

Intended for

**Department of Regional NSW**

Document type

**Report**

Date

**October 2022**

Project Number

**318001193-T10**

# **CAPTAINS FLAT LEAD MANAGEMENT PLAN**

**RAMBOLL**

Bright ideas. Sustainable change.

Project name Captains Flat Lead Management Plan  
Project No. 318001193-T10  
Recipient by Department of Regional NSW  
Document type Report  
Description This report presents a management plan for contamination linked to the historic metalliferous mining and land-fill activities within the community of Captains Flat.

Revision	Date	Prepared by	Checked by	Approved by	Description
Draft/Rev0	25/11/21	S Maxwell	F Robinson	R Salmon	For client review
Rev 1	11/02/2022	S Maxwell	F Robinson	R Salmon	For client review
Rev2	06/10/2022	S Maxwell	S Maxwell	R Salmon	Final
Rev3	21/10/2022	S Maxwell	S Maxwell CEnvP SC 41184	R Salmon	Final



Ramboll  
Level 2, Suite 18  
50 Glebe Road  
PO Box 435  
The Junction  
NSW 2291  
Australia  
T +61 2 4962 5444  
www.ramboll.com

# CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1. INTRODUCTION .....</b>	<b>5</b>
1.1 Purpose.....	7
1.2 Background .....	7
1.3 Identification of the Captains Flat Lead Management Plan Precinct .....	7
1.4 Regulatory Requirements.....	8
<b>2. ENVIRONMENTAL SETTING.....</b>	<b>9</b>
2.1 Topography and Hydrology .....	9
2.2 Geology .....	9
2.3 Hydrogeology.....	10
<b>3. DESCRIPTION OF RESIDUAL CONTAMINATION.....</b>	<b>11</b>
<b>4. MANAGEMENT FRAMEWORK .....</b>	<b>13</b>
4.1 Roles and Responsibilities .....	13
4.2 Legislative and Regulatory Framework .....	14
4.3 Periodic Evaluation .....	15
4.4 Non-Compliance and Corrective Actions.....	15
4.5 Record Keeping.....	15
<b>5. MANAGEMENT ACTIVITIES .....</b>	<b>16</b>
5.1 Public Space Abatement Plans.....	16
5.2 Routine Management and Maintenance Activities .....	18
5.3 Interim Water Use Guidelines.....	19
5.4 Recreational Fishing.....	22
5.5 Limitation on Groundwater Extraction.....	22
5.6 Generic RAP for Private Property .....	22
5.7 Living Safely with Lead Guidance.....	22
<b>6. INSPECTIONS, MAINTENANCE, MONITORING AND REPORTING .....</b>	<b>23</b>
<b>7. COMMUNICATIONS AND NOTIFICATIONS.....</b>	<b>24</b>
<b>8. REFERENCES.....</b>	<b>25</b>
<b>9. LIMITATIONS .....</b>	<b>26</b>
9.1 User Reliance.....	26

## LIST OF FIGURES

<b>Figure 1: The Captains Flat Precinct and Risk Areas</b> .....	<b>2</b>
<b>Figure 2: The Captains Flat Lead Management Plan</b> .....	<b>3</b>
<b>Figure 3: The Captains Flat Lead Management Plan</b> .....	<b>6</b>
<b>Figure 4: Abatement sequencing considerations</b> .....	<b>17</b>

## LIST OF TABLES

<b>Table 1-1: Site Identification</b> .....	<b>8</b>
<b>Table 4-1: Roles and Responsibilities</b> .....	<b>13</b>
<b>Table 5-1: General Hazard Mitigation Measures</b> .....	<b>18</b>
<b>Table 5-2: Summary of the interim water use guidelines</b> .....	<b>21</b>

## APPENDICES

### Appendix 1

Taskforce Review of the report on Managing Residual Lead in North Lake Macquarie for Lake Macquarie

