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LEAD ABATEMENT PLAN CAPTAINS FLAT LEAD MANAGEMENT PLAN – FORMER PRESCHOOL

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Ramboll
Level 2, Suite 18 Eastpoint
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia

T +61 2 4962 5444
<https://ramboll.com>

Revision	Date	Prepared by	Checked by	Approved by	Description
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Ramboll Australia Pty Ltd.
ACN 095 437 442
ABN 49 095 437 442

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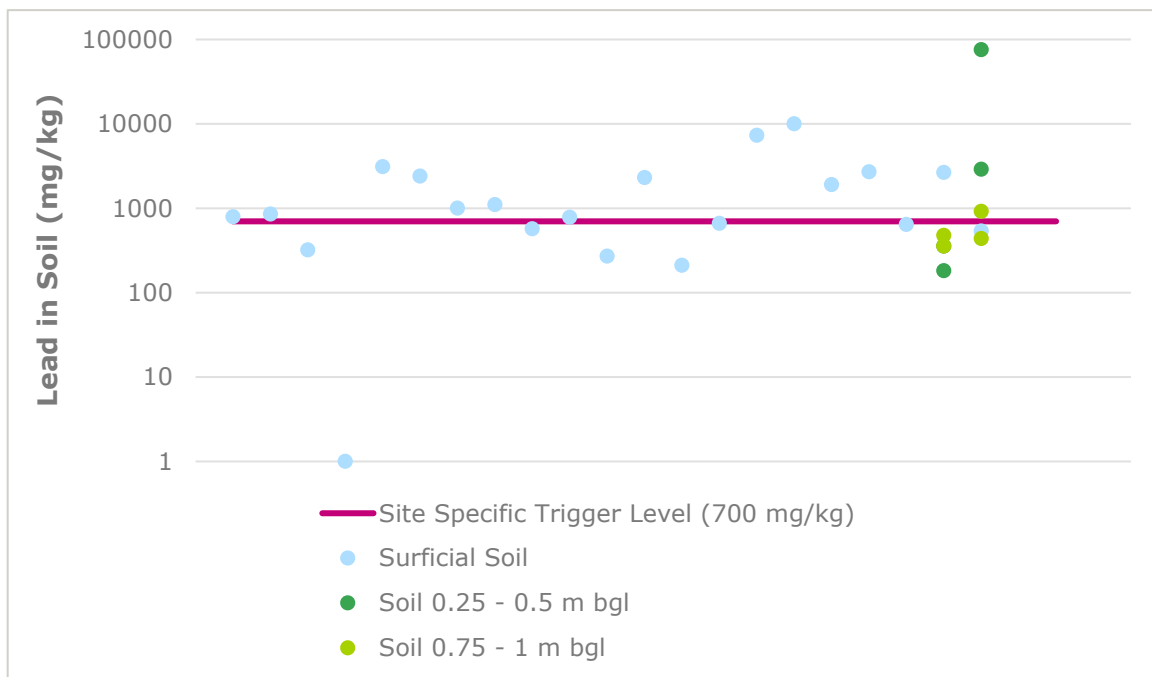
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SEPP Hazards and Resilience (former Sepp 55) Notification Letter

EXECUTIVE SUMMARY

Ramboll Australia Pty Ltd was retained by the Department of Regional New South Wales to prepare this Lead Abatement Plan to address exposure risks from lead at the former preschool located at 27 Foxlow Street, Captains Flat, New South Wales. The Lead Abatement Plan forms part of the Captains Flat Lead Management Plan.

Potential for human health risks from exposure to lead in soil was identified as moderate or high in seven areas of Captains Flat. Risks were generally limited to the southern part of Captains Flat and public land near the northern bank of the Molonglo River though also included Foxlow Parklet. Assessment of lead concentrations at the former preschool against a site-specific trigger level protective of human health (recreational land use) is summarised in **Graph 1**.



Graph 1: Lead in soil at the former preschool

Concentrations of lead in soil generally ranged between 85 to 75,393 mg/kg and an average concentration of 3,830 mg/kg was reported in the five boreholes nearby/within the site (SAQP11-BH05 - SAQP11_BH10). The depth of lead impacts was not delineated in most of the boreholes however the nearby monitoring well borehole (GW1) reported no lead exceedances beyond 1 m below the ground surface and the highest concentration was reported at a depth of 0.5 m. Therefore, the depth of impacts is not fully delineated and assumed to be associated with the fill profile.

This Lead Abatement Plan has been prepared specifically for the former preschool located on Foxlow Street. The objectives are:

- To define an abatement strategy to reduce community exposure risks
- To provide a detailed design including a separable bill of quantities and relevant drawings to allow abatement to be approved and implemented
- To provide an abatement works plans to guide execution of the nominated strategy

The core elements of the abatement strategy for the former preschool are:

- Removal of existing trees (as required)
- Removal of existing fence (replacement after abatement is not required)
- Excavation of the upper 0.1 m where asphalt/hardstand construction is proposed or 0.3 m of soil if/where unsealed landscaping is proposed. The management option for excavated spoil will comprise:
 - Disposal without immobilisation at an appropriately licensed facility (subject to completion of an in-situ waste classification) or
 - Immobilisation for offsite disposal at an appropriately licensed facility as immobilised General Solid Waste (subject to completion of an in-situ waste classification and treatability trial). This pathway includes offsite chemical immobilisation followed by disposal as immobilised General Solid Waste at an appropriately licensed landfill. A waste facility capable of receiving the volume and type of material proposed to be generated during onsite remediation has not yet been identified. A pathway for offsite disposal exists however through amendment to the Environment Protection License (EPL) of a local landfill to allow treatment (where lead concentrations warrant treatment) as a precursor to disposal as GSW. This pathway would include:
 - Assessment of other potential contaminants of potential concern in the projected waste streams which may affect waste classification
 - A treatability trial to confirm an optimal treatment process
 - Application for an immobilisation approval for disposal of treated waste as immobilised GSW
 - Environmental planning and approvals to allow chemical immobilisation at the waste facility or at a suitable interim location
 - Mixing of soils with immobilising reagents
 - Stockpiling to allow confirmatory sampling to assess success of immobilisation
 - Confirmation of waste classification and disposal as immobilised GSW or
 - Transport to the northern tailings dump for placement in the mine site containment cell.
- Survey the stripped surface (X, Y, Z co-ordinates) for remnant contaminated soil
- Placement of a geofabric marker layer on the top of the contaminated soil surface to act as a visual and physical barrier
- Placement of clean capping comprising either a minimum 0.1 m thick sealed hardstand pavement or a minimum of 0.3 m thick soil layer that reinstates current landform levels
- Survey of the top surface of the capping layer (X, Y, Z co-ordinates) to ensure that the required thickness has been achieved
- Revegetation of the final capped surface (where not hardstand) to minimise soil erosion and damage to the capping layer
- Management of remnant contamination under a Long-Term Environmental Management Plan (LTEMP)

The effectiveness of remediation at mitigating exposure risks associated with site contamination in the receiving environment will be assessed through validation of the cap construction.

