07

This approval replaces general approval of immobilisation number: 1999/07 which is hereby revoked.

B) SPECIFICATION OF WASTE STREAM

Metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials.

C) CONTAMINANTS APPROVED AS IMMOBILISED

Beryllium, Chromium (VI), Lead, Nickel, Polycyclic Aromatic Hydrocarbons (PAHs) and Benzo(a)pyrene (BaP).

D) TYPE OF IMMOBILISATION

Natural

E) MECHANISM OF IMMOBILISATION

Beryllium, Chromium, Lead or Nickel metals and their metal compounds as well as PAHs and BaP are encapsulated within the furnace slag during its formation at elevated temperature exceeding 1,000 degrees Celsius. These metals, metal and organic compounds and their silicate compounds are bonded within a vitrified solid mass.

F) CONDITIONS OF APPROVAL

- *Packaging Requirements*

None

- *Waste Assessment Requirements*

The total concentration (SCC) limits for Beryllium Chromium (VI), Lead, Nickel, PAHs and BaP listed in the *DECC Waste Classification Guidelines Part 1: Classifying Waste (April 2008)* (Waste Guidelines) do not apply to the assessment of metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials. With respect to Beryllium, Chromium (VI), Lead, Nickel and BaP, metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials can be classified according to their leachable concentration (TCLP) values alone.

Any contaminants listed in the Waste Guidelines (other than Beryllium, Chromium (VI), Lead, Nickel, PAHs and BaP) that are contained within the metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials must be assessed in accordance with the Waste Guidelines.

The metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials must not contain any free liquids as defined in the Waste Guidelines.

- *Disposal Restrictions*

None.

Note: The classified metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials may be disposed of to waste facilities which can legally receive them.

- *Record keeping requirements*

The responsible person is required to keep records of the management and disposal metallurgical furnace slag or metallurgical furnace slag contaminated natural excavated materials that are classified as hazardous or industrial waste for a period of at least 3 years from the date which these wastes are disposed of off site.

- *Waste Management Requirements*

None.

1.1.1 G) RESPONSIBLE PERSON

The person or class of persons to whom this general approval relates is the person who carries out the assessment and classification for the purpose of this approval. The responsible person must comply with the conditions of this approval.

Environment Protection Authority

Per: Mark Gorta

Manager Waste Management

By Delegation

Date: 1 July 2009

APPENDIX 3
NOTIFICATION OF CAPPING FORM

NOTIFICATION OF CAPPING
INSERT PROPERTY ADDRESS

Notification of Capping Form

This Notification of Capping form has been prepared to document the capping works completed at the property listed below. Details of the property are listed in **Table 1**.

Table 1: Site Particulars

Site Address	
Lot and DP	
Site Area	
Land Owner	
Contact details	Phone: _____ Email: _____ Address (if different to above): _____ _____ Postal address (if different to above): _____ _____

Soils impacted with lead from the former Lake George Legacy Mine have been capped on this property.

Please attach a plan showing the extent of capping undertaken at the site.

Soils have been capped in accordance with the Standard Remedial Action Plan, Ramboll, February 2022

Soils were capped on the _____ (insert date)

in conjunction with Development Approval Number _____ (insert DA number)

Where capping is not undertaken as part of a Development Approval provide brief description of the development undertaken:

Capping material comprises _____

The marker layer comprises _____

I am aware that this Notification of Capping form will be registered in Section 10.7 of the Planning Certificate held with Queanbeyan-Palerang Regional Council.

Name of land owner _____

Signature of land owner _____

Date _____

Attachments:
Site plan showing extent of capping

APPENDIX 4
LONG TERM ENVIRONMENTAL MANAGEMENT PLAN

Intended for
Insert Land Owner

Document type
Report

Date
DATE

Project Number

LONG TERM ENVIRONMENTAL MANAGEMENT PLAN

INSERT PROPERTY ADDRESS

Revision	Date	Prepared by ¹	Checked by	Approved by	Signature

¹ Appropriately Qualified Contaminated Land Consultant

CONTENTS

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1. INTRODUCTION

This Long-Term Environmental Management Plan (EMP) has been prepared to ensure that capping works at the property listed below is maintained and utilised in a manner that minimises the impact of lead contaminated soil on site occupants, maintenance personnel and the environment.