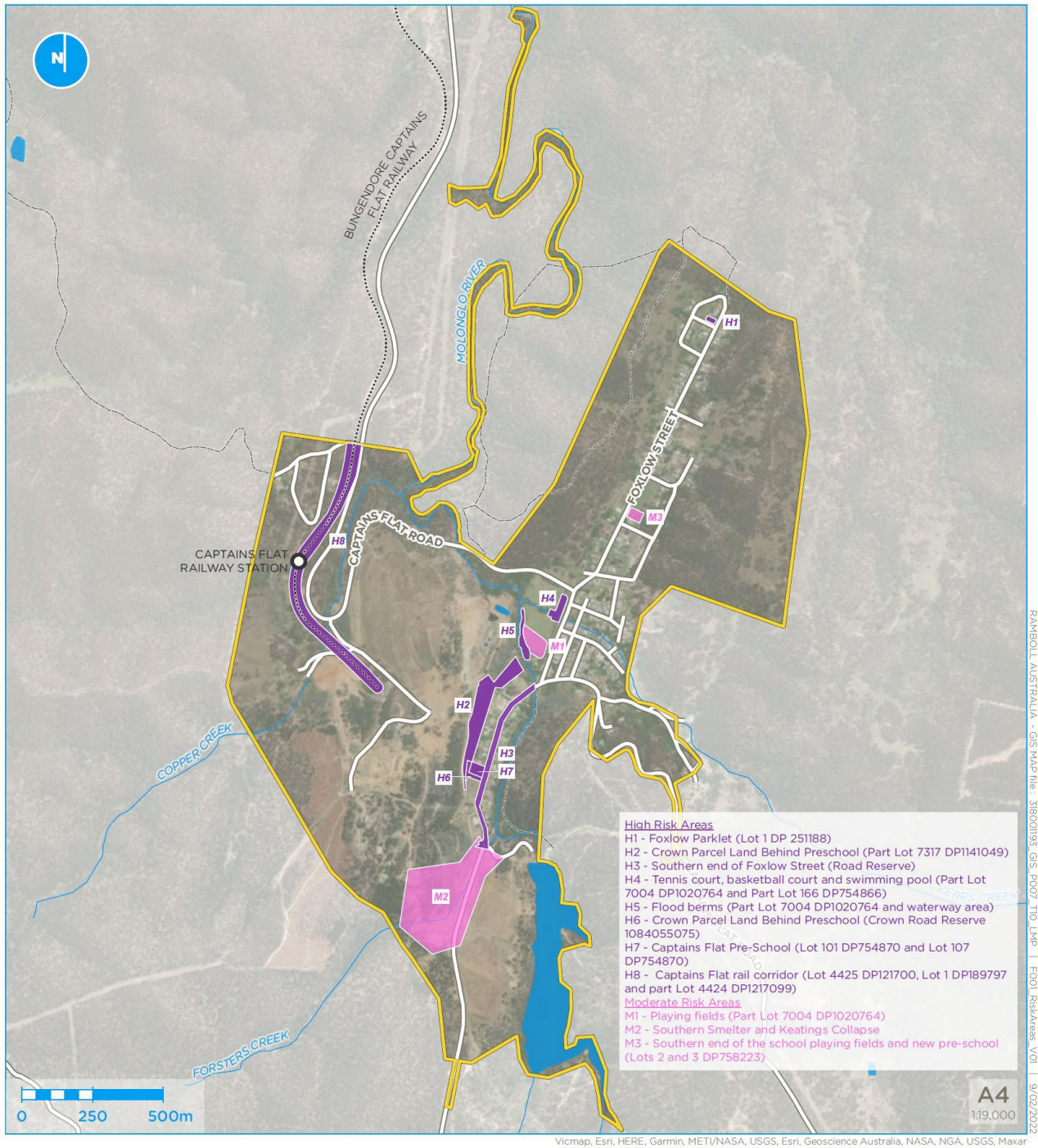
### Appendix 2

Figures

## EXECUTIVE SUMMARY

Historic metalliferous mining (including subsequent processing, smelting and transport) and land-fill activities have contaminated Captains Flat. The primary contaminant exposure risks for human health at Captains Flat relate to lead and Ramboll Australia Pty Ltd (Ramboll) was retained by the Department of Regional NSW (Regional NSW) to prepare the Captains Flat Lead Management Plan (LMP).