It is anticipated that the proposed abatement strategy will appropriately mitigate risks associated with site contamination and that the Long-Term Environmental Management Plan will effectively manage risks from residual contamination.

ABBREVIATIONS

Measures	Description
%	per cent
km	Kilometres
km/h	Kilometres per hour
m	Metre
mAHD	Metres Australian Height Datum
mbgl	Metres Below Ground Level
mg/kg	Milligrams per Kilogram
AHD	Australian Height Datum
CSM	Conceptual Site Model
DQO	Data Quality Objective
DRNSW	Department of Regional New South Wales
EIL	Ecological Investigation Level
ENM	Excavated Natural Material
EPA	Environment Protection Authority (NSW)
fpXRF	Field Portable X-ray Fluorescence
HIL	Health Investigation Level
LAP	Lead Abatement Plan
LTEMP	Long-Term Environmental Management Plan
Mercury	Inorganic mercury unless noted otherwise
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury
NATA	National Association of Testing Authorities
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NSW	New South Wales
PM	Particulate Matter
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
SAQP	Sampling and Analysis Quality Plan
SEPP	State Environmental Planning Policy
SSTL	Site Specific Trigger Level
TBA	To be announced se
TSP	Total Suspended Particulate
US EPA	United States Environmental Protection Authority
VENM	Virgin Excavated Natural Material
-	On tables is "not calculated", "no criteria" or "not applicable"

1. INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was retained by the Department of Regional New South Wales (Regional NSW) to prepare the Lead Abatement Plan (LAP) to address exposure risks from lead within the former preschool located at 27 Foxlow Street, Captains Flat, New South Wales (NSW) (the site).

1.1 Background

This LAP forms part of the Captains Flat Lead Management Plan (LMP) and the site is located within the Captains Flat Lead Management Precinct (the Precinct). The Precinct was defined in the Conceptual Site Model (Ramboll 2021) and 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 perimeter of the community.

A figure showing the location of the Precinct is presented in **Appendix 1, Figure 1**.

1.2 Conceptual Site Model Summary

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

Additionally, potential human health risks from exposure to contaminated surface water and groundwater are considered **moderate**.

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

Interim water use guidelines have been developed and define measures to mitigate risks from public water related to exposure to contaminants from historical mining and land-fill activities at Captains Flat. The interim guidelines integrate information on current usage based on a survey completed by Regional NSW and it is anticipated they will be reviewed after mine site rehabilitation and abatement measures proposed for public lands within Captains Flat. The

potential risk to human health due to environmental impacts in groundwater is relatively low based on the water use survey where no groundwater users were identified.

1.3 Objectives

The objectives of this abatement plan are:

- To define an abatement strategy to reduce community exposure risks
- To provide a detailed design including a separable bill of quantities and relevant drawings to allow abatement to be approved and implemented
- To provide an abatement works plans to guide execution of the nominated strategy

Abatement of the former preschool is proposed to support reuse of the site for a limited range of community uses excluding childcare.

Public Space abatement plans target remediation of lead in soil in areas where potential risks to human health are considered to be moderate or high however it is noted that elevated concentrations of other metals are co-located with lead and present potential risks particularly to ecology. Implementation of the abatement plan could be expected to mitigate risks from other metals and the scope of long-term monitoring in receiving environments is intended to inform evaluation of management outcomes related to ecological risk.

2. SITE DESCRIPTION

2.1 Site Identification

A site locality plan and a site features are presented as **Figure 1** and **Figure 2, Appendix 1**.

The site details are presented in **Table 2-1**.

Table 2-1: Site Identification

Information	Description
Street Address:	27 Foxlow Street, Captains Flat, NSW
Identifier:	Lots 101 and 107 Deposited Plan P754870
Site Area:	Approximately 2,000 m ²
Local Government:	Queanbeyan-Palerang Regional Council
County and Parish:	County of Murray, Parish of Ballallaba
Owner:	Crown Land
Leased by:	-
Site boundaries:	The site is bounded by Foxlow Street to the east, vacant Crown land to the south and west and residential properties to the north.
Current Site Use:	Former preschool, currently vacant and public open space.

2.2 Site Details

The site comprises the preschool building, outdoor play area and vacant land surrounding the preschool fencing. The site elevation is approximately 840 m Australian Height Datum (mAHD).

2.3 Land Use

The site comprises the former preschool which is currently vacant and managed by Crown Land.

2.4 Site Condition and Surrounding Environment

Site details observed during the inspection conducted in February 2021 are outlined in **Table 2-2**.

Table 2-2: Site Condition and Surrounding Environment

Site	Description
Topography	The site is flat and sits at the base of the valley within the Captains Flat township with the eastern embankment of the mine site to the west.
Conditions at Site Boundary	The site is bounded by Foxlow Street to the east, vacant Crown land to the south and west and residential properties to the north.
Visible Signs of Contamination	Large areas of bare soil in the area surrounding the site are evidence of vegetative stress likely contributed to by contamination in soil. These areas are visible evidence of widespread contamination.
Presence of Drums, Wastes and Fill Material	Fill was reported in bore logs at the site from the surface to a depth of between 0.4-0.6 mbgl and comprised sandy/silty/gravelly clay. No presence of anthropogenic waste material was observed in the soil profile at the site.
Odours	No odours were noted onsite during the inspection.

3. ABATEMENT CRITERIA

Site specific trigger levels (SSTLs) protective of human health were developed for lead in soil. The bio-accessibility of lead assumed in Health Investigation Levels (HILs) generically applicable in Australia was replaced with site specific bio-accessibility determined through representative sampling and analyses of Captains Flat soils. All other parameters used in the HIL models were retained. The resulting lead in soil concentrations were adopted as SSTLs for human health risk assessment across the land use scenarios that occur in public spaces of Captains Flat. A technical note describing the development of these SSTLs is presented in the CSM report (Ramboll, 2021). The SSTL technical note was reviewed and approved by the Captains Flat LMP Taskforce integrating the NSW EPA and NSW Department of Planning, Industry and Environment (DPIE) Contaminants and Risks Team.

The adopted abatement criteria for the site is presented in **Table 3-1** based on a recreational land use scenario. This land use scenario is consistent with the limited range of community uses being considered for the site.