Details of the property are listed in **Table 1-1**.

Table 1-1: Site Particulars

Site Address	TO BE PROVIDED
Lot and DP	TO BE PROVIDED
Site Area	TO BE PROVIDED
Land Owner	TO BE PROVIDED

This Long Term EMP includes information pertaining to the following:

- A description of the contamination existing on the property
- The nature and extent of the capping
- Control measures required to maintain the cap
- Responsibilities
- Precautions and control measures required when completing works beneath the cap
- How long this plan is required for

2. CONTAMINATION STATUS OF THE SITE

This property is located within the Captains Flat Precinct and has been impacted by lead contamination associated with the former Lake George Legacy Mine.

Capping has been undertaken at the site in accordance with the 'Standard Remedial Action Plan, Land Impacted by the Former Lake George Legacy Mine' (The Standard RAP).

3. CAPPING

A portion of this property has been capped to prevent access to lead contaminated surface soils. Details of the capping are provided in **Table 3-1**.

Table 3-1: Capping Details

Description	TO BE PROVIDED
Area of the property capped	Describe the extent and location of the capping, survey plan to be included
Type of capping	Concrete or hardstand paving (DELETE INCORRECT OPTION)
Surrounding ground surface	Grass, concrete, hardstand paving, constructed building (DELETE INCORRECT OPTION)

4. CONTROL MEASURES

Capping via the placement of concrete or hardstand has been completed to prevent occupants of the property and visitors to the property from coming into contact with lead contaminated soil. The cap must remain in place for the property to be considered suitable for private land use.

Any excavation works to be undertaken beneath the cap must be completed in accordance with the requirements outlined in **Section 6**.

Responsibilities for maintaining the cap are outlined in **Section 5**.

5. RESPONSIBILITIES

Table 5-1 outlines responsibilities in relation to capping of lead contaminated soil at the property.

Table 5-1: Responsibilities

Entity	Responsibilities
Property Owner	The property owner is responsible for ensuring that the cap remains in place in perpetuity. The property owner is responsible for completing site works beneath the cap in accordance with the requirements outlined in Section 6 . If the cap is to be removed, it is the property owner's responsibility to remediate the lead contaminated soil below the cap.
QPRC	It is the responsibility of QPRC to notify the presence of this Long Term EMP on Section 10.7 Certificate.

6. HOW TO COMPLETE SITE WORKS

In the event that excavation works are required below the cap, the following requirements are to be followed by the property owner.

6.1 Personal Protective Equipment requirements

Soil beneath the cap is contaminated either with lead fallout from the former mine or with slag or mine waste fill, which originated from the former mine. To prevent exposure to lead contamination, the following Personal Protective Equipment (PPE) is required to be worn:

- Long sleeved shirt and long pants
- Gloves
- Dust mask

In addition, the following PPE should be applied if working around moving plant such as excavators or backhoes:

- Hard hat
- Safety glasses
- Steel capped boots

6.2 Reinstatement of the Cap

The cap must be reinstated at the completion of the works. The reinstated cap must be in accordance with s.9.3 of the Standard RAP and be of sufficient quality to continue to prevent access to lead contaminated soil below the cap.

If the cap is being removed with no intention to reinstate it, remediation of the lead contamination is required in accordance with Standard RAP, a copy of which is available from QPRC.

6.3 Documentation of Excavated Soil

In the event that lead contaminated soil is to be removed from the property, it must be disposed of lawfully.

Lead contaminated waste at residential, educational or childcare facilities is pre-classified as general solid waste however classification of waste following the NSW EPA Waste Classification Guidance is required for lead contaminated soils originating from other sources.

The property owner must obtain and file copies of the landfill disposal dockets to demonstrate that the lead contaminated soil, black slag or mining waste was disposed of lawfully.