The Captains Flat Lead Management Plan Precinct (the Precinct) was defined in the Conceptual Site Model (Ramboll 2021a) 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 perimeters of the community. The Precinct was defined in this manner to facilitate assessment of the degree and extent of contamination around source areas and to facilitate management of contaminant exposure risks to human health. The Precinct is presented on Figure 1 below.



**Figure 1: The Captains Flat Precinct and Risk Areas**

The LMP sets out a framework for management activities applicable to the land owners and land use scenarios that fall within Captains Flat. An infographic describing key elements of the LMP is presented as Figure 2 below.



Site Specific Risk Assessment

Best Practice

# Captains Flat Lead Management Plan

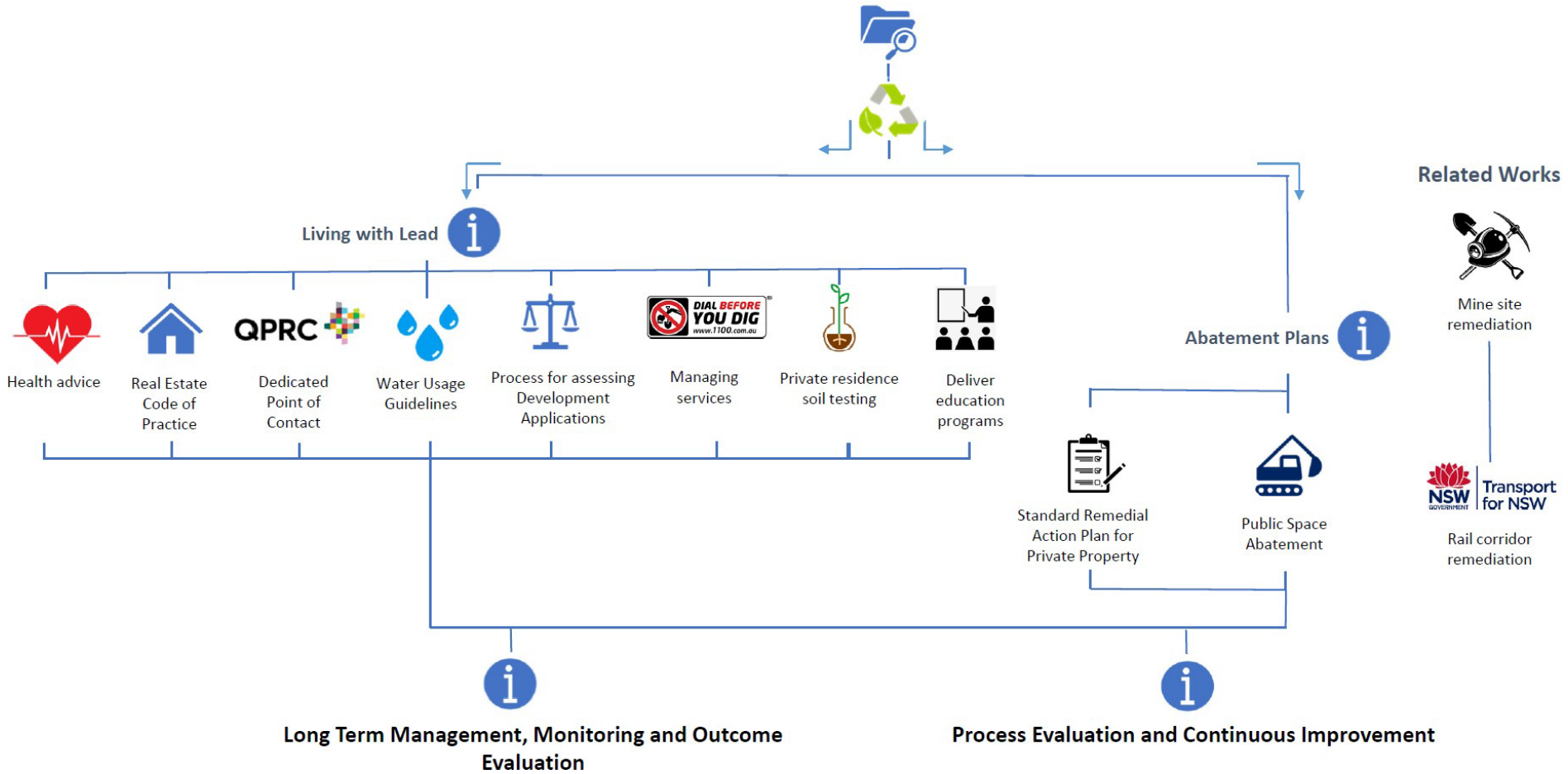


Figure 2: The Captains Flat Lead Management Plan

Roles and responsibilities for implementing the LMP are defined for key stakeholder in accordance with applicable regulatory frameworks.