Table 3-1: Soil Assessment Criteria (mg/kg)

Contaminant	Human Health SSTL (C)
Lead	700

The 95% upper confidence limit of the arithmetic mean lead reading (as measured by fpXRF in the field) will be assessed against the criteria nominated in **Table 3-1** where the following conditions are met:

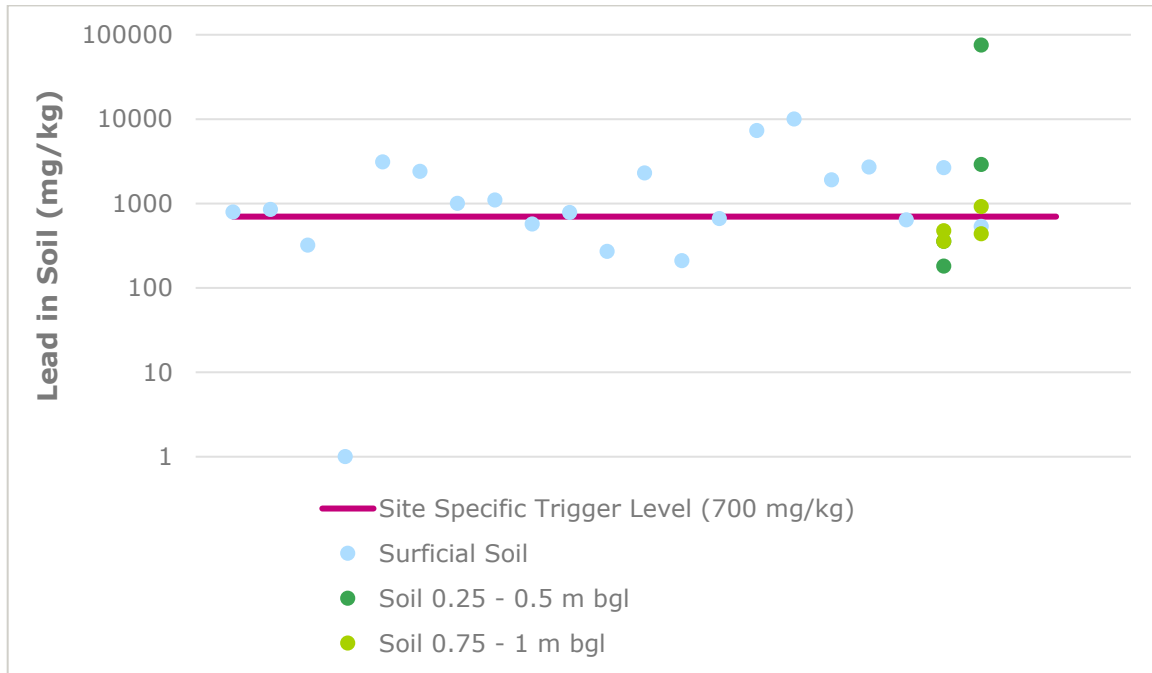
- The standard deviation of the results is less than 50% of the criteria, and
- No single value should exceed 250% of the criteria

Where these conditions are not met, absolute lead readings will be adopted.

4. SITE CHARACTERISATION

Soil descriptions from the recent investigations (Ramboll, 2021) indicate the site is underlain by fill comprising sand, clay and gravel overlying natural clay.

Assessment of lead concentrations at the former preschool against a SSTL protective of human health (recreational land use) is summarised in **Graph 2**.



Graph 2: Lead in soil at the former preschool

Concentrations of lead in soil ranged between 85 to 75,393 mg/kg and an average concentration of 3,830 mg/kg was reported in the five boreholes nearby/within the site (SAQP11-BH05 - SAQP11_BH10). The depth of lead impacts was not delineated in most of the boreholes however the nearby monitoring well borehole (GW1) reported no lead exceedances beyond 1 m below the ground surface and the highest concentration was reported at a depth of 0.5 m. Therefore, the depth of impacts is not fully delineated and assume to be associated with the fill profile.

The extent of lead concentrations exceeding adopted assessment criteria and requiring remediation are presented on **Figure 2, Appendix 1**. Abatement is proposed across all external unsealed areas of the site (outside existing building and pavement).

5. ABATEMENT OPTIONS ASSESSMENT AND ABATEMENT STRATEGY

An abatement options assessment was prepared in conjunction with the Captains Flat LMP Taskforce to identify preferred strategies for public spaces identified as having moderate or high potential human health exposure risks from lead in soil (Ramboll 2022).

The core elements of the abatement strategy for the former preschool are:

- Removal of existing trees (as required)
- Removal of existing fence (replacement after abatement is not required)
- Excavation of the upper 0.1 m where asphalt/hardstand construction is proposed or 0.3 m of soil if/where unsealed landscaping is proposed. The management option for excavated spoil will comprise:
 - Disposal without immobilisation at an appropriately licensed facility (subject to completion of an in-situ waste classification) or
 - Immobilisation for offsite disposal at an appropriately licensed facility as immobilised General Solid Waste (subject to completion of an in-situ waste classification and treatability trial). This pathway includes offsite chemical immobilisation followed by disposal as immobilised General Solid Waste at an appropriately licensed landfill. A waste facility capable of receiving the volume and type of material proposed to be generated during onsite remediation has not yet been identified. A pathway for offsite disposal exists however through amendment to the Environment Protection License (EPL) of a local landfill to allow treatment (where lead concentrations warrant treatment) as a precursor to disposal as GSW. This pathway would include:
 - Assessment of other potential contaminants of potential concern in the projected waste streams which may affect waste classification
 - A treatability trial to confirm an optimal treatment process
 - Application for an immobilisation approval for disposal of treated waste as immobilised GSW
 - Environmental planning and approvals to allow chemical immobilisation at the waste facility or at a suitable interim location
 - Mixing of soils with immobilising reagents
 - Stockpiling to allow confirmatory sampling to assess success of immobilisation
 - Confirmation of waste classification and disposal as immobilised GSW or
 - Transport to the northern tailings dump for placement in the mine site containment cell.
- Survey the stripped surface (X, Y, Z co-ordinates) for remnant contaminated soil
- Placement of a geofabric marker layer on the top of the contaminated soil surface to act as a visual and physical barrier
- Placement of clean capping comprising either a minimum 0.1 m thick sealed hardstand pavement or a minimum of 0.3 m thick soil layer that reinstates current landform levels
- Survey of the top surface of the capping layer (X, Y, Z co-ordinates) to ensure that the required thickness has been achieved
- Revegetation of the final capped surface (where not hardstand) to minimise soil erosion and damage to the capping layer
- Management of remnant contamination under a Long-Term Environmental Management Plan (LTEMP)

5.1 Bill of Quantities for Preferred Abatement Option

A bill of quantities (the BoQ) for the preferred abatement option for the site is summarised in **Table 5-1**.

Table 5-1: Bill of Quantities for Preferred Abatement Option

Description	Unit	Estimated Quantity
Load out of shallow soil to appropriate facility	m ³	180
Supply and construct pavement	m ²	1800

No provision is made in the BoQ for landscaping as it is anticipated that most if not all of the site will be capped with sealed pavement.

Excavation volume estimate based on a maximum depth of 0.1 m over 1,800 m² (site area less building footprint) noting that a depth of 0.3 m would be required in landscaped areas if this option is pursued.

The bill of quantities specifications exclude details associated with revegetation such as species selection and placement. The Principal should provide clarification of preferred species and final vegetation design to inform Contractor planning. Revegetation is not required in asphalt/hardstand areas.

6. ABATEMENT WORKS PLAN

6.1 Key Personnel

All site personnel (including Crown Land and its contractors) have the responsibility of protecting human health and the environment. Key personnel and their roles and responsibilities are outlined in **Table 6-1**.