6.4 Importation of Material

All imported soils and landscaping materials must be validated PRIOR to being received at the site to confirm these are Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM).

VENM must meet the definition of VENM provided on <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material>:

'natural material (such as clay, gravel, sand, soil or rock fines):

- (a) That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities and
- (b) That does not contain any sulfidic ores or soil or any other waste.

ENM must meet the requirements of the Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The Excavated Natural Material Order 2014. A copy of this order can be found at <https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/current-orders-and-exemption>.

6.5 Construction Environmental Management Plan

Remediation works undertaken at this site must follow the requirements of the Construction Environmental Management Plan as outlined in the Standard RAP.

APPENDIX 5
SAFE WORK METHOD STATEMENT

Generic Safe Work Method Statement – Lead Remediation on a Private Property

NOTE: Work must be performed in accordance with this SWMS.
 This SWMS must be kept and be available for inspection until the high risk construction work to which this SWMS relates is completed. If the SWMS is revised, all versions should be kept.
 If a notifiable incident occurs in relation to the high risk construction work in this SWMS, the SWMS must be kept for at least 2 years from the date of the notifiable incident.

High risk construction work:	<input type="checkbox"/> Risk of a person falling more than 2 metres (in this case into an excavation)	<input type="checkbox"/> Work on a telecommunication tower	<input type="checkbox"/> Demolition of load-bearing structure
	<input type="checkbox"/> May involve disturbing asbestos	<input type="checkbox"/> Temporary load-bearing support for structural alterations or repairs	<input type="checkbox"/> Work in or near a confined space
	<input type="checkbox"/> Work in or near a shaft or trench deeper than 1.5 m or a tunnel	<input type="checkbox"/> Use of explosives	<input type="checkbox"/> Work on or near pressurised gas mains or piping
	<input type="checkbox"/> Work on or near chemical, fuel or refrigerant lines	<input type="checkbox"/> Work on or near energised electrical installations or services	<input type="checkbox"/> Work in an area that may have a contaminated or flammable atmosphere
	<input type="checkbox"/> Tilt-up or precast concrete elements	<input type="checkbox"/> Work on, in or adjacent to a road, railway, shipping lane or other traffic corridor in use by traffic other than pedestrians	<input type="checkbox"/> Work in an area with movement of powered mobile plant
	<input type="checkbox"/> Work in areas with artificial extremes of temperature	<input type="checkbox"/> Work in or near water or other liquid that involves a risk of drowning	<input type="checkbox"/> Diving work

Safe Work Method Statement (SWMS)			
Site Activities:	Travel to and from site	Site Details:	Private properties within the Precinct
	Excavation of lead contaminated surface soils		
	Loading of contaminated soil into trucks		
		Activity Date:	To be provided
		Site Contact:	To be provided
		Client Contact Phone:	
Emergency Information.	Queanbeyan Hospital Ph (02) 6150 7000	Emergency Contact	000
Risk Assessment prepared by:		Signature	Date
Risk Assessment reviewed by:		Signature	Date

Steps for filling out
1. Discuss with relevant employees, contractors and Health and Safety Coordinator what work will be high-risk, the tasks, and associated hazards, risks and controls.
2. In the task column, list the work tasks in sequence to how they will be carried out.
3. In the 'What are the hazard/environmental impact and risks?' column, list the hazards/environmental impacts and risks for each work task.
4. In the 'How will the hazards and risks be controlled?' column, select the hazard or risk and then work through the control levels 1 – 4 from top to bottom. Choose a control measure (and how it is to be used) that is as close to level 1 as is reasonably practicable.
Control levels
1. Eliminate any risk to health or safety associated with construction work. 2. Reduce the risk to health or safety by any one or any combination of the following: <ul style="list-style-type: none"> • Substituting a new activity, procedure, plant, process or substance • Isolating persons from the hazard, such as barricading, fencing or guardrailing, or • Using engineering controls, such as mechanical or electrical devices. 3. Use administrative controls , such as changing the way the work is done. 4. Provide appropriate personal protective equipment.
5. Brief each team member on this SWMS before commencing work. Ensure team knows that work is to immediately stop if the SWMS is not being followed.
6. Observe work being carried out. If controls are not adequate, stop the work, review the SWMS, adjust as required and re-brief the team.
7. Retain this SWMS for the duration of the site works and file/scan and file signed copy on completion of works.