Queanbeyan Palerang Regional Council (QPRC) and Crown Land are key custodians of public land within the Precinct and will be responsible for implementing and maintaining public space abatement plans. Public spaces where abatement is proposed are presented on Figure 1 above.

The LMP connects additional management advice to streamline remediation of private property in Captains Flat and for 'Living Safely with Lead' into the future.

The LMP describes a process for long term environmental monitoring and evaluation of management processes and outcomes.

It is noted that elevated concentrations of other metals are co-located with lead and present potential risks particularly to ecology. Implementation of the LMP could be expected to mitigate risks from other metals and the scope of long term monitoring is intended to inform evaluation of management outcomes related to ecological risk.



## 1. INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was retained by the Department of Regional NSW (Regional NSW) to prepare the Captains Flat Lead Management Plan (LMP) to address exposure risks from lead within the environment and the community that is linked to historical mining and land-fill activities. The LMP sets out a framework for management activities applicable to the land owners and land use scenarios that fall within Captains Flat. An infographic describing key elements of the LMP is presented as Figure 3 below.

# Captains Flat Lead Management Plan



Site Specific Risk Assessment

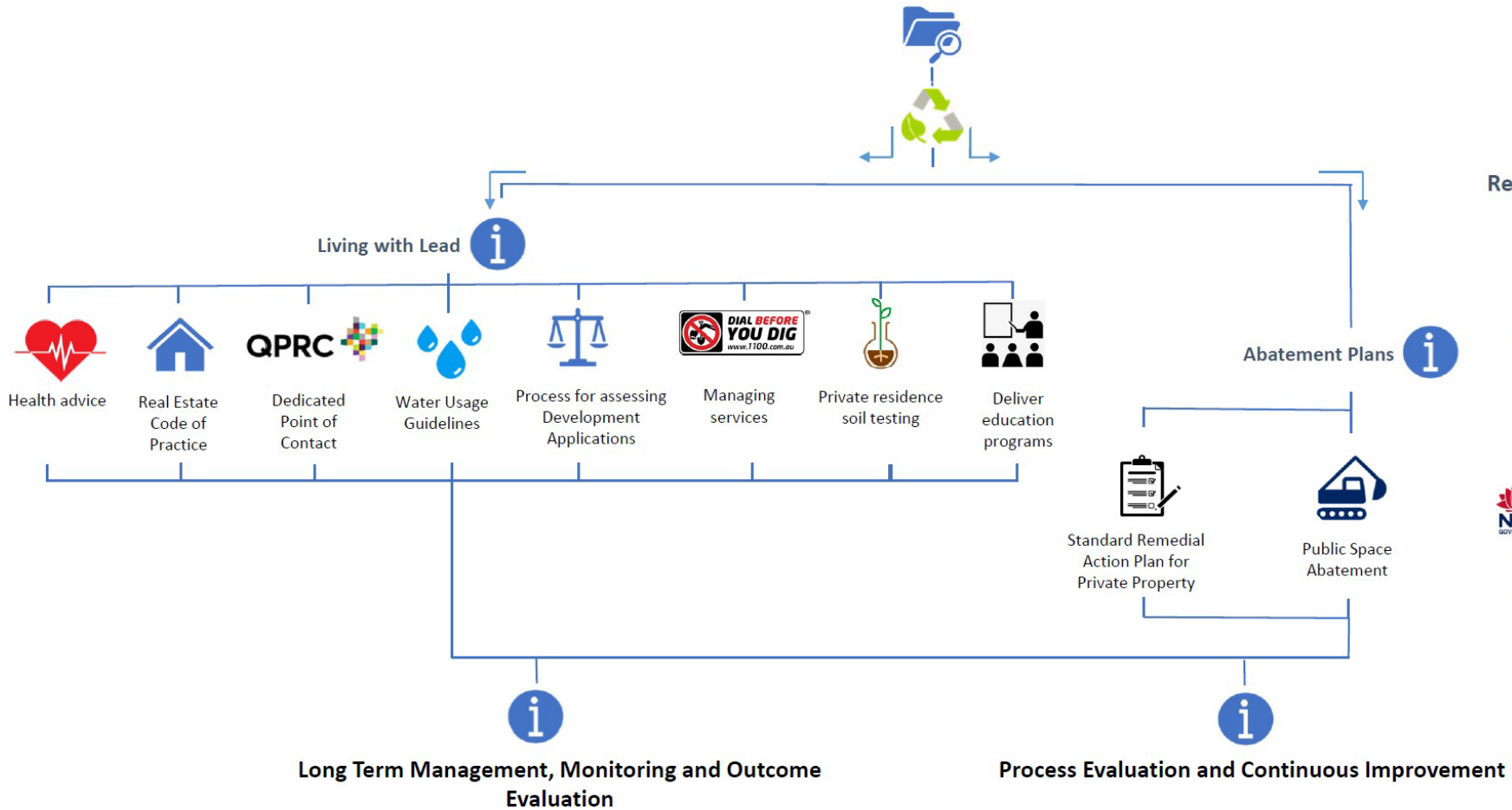
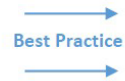