Table 6-1: Key Personnel roles and Responsibilities

Personnel	Name and Contact Details	Role / Responsibility
Principal	Crown Land	Responsible for implementing the LAP.
Principals Environmental Representative	TBC	Personnel employed by Crown Land or sub-contracted to Crown Land to oversee / provide technical advice on remediation works and ensure works are completed in accordance with relevant guidelines.
Contractor	TBA	Company contracted to undertake remediation works. Responsible for supplying all plant and personnel to conduct the works as outlined in this LAP and as required under local, state and federal legislation.
Contractors Supervisor or Project Manager	TBA	Responsible person appointed by contractor to supervise / coordinate all aspects of remedial works on behalf of the contractor. The primary point of contact for the project.

6.2 Licenses and Approvals

As a precursor to licensing and approvals specific to remediation, Land Owner Consent will be required as will an assessment of Native Title.

The State Environmental Planning Policy (SEPP) Resilience and Hazards 2021 (the Hazards and Resilience SEPP) defines a framework for management of contamination in NSW. It defines requirements for engagement with consent authorities and local councils according to whether remediation is considered Category 1 (requiring development consent) or Category 2 (requiring notification 30 days before remediation). Ramboll consider the proposed abatement strategy to be Category 2 remediation. Category 2 remediation work is deemed remediation work that is not Category 1 remediation as described in Section 4.8 (a) – (f) under the Hazards and Resilience SEPP.

The proposed remediation works do not trigger the criteria in Section 4.8 (a) – (f) under the Hazards and Resilience SEPP and the proposed remediation works are not ancillary to any other current development requiring Development Consent. Based upon the above information and criteria, the remediation works are deemed to be Category 2 works under the Resilience and Hazards SEPP. The Notification Letter included in **Appendix 2** must be provided to Queanbeyan-Palerang Regional Council a minimum of 30 days before commencement of remediation.

Where immobilisation is proposed a specific immobilisation approval from the EPA and an approval for the immobilisation work to occur must also be coordinated.

6.3 Community Relations

Crown Land will manage community relations through abatement at the former preschool according to a formalised community relations plan.

6.4 Protection of Infrastructure, Heritage and Vegetation

The Contractor's methodology will include measures to ensure the protection of surrounding infrastructure, heritage and vegetation immediately surrounding the site.

The Principal will provide current service plans covering proposed areas of excavation. The Contractor will make provision for onsite location of services and measures to ensure services are not disturbed. Notification should be given to any service providers to ensure the capping does not disturb service assets.

6.5 Site Establishment

The Contractor will be responsible for site establishment including:

- Notification to SafeWork NSW of lead risk work before mobilisation to site
- Communication of the requirements of the LAP to all workers. This requirement must be embedded in commercial agreements with the Contractor and in Contractor management plans
- Establishment of site access restrictions and ancillary provisions for site access such as traffic control.
- Mobilisation and management of all Contractor personnel and plant that are required

The Principal's Environmental Representative will refine excavation extents through fpXRF measurement of surface lead concentrations in/around proposed excavation areas and work with the Contractor during abatement to confirm the extent of capping required.

Site boundaries are presented on **Figure 2, Appendix 1**.

6.6 Management Plans

Prior to commencing works at the site, management plans are required to be developed and approved by the Principal. Management plans required, at a minimum are as follows.

- A Construction Environmental Management Plan that details the controls proposed by the contractor to minimise impacts on the community and the environment during the works. This plan is to include as a minimum, the subplans outlined in **Section 0 to 6.10**
- A worker health and safety plan that includes the specific details for working with these materials

Plans are to be reviewed and approved by the Principal prior to the commencement of abatement works.

6.7 Earthworks Management Plan

The contractor will prepare an earthworks management plan to describe the systems, equipment and methodologies that will be utilised to implement the abatement plan. It is anticipated that this will describe direct excavation of contaminated soils to trucks for transport to an appropriate offsite facility. At a minimum the earthworks management plan will satisfy the following requirements:

- All earthworks shall be completed in accordance with AS3798-2007
- Remnant surfaces after excavation of contaminated soils shall be finished to provide a uniform surface free of defects that may adversely affect the overlying layers
- Manufacturer's certification of marker layer will be provided to the Principal and must be approved before these materials are delivered to site
- The fill layer shall be constructed with specific regard for provisions described within AS3798-2007 Section 6.2 including compaction of fill as a systematic construction operation using plant that is specifically assigned to the compaction task and which tracks progressively across the surface of the fill. All other provisions for construction of fill described within AS3798-2007 must also be followed
- Fill material shall not contain:
 - Contaminated material harmful to the receiving environment
 - Silts or materials that adversely affect capacity to achieve compliance with AS3798-2007
 - Deleterious material that limits geotechnical or aesthetic suitability, or that is not compliance with assessment criteria for imported material described elsewhere in this abatement plan
 - Actual or potential acid sulphate soils
- Pavement including any base or subgrade layers shall be constructed in accordance with Principal specifications
- Where pavement is not applied the upper 0.1 m of the fill profile shall comprise topsoil that shall be spread evenly in one lift and compacted lightly so that the finished surface is smooth and free of lumpy material such as stones, wood or other vegetative matter
- Placement and establishment of vegetation in accordance with Principal specifications

Any imported materials must also meet the validation requirements in Table 7-2. I.e. certification demonstrating compliance of imported material as VENM, ENM or another recovered resource must be provided to and formally accepted by the Principal before the material is imported to site.

6.8 Soil and Water Management Plan

The Contractor will prepare a Soil and Water Management Plan in accordance with relevant provisions of the Managing Urban Stormwater: Soils and Construction (Landcom 2008) to manage soil and water during the works. The Contractor must define and implement controls to prevent offsite contaminant migration above criteria protective of the receiving environment.

6.9 Noise Management Plan

The Contractor will prepare a noise management plan to manage noise during the works. The following noise control measures should be considered:

- Construction vehicles and machinery would be selected with consideration 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.
- All site personnel would be informed of their obligations to minimise potential noise impacts on residents during the site induction and need to take reasonable and practical measures to minimise noise.
- Hours of operation described in **Section 6.14** must be observed.

6.10 Dust Management Plan

The Contractor will prepare a dust management plan to manage dust during the works. The Contractor must define and implement dust controls to prevent offsite contaminant migration above criteria protective of the receiving environment. Controls will prevent offsite migration of dust. The following dust control measures should be considered:

- Regularly water vehicle routes and work areas with a watercart
- Maintain and sweep roads where deposited dust or spillage is visible
- Avoid unnecessary use of and access to unsealed surfaces
- Limit vehicle and mobile plant speeds within the work area e.g., 10 km/h
- Modify or cease operations during adverse meteorological or dust generating conditions
- Consider use of wind breaks or shielding around material and/or stockpiles
- Maintain stockpiles at defined height, where the lowest practicable height is preferable
- Avoid double-handling of material and optimise transfers to limit time stockpiled or handled
- Visually observe dust levels to adapt operations
- Cover all loads when transporting material
- Identify and allocate sufficient resources to manage dust risks
- Facilitate training and tool-box-talks addressing air quality management objectives, hazards, risks, controls, behaviours and consequences for inappropriate behaviour

The Dust Management Plan should include onsite air quality monitoring specific to the Contractor's methodology. There is no available method to measure deposited dust or lead in TSP in real-time so monitoring will include sampling of airborne dust at the site boundaries. The monitoring equipment should be capable of measuring TSP, PM₁₀ and PM_{2.5} continuously. The equipment should be capable of alerting to trigger values through telemetry and software that allows alerting at averaged set-points to email and/or SMS. The instrumentation should be maintained in accordance with the manufacturers specifications and hold a current factory calibration certificate.