Task	Hazards	Inherent Risk (Use Matrix)			Controls (refer also to the HASP for further detail)	Residual Risk (Use Matrix)		
		Consequence (1, 2, 3, 4, 5)	Likelihood (A, B, C, D, E)	Inherent Risk (L, M, H, E)		Consequence (1, 2, 3, 4, 5)	Likelihood (A, B, C, D, E)	Inherent Risk (L, M, H, E)
Travel to and from site	Vehicle accident	5	D	H	Use defensive driving techniques. Undertake vehicle check prior to operating to ensure vehicle is in good condition. Drive to the conditions (example reduce speed in rain or low visibility). Hold a drivers licence Have completed Driver Safety Awareness training.	5	E	M
Excavation of lead contaminated surface soil	Exposure to lead contamination in soil and dust	3	C	H	Wear PPE (Long-sleeved shirt, long pants, gloves, dust mask, safety glasses) Wash hands prior to eating, drinking or smoking	2	D	M
	Use of an excavator or back hoe	5	C	E	Establish a work area/no go zone prior to commencing excavation Agree with operator on the communication process Remain in clear view of the operator at all times, do not enter the work area/no go zone until the bucket is lowered to the ground and given clear consent to enter (positive communication)	5	E	M
	Underground and overhead services	5	C	E	Complete Dial Before You Dig prior to starting work Use a locator to mark out services on the property prior to starting work Look up to identify overhead services Excavate in small depth increments Look for caution tape over services and stop digging if exposed	4	D	M
	Sun exposure / heat stress	2	D	M	Long-sleeve shirt, long pants, wide-brimmed hat, tinted glasses and sunscreen to be worn by site personnel. Regular breaks will be taken for workers to cool down and drink water. Breaks will be taken every 20 mins, or sooner if required by site personnel. Stay out of sun where possible.	1	E	L
	Manual handling, carrying equipment to sites	2	C	M	Use SMART techniques, S ize up the load (Assess the load - size, shape and weight. Assess whether the load needs to be moved. Ensure pathway is clear. Assess whether human or mechanical assistance is required. M ove the load as close to your body as possible A lways bend your knees R aise the load with your legs	2	D	M

Designated Site Supervisor			
Name	Contact Phone	Signature	Date

Site Team Sign-off – I fully understand the hazards and control measures to be implemented for this activity:			
Name	Company	Signature	Date

Risk Matrix

		Consequence Category				
		1-Minor	2-Medium	3-Serious	4-Major	5-Catastrophic
		Minor (first aid) injury; Minor impact on environment that can be remedied.	Significant medical treatment) injury; Major impact on environment that can be remedied.	Long term injury; Permanent impact on environment in local area.	Permanent disabling injury; Long term impact on environment over wide area.	One or more fatalities; Permanent impact on environment over wide area.
Likelihood Category	A-Almost Certain	Medium	High	Extreme	Extreme	Extreme
	B-Likely	Medium	Medium	High	Extreme	Extreme
	C-Possible	Low	Medium	High	High	Extreme
	D -Unlikely	Low	Medium	Medium	Medium	High
	E- Rare	Low	Low	Low	Medium	Medium

APPENDIX 6
MATERIAL TRACKING SPREADSHEET

Site Address:
Date:

Captains Flat Private Property Material Tracking Summary

Material Source	Vehicle Registrat	Transport Compa	Waste Type	Waste Classificat	Time Excavated	Date Excavated	Destination	Weighbridge Tim	Weighbridge Dat	Docket #	Net Weight (t)

Notes

Material source and destination (if onsite) should be defined with reference to a 5 x 5 m grid reference system prepared on the Site Plan.