Figure 3: The Captains Flat Lead Management Plan

### **1.1 Purpose**

The purpose of this LMP is to provide strategies to minimise and manage risks from exposure to contamination associated with the historic metalliferous mining and land-fill activities at Captains Flat. The scope of the LMP excludes management or rehabilitation of the former Lake George Mine site and remediation of the rail corridor.

### **1.2 Background**

An extensive assessment has been completed targeting the environmental impacts of historic metalliferous mining and land-fill activities at Captains Flat and the associated risks to human health and the environment. Key reports include the Literature Review - Nature and extent of contamination in the Captains Flat Region, NSW (Department of Planning Industry and Environment Contaminant and Risk Team 2021), the Conceptual Site Model – Captains Flat Lead Management Plan (Ramboll 2021a) and the Abatement Options Assessment – Captains Flat Lead Management Plan (Ramboll 2021b).

In addition, the Captains Flat Taskforce also considered the Lead Expert Working Group Report on Managing Residual Lead Contamination in North Lake Macquarie (2016) as a relevant case study for identifying management practices at Captains Flat. Nineteen of the recommendations from that report were considered by the Taskforce. Further detail is presented as Appendix 1.

It is acknowledged that abatement options must be developed that are specific to a Conceptual Site Model, as has occurred for the Captains Flat Lead Management Plan. The Taskforce recognises the valuable work that is undertaken by the Lead Expert Working Group and chose to use its report for North Lake Macquarie as a commencement point for consideration of potential management practices at Captains Flat.

### **1.3 Identification of the Captains Flat Lead Management Plan Precinct**

The Captains Flat Lead Management Plan Precinct (the Precinct) was defined in the Conceptual Site Model (Ramboll 2021a) 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 perimeters of the community. The Precinct was defined in this manner to facilitate assessment of the degree and extent of contamination around source areas and to facilitate management of contaminant exposure risks to human health.

The Precinct is presented on Figure 1, Appendix 2. Precinct details are presented in Table 1-1. The key features of the Precinct are shown on Figure 2.