A three-level air quality alert system is proposed. The trigger levels should be based on real-time monitoring from the Precinct collected prior to abatement. The alert values should be based on the 98%, 99.9% and 100% percentile of the 15-minute averages of measurements over a minimum 12-month period. These values are considered appropriate when considering what is

acceptable in the community, the low airborne lead measured in absence of abatement and when considered against the air quality criteria at longer averaging periods. Trigger values should be reviewed following the first month of data and potentially revised with consideration of the air quality criteria, monitoring technique and positioning of monitors.

- Alert Level:
 - Elevated levels of dust measured for one 15-minute averaging period
 - Initial trigger values set at 98 percentile 15-minute average
 - Observe the operation to identify dust generating activities. Consider further action to minimise dust generation or continue to observe closely
- Action Level 1:
 - Elevated levels of dust measured for two consecutive 15-minute averaging periods
 - Initial trigger values set at 99.9 percentile 15-minute average
 - Immediately action additional dust mitigation measures and communicate requirement to reduce dust levels to all operational staff
- Action Level 2:
 - Elevated levels of dust measured for three consecutive 15-minute averaging periods
 - Initial trigger values set at 100 percentile 15-minute average
 - Cease operation and prioritise dust mitigation measures. Operation can recommence once subsequent alert levels are at Action Level 1 or below.

The Dust Management Plan is to consider historical activities completed in the Captains Flat area and the sensitivities of neighbouring properties to impacts from dust.

6.11 Material Tracking

All material handled during excavation of lead impacted materials 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 excavated during remediation. Records will be maintained by Contractor site personnel defining location of origin, material types loaded, and material fate.

6.12 Survey

The Contractor will co-ordinate survey to ensure all capped areas and remnant contamination is accurately defined.

This survey forms part of the validation requirements described in **Table 7-2**.

6.13 Abatement Schedule

The final abatement schedule will be discussed with the Contractor. A proposed indicative schedule up to the completion of a draft validation report is outlined in **Table 6-2**.

Table 6-2: Remediation Schedule

Task	Estimated Duration
Planning, engagement of Remediation Contractor and receiving facility	3 – 6 months
Establishment of Site	2 weeks
Excavation and capping	4 – 6 weeks
Total Duration	18 – 32 weeks

6.14 Hours of Operation

The Remediation Contractor shall only undertake works associated with validation works that may generate an audible noise at the closest residential receptors (18-34 and 31-39 Foxlow Street) during the following hours, unless under direction from relevant authority for safety reasons or in the event of an emergency:

- 7:00 am to 6:00 pm Monday to Friday
- 7:00 am to 1:00 pm Saturdays
- At no time on Sundays or public holidays

6.15 Contingency Plan

The contingencies presented in **Table 6-3** are to be implemented where unexpected site conditions or circumstances occur.

6.16 Long Term Environmental Management Plan

A LTEMP will be required to provide guidance for ongoing maintenance of remnant contamination. The LTEMP will include survey of landform prior and post capping. A legal requirement to implement the LTEMP should be defined through a covenant to the land title.

The report should include the following headings as a minimum:

- Title
- Purpose
- Background
- Description of existing/residual contamination
- Management activities
- Inspection, maintenance, environmental sampling, analysis and reporting
- Monitor and review of environmental management plan
- Communications and notifications

Table 6-3: Contingency Plan

Contingency Event	Contingency Action	Personnel Responsible
Receival of a dust complaint	<p>Stop Work</p> <p>Identify dust source and review control measures.</p> <p>Assess requirements for additional monitoring or investigation of impact.</p> <p>Review trigger alert system to determine if unacceptable impact measured at site boundary.</p>	Contractor following consideration from the Principal and Principal's Environmental Representative
Exceedance of dust trigger levels (defined in Section 6.10)	<p>Alert level trigger received – observe the operation to identify dust generating activities. Consider further action to minimise dust generation or continue to observe closely.</p> <p>Action Level 1 – Immediately action additional dust mitigation measures and communicate requirement to reduce dust levels to all operational staff.</p> <p>Action Level 2 - Cease operation and prioritise dust mitigation measures. Operation can recommence once subsequent alert levels are at Action Level 1 or below.</p>	Contractor following consideration from the Principal and Principal's Environmental Representative
Discovery of unexpected materials	Contact the Principal's representative, sort materials into a segregated stockpile and discuss possible disposal options with the Principal or the Principal's Representative	Principal, following notification from the Contractor
Receival of a noise complaint	Identify noise source and implement noise control measures	Contractor

7. VALIDATION PLAN

The following validation Sampling and Analysis Quality Plan (SAQP) is to be implemented to validate that the remedial objective has been achieved for the site.

7.1 Validation Data Quality Objectives

Specific Data Quality Objectives (DQOs) have been developed for the validation of field and analytical data obtained during the remediation. The DQO process is a systemic, seven step process that defines the criteria that the validation sampling should satisfy in accordance with the requirements of NSW Environment Protection Authority (EPA) (2017) *Guidelines for the NSW Site Auditor Scheme* (3rd Edition). The DQOs are as follows:

7.1.1 Step 1: State the Problem

Lead impacted soil exists at the site. Abatement is required to mitigate potential exposure risks into the future and validation is required to demonstrate that abatement works have been successfully completed.

7.1.2 Step 2: Identify the Decisions

The validation SAQP is to ensure that abatement of the site occurs such that remnant lead concentrations are isolated from the potential future receptors. The decisions that are required to address the problem include:

- Has the contamination been isolated such that it does not present an exposure risk to current and future occupants of the site?

7.1.3 Step 3: Identify Inputs to the Decision

The following inputs into the decision-making process are required:

- Survey of pre-capping surface levels and final landform to define the location of contaminated soils remaining onsite and to validate capping thickness
- Contractor records demonstrating compliance with earthworks specifications
- Waste tracking to confirm volume and type of material transported to the mine site containment cell or to an appropriately licensed waste facility
- Validation sampling of imported capping material

7.1.4 Step 4: Define the Study Boundary

The study boundary includes the former preschool located at 27 Foxlow Street, Captains Flat, NSW as defined in **Figure 1**.

7.1.5 Step 5: Development of Decision Rules

Data will be considered reliable if it satisfies the limits of decision error defined in **Section 0**.

Soil will be considered suitable as backfill material from a contamination perspective if it meets the definition of Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM) or otherwise meets the requirements of another Resource Recovery Order/Exemption (RRO/RRE) as defined in the POEO Act and also meets the relevant human health and ecological criteria for the proposed land use (e.g., HIL C).

Potential for offsite contaminant migration after remediation will be considered to be satisfactorily low if contaminants are isolated below a suitable capping material at a minimum thickness of 0.1 m.

7.1.6 Step 6: Specify Performance Criteria

Validation performance criteria are defined to assess potential for a false positive or false negative in validation data. Performance criteria are presented in below.

Table 7-1: Performance Criteria for Validation Sampling

Category	Sampling of Imported Soils / Landscape Materials
<p>Accuracy: Accuracy in the collection of field data will be controlled by:</p>	<p>It is envisaged that imported soils may be limited to pavement and landscaping products.</p> <p>Sampling for laboratory analyses will occur in general accordance with <i>AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil - Non-volatile and semi-volatile compounds</i> and <i>AS 1141.3.1 - 2012 Methods for Sampling and Testing Aggregates, Method 3.1: Sampling - Aggregates</i></p>
<p>Precision: The degree to which data generated from replicate or repetitive measurements differ from one another due to random errors. Precision of field data will be maintained by:</p>	<p>In the field, precision will be maintained by:</p> <ul style="list-style-type: none"> • Using standard operating procedures for the collection of soil samples. • Collection of soil samples by suitably experienced environmental scientists. • Use of disposable nitrile rubber gloves between sampling locations. • Placement of samples directly into designated single use sampling containers. • Collection of intra-laboratory and inter-laboratory duplicate samples at a rate of 1 in 20 primary samples. • Collection of one rinsate sample on reusable sampling equipment at the end of each day. • Recording of sample identification and analytical requirements on chain of custody documents. • Samples transported to the laboratory under chain of custody conditions to a laboratory with NATA accreditation for the analytical methods prescribed. <p>In the laboratory, precision will be assessed using blind duplicate samples and split duplicates.</p> <p>Performance criteria for analyses of soil duplicates are defined as follows:</p> <ul style="list-style-type: none"> • Data will be analysed adopting RPD control limits of +/- 30%. <p>Where concentration levels are less than two times the Practical Quantitation Limit (PQL), the Absolute Difference (AD) shall be calculated. Data will be considered acceptable if: AD < 2.5 times the PQL.</p> <p>Any data which does not conform to these acceptance criteria will be examined for determination of suitability.</p> <ul style="list-style-type: none"> • Blank samples will be submitted with the analytical samples and analysed for the contaminants of concern: One Field Blank will be collected each day.

Category	
Sampling of Imported Soils / Landscape Materials	
	<p>The laboratory will additionally undertake a method blank with each analytical batch of samples. Laboratory method blank analyses are to be below the PQLs.</p> <p>Positive results may be acceptable if sample analyte concentrations are significantly greater than the amount reported in the blank (ten times for laboratory reagents such as methylene chloride, chloroform, and acetone etc., and five times for all other analytes). Alternatively, the laboratory PQL may be raised to accommodate blank anomalies provided that regulatory guidelines are not compromised by any adjustment made to the PQL.</p>
Completeness: The completeness of the data set shall be judged by:	<ul style="list-style-type: none"> • All locations sampled as outlined in Section 7.1.7. • Sampling completed by experienced personnel • Field documentation completed correctly
Representativeness: The representativeness of the field data will be judged by:	<ul style="list-style-type: none"> • Non-disposable sampling equipment, such as the hand auger, will be thoroughly decontaminated between locations using Decon®90 solution and deionised rinsate water. • At each location, a pair of disposable nitrile gloves will be worn while sampling and handling the sample; gloves will be replaced between each successive sample. • Soil analytical samples will be collected directly into the sampling containers.
Comparability: Comparability to existing field data will be maintained by:	<ul style="list-style-type: none"> • Use of the same appropriate sampling methodologies • Same sampling depths will be used (where practical) • Analytical samples will be collected for submission to the laboratory • Photographs will be taken of sampling location conditions at the time of sampling.

Decision Error Protocol

If the data received is not in accordance with the defined acceptable limits outlined in Steps 5 and 6, it may be considered to be an estimate or be rejected. Determination of whether this data may be used or if re-sampling is required will be based on the following considerations:

- Closeness of the result to the site-specific trigger levels
- Specific contaminant of concern (e.g. response to carcinogens may be more conservative)
- The area of site and the potential lateral and vertical extent of questionable information
- Whether the uncertainty can be effectively incorporated into site management controls

Rectifying Non-conformances

If any of the validation procedures or criteria identified are not followed or met, this will constitute a non-conformance. The significance of the non-conformance will determine if rectification is required and should be assessed by the Landowner’s Environmental Representative.

7.1.7 Step 7: Optimise the Design for Obtaining Data

All validation samples are to be collected in accordance with the DQOs outlined in this Section.

Validation samples, frequency of collection, the analysis required, and justification is presented in **Table 7-2**.

Table 7-2: Validation Plan

Validation Method	Validation Requirements	Measurement / Analyses
<p>Validation of soils offsite disposal</p>	<p>If soils are immobilised for disposal as immobilised GSW:</p> <ul style="list-style-type: none"> • Immobilised soils will be considered suitable for disposal as immobilised GSW if the 95% UCL of lead leachate (TCLP) is less than the limit for lead leachate in GSW defined in the NSW EPA Waste Classification Guidelines (TCLP1 – 5 mg/L). • Validation sampling of immobilised soil stockpiles will be completed by the Principal’s environmental representative. • Sampling will occur to achieve a density of 1/25 m³ with a minimum of three samples. <p>If soils are disposed of at a licensed waste facility without immobilisation or transported to the northern tailings dump for placement in the mine site containment cell, validation sampling is not required.</p>	<p>Laboratory analyses of immobilised soils for total lead and immobilised fines for lead leachate (TCLP).</p>
<p>Validation of construction or landscaping materials</p>	<p>Capping/backfill material will be considered suitable if it meets the definition of VENM or ENM or an RRO/RRE.</p> <p>Samples should be tested at a frequency of 1 sample per 25 m³ and in accordance with the relevant RRO.</p>	<p>Certification of the suitability of backfill materials for proposed use (eg: VENM/ENM or similar for topsoil certifying compliance with the NSW EPA Resource Recovery framework described in the POEO (Waste) Regulation).</p> <p>Laboratory analyses of capping/backfill material for COPC including those specified in the ENM Order or other resource recovery order or at a minimum TRH, BTEXN, PAH, OCP, OPP, heavy metals and asbestos as well as any other potential contaminants of concern from the materials origin site.</p>
<p>Validation of cap construction</p>	<p>Cap construction including hardstand and soil will be considered suitable if underlain by geofabric marker layer, applied to encompass the entire site excluding building footprints and compliant with Principal specifications.</p>	<p>Contractor records demonstrating compliance with Principal specifications. The Contractor must provide as built drawings demonstrating cap construction to address the validation requirements including registered survey of the site, building footprint and all cap features including X, Y, Z coordinates for marker layer and top of cap including top of landscaping materials.</p>

7.1.7.1 Validation Reporting

A validation Report will be prepared in general accordance with the relevant sections of NSW EPA (2020) Contaminated Land Guidelines: *Consultants Reporting on Contaminated Land* and the NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)*. The Validation Report will include:

- Executive summary
- Scope of work
- Site Description
- Summary of site history and previous investigations
- Remediation activities undertaken, including the extent of the excavation and capping works (survey information) and observations made during excavation works
- Supporting factual evidence of the abatement work including photographic and field records and materials tracking data
- Validation sampling and analysis results
- Quality assurance/ quality control (QA/QC) protocols for field work and laboratory analysis and
- A statement indicating the adequacy of the abatement completed, degree to which lead impacts have been removed and if / where impacts remain

8. CONCLUSIONS

The preferred abatement strategy for the former preschool includes excavation of shallow contaminated soils, disposal of spoil at an appropriate facility and capping to support a limited range of community uses (excluding childcare).

Contaminated soil will remain below the final capped surface and will be managed under an LTEMP.

The effectiveness of remediation at mitigating exposure risks associated with site contamination in the receiving environment will be assessed through validation of the cap construction.

It is anticipated that the proposed abatement strategy will appropriately mitigate risks associated with site contamination and that the LTEMP will effectively manage risks from residual contamination.

9. LIMITATIONS

Ramboll prepared this report in accordance with the scope of work as outlined in our proposal to DRNSW and in accordance with our understanding and interpretation of current regulatory standards.

The conclusions presented in this report represent Ramboll's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll's knowledge as at the date of the assessment.

Ramboll did not independently verify all of the written or oral information provided to Ramboll during the course of this investigation. While Ramboll has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

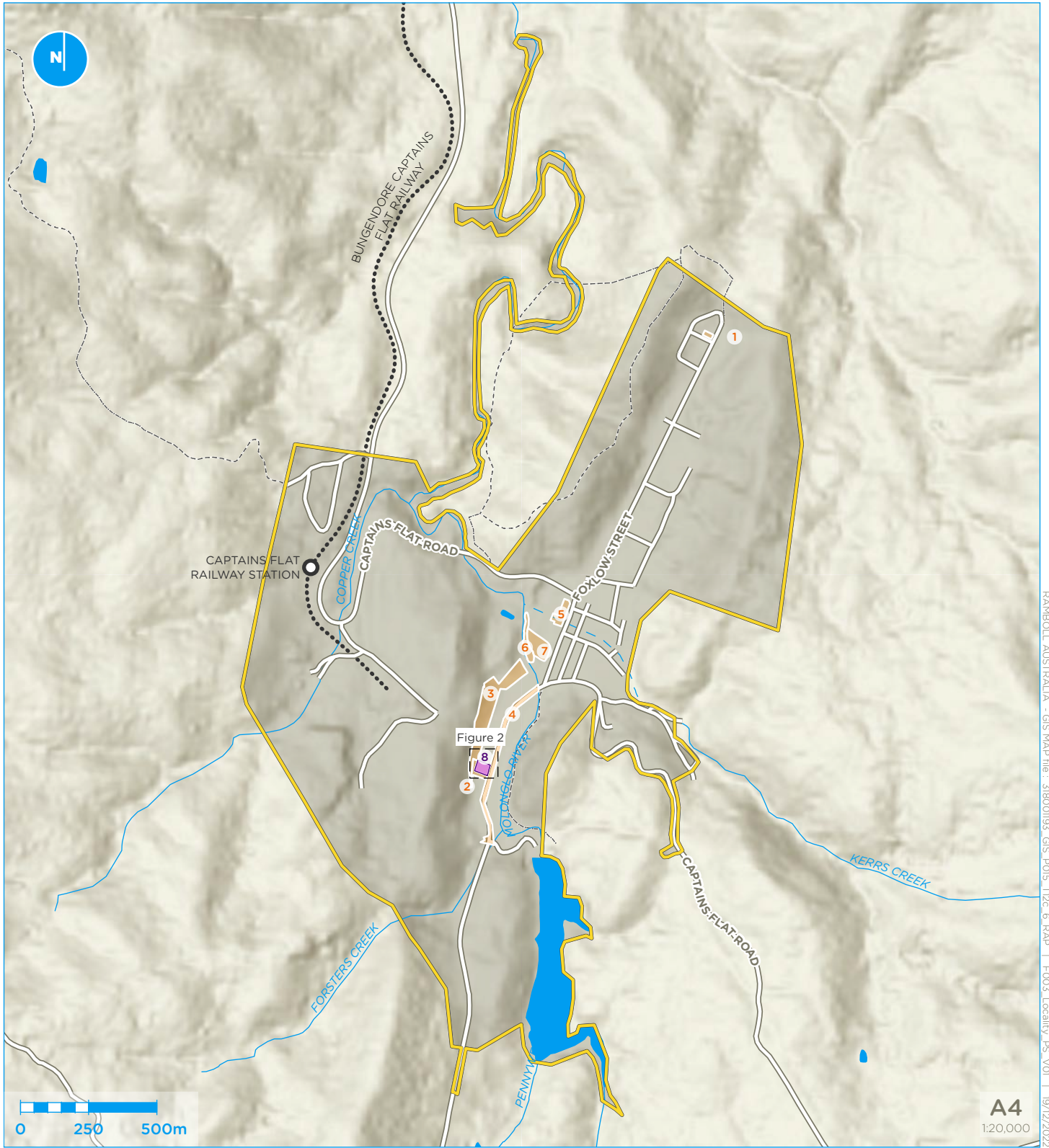
9.1 User Reliance

This report has been prepared exclusively for DRNSW and may not be relied upon by any other person or entity without Ramboll's express written permission.

10. REFERENCES

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APPENDIX 1 FIGURES



RANBOLL AUSTRALIA - GIS MAP file : 31800193_GIS_P015_T12c-6_RAP | F003_Locality_PS_V01 | 19/12/2022

Esri, Geoscience Australia, NASA, NGA, USGS, Esri, HERE, Garmin, FAO, NOAA, USGS, Esri, USGS

Legend

- Precinct boundary
- Other abatement areas
- Former Preschool

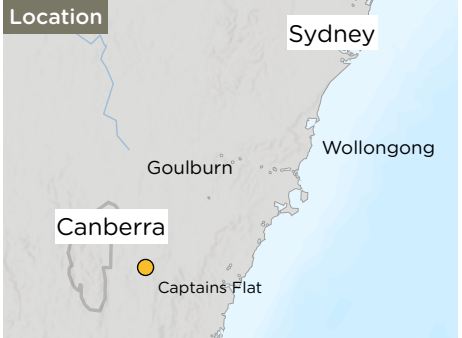
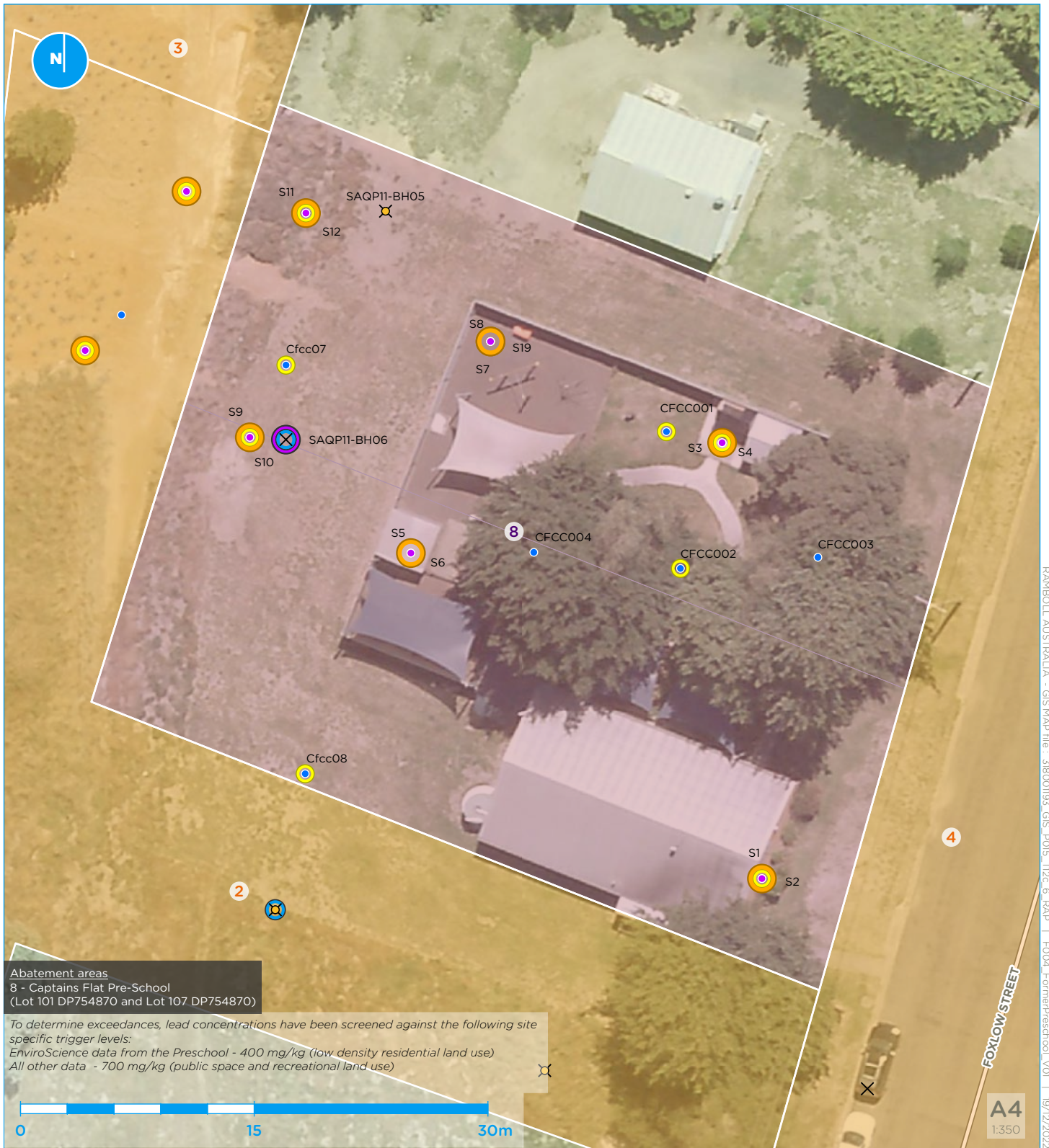


Figure 1 : Site location
 Lead Abatement Plan - Former Preschool



Legend

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> Former Captains Flat Preschool Abatement areas | <ul style="list-style-type: none"> Samples (Ramboll 2021) X Soil sample Lead exceedance at depth Surface (<0.05 m) 0.05 m-0.5 m >0.5 m | <ul style="list-style-type: none"> Previous soil samples EnviroScience (2021) EPA Lead exceedance at depth Surface 0.4-0.5 m |
|---|--|--|

Figure 2 : Site features plan
Lead Abatement Plan - Former Preschool

**APPENDIX 2
SEPP HAZARDS AND RESILIENCE (FORMER SEPP 55) NOTIFICATION
LETTER**

Queanbeyan-Palerang Regional Council
PO Box 90
Queanbeyan NSW 2620
Attention: The General Manager

Date xx/xx/xxxx

Captains Flat Former Preschool Lead Abatement NOTIFICATION OF CATEGORY 2 REMEDIATION WORKS

INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was retained by Department of Regional NSW (DRNSW) on behalf of the landowner to prepare a Lead Abatement Plan (LAP) for contamination identified at the former preschool located at 27 Foxlow Street Captains Flat. This area is presented on **Figure 1, Appendix 1** and is here-in referred to as the site.

Queanbeyan-Palerang Regional Council (QPRC) respectfully notify QPRC of planned Category 2 remediation works, as defined by *State Environmental Planning Policy (Resilience and Hazards) 2021* that will occur at the site.

REMEDIATION WORK

The preferred remedial strategy comprises recontouring the flood berms, immobilising impacted soils and capping and excavation, immobilisation, offsite disposal and capping the playing fields.

CATEGORY 2 REMEDIATION WORKS

This project is deemed to be Category 2 remediation work in accordance with the Resilience and Hazards SEPP. Category 2 remediation work is deemed remediation work that is not Category 1 remediation as described in Clause 4.8 of the Resilience and Hazards SEPP. The triggers for Category 1 remediation work are evaluated in **Table 1**.

Ramboll
Level 2, Suite 18 Eastpoint
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia

T +61 2 4962 5444
<https://ramboll.com>

Ref 318001193

Table 1: Evaluation of Category 1 Triggers

Clause 4.8 Trigger	Evaluation
a) Designated development	The project is not designated development. Schedule 3 Clause 15 of the <i>Environmental Planning and Assessment Regulation 2000</i> describes conditions under which contaminated soil treatment works are deemed designated development
b) carried out or to be carried out on land declared to be a critical habitat, or	The project would not be carried out on land declared to be a critical habitat.
c) likely to have a significant effect on a critical habitat or a threatened species, population or ecological community, or	The site is used as flood berms and playing fields and is void of any native vegetation or wildlife. It will not require disturbance of critical habitat or a threatened species, population or ecological community.
d) development for which another State environmental planning policy or a regional environmental plan requires development consent, or	No State Environmental Planning Policy or Regional Environmental Plan identifies the proposed remediation as an activity requiring development consent.
e) carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument: (i) coastal protection, (ii) conservation or heritage conservation, (iii) habitat area, habitat protection area, habitat or wildlife corridor, (iv) environment protection, (v) escarpment, escarpment protection or escarpment preservation, (vi) floodway, (vii) littoral rainforest, (viii) nature reserve, (ix) scenic area or scenic protection, (x) wetland, or	The project is located on land zoned RE1 Public Recreation under the <i>Queanbeyan Local Environment Plan 2012</i> . No other environmental planning instrument prescribes the project site as one of the areas listed in point (e).
f) carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands Commissioner).	The <i>Queanbeyan Development Control Plan 2012</i> includes guidance that applies to Contaminated Land. The proposed remediation complies with the guidance.

The proposed remediation works do not trigger the criteria in clause 4.8 (a) – (f) as outlined in **Table 1**, and the proposed remediation works are not ancillary to any other current development requiring Development Consent. Based upon the above information and criteria the remediation works are deemed to be Category 2 works under the Resilience and Hazards SEPP.

It is anticipated that remediation of the activities associated with the Flood Berms and Playing Fields Lead Abatement would commence in late **xxx** and be completed **xxx**.

Yours sincerely