**Table 1-1: Site Identification**

Information	Description
Site Area:	Approximately 295 Ha (noting this encompasses numerous private properties that were not assessed)
Local Government Area:	Queanbeyan-Palerang Region
Owners:	Crown Lands (integrating land managed under the Legacy Mines Program), Queanbeyan-Palerang Regional Council (QPRC), Department of Education (DoE), Transport for NSW (TfNSW), Mogo Aboriginal Land Council, numerous private land owners
Current Land Use (by Owner):	<p>Usage of land within the Precinct include:</p> <ul style="list-style-type: none"> <li>• Crown Lands (Legacy Mine areas, preschool, parks, rivers, the water supply dam and bushland) <sup>1</sup></li> <li>• QPRC (public roads, sewage treatment plant (STP), potable water treatment plant (WTP) and community buildings including the Community Hall, Rural Fire Service (RFS), State Emergency Services (SES) and Men's Shed)</li> <li>• DoE (Captains Flat Public School and the new preschool)</li> <li>• TfNSW (non-operational Captains Flat-Bungendore rail line)</li> <li>• Mogo Local Aboriginal Land Council (areas west of the rail corridor and north of the Northern Tailings Dump)</li> <li>• Numerous discrete private commercial/industrial and residential land parcels. It is noted that large areas of the former Lake George Mine are held in private ownership.</li> </ul>

#### 1.4 Regulatory Requirements

This LMP has been prepared in general accordance with the NSW EPA Practice Note: Preparing Environmental Management Plans for Contaminated Land (2020) and the NSW EPA Consultants Reporting on Contaminated Land - Contaminated Land Guidelines (2020).

---

<sup>1</sup> Based on review of Crown Lands as presented on the NSW Resources and Geosciences Minview web mapping application (<https://minview.geoscience.nsw.gov.au/#/?lon=149.4471&lat=-35.60473&z=17&bm=bm1&l=wa3:y:100,ad6:y:100>) accessed 25 May 2021.

## 2. ENVIRONMENTAL SETTING

### 2.1 Topography and Hydrology

The following topography and hydrology summary is replicated from the DPIE C&R Team literature review (2021).

The Captains Flat area is part of the Southern Highlands of New South Wales and located on the western slopes of the Great Dividing Range. Overall, the area is of rugged relief and is characterised by a prominent north-south trending ridge bisected by a saddle and alluvial flats in the northern part of the Molonglo River. The main headworks and processing facilities of the mine are located along the ridge line with several adits and collapsed areas along the Eastern Flank. The extent of height variations across the site range from 840 m Australian Height Datum (AHD) at the Molonglo River to 940 m AHD at the top of the mine ridge (GHD, 2018).

The area is situated within the Molonglo River catchment. The river runs towards the north and has a confluence with its major tributary, the Queanbeyan River (55 km downstream). The river then continues to Lake Burley Griffin and subsequently towards the Murrumbidgee River (BOM, 2019). GHD (2018) identified local drainage features to include:

- Copper Creek - receives drainage from the Mill, Rail Loading, western slopes of the Central Mine, and Northern Tailings Dumps
- Forsters Creek - receives drainage from Keating's Collapse diversion channels, Southern tailings dumps on the western side, areas of slag associated with the former smelter, and the Central Mine
- Molonglo River - receives drainage from the Cooper Creek (confluence is ~ 100 m north of the Northern Tailings Dumps), Forsters Creek (confluence is ~ 100 m north of the Southern Tailings Dumps), Southern Tailings Dumps, Eastern Flank of the Central and Elliot's mines, Open Cut, Main Adit and Explosive/Magazine Adit Springs, seepage through Molonglo Fault fractures, Northern Dumps at the northeast corner, and Southern Dumps on the eastern side

### 2.2 Geology

The regional geology of the Captains Flat area is characterised by a well-defined north-south trending graben<sup>2</sup> (2 to 8 km wide), bounded by two horsts<sup>3</sup> at its southern and northern ends. The horsts comprise tightly folded Middle to Upper Silurian felsic pyroclastics, volcanogenic sediments and shales. Faults at the boundaries of these structures have the potential to be preferential pathways for groundwater (GHD, 2018). Review of the Department of Regional NSW interactive GIS portal MinView<sup>4</sup> indicates the Narongo Fault passes through the site orientated north – south between Copper Creek Road and Copper Creek.

<sup>2</sup> A graben is a valley caused by the downward displacement of a section of the earth's crust. These are produced by parallel faults.

<sup>3</sup> A horst is a raised block of land bounded by parallel normal faults. Horsts are bits of land which have either been lifted or has remained stationary while the land on either side (graben) have fallen.

<sup>4</sup> <https://minview.geoscience.nsw.gov.au/#/?lon=149.4385&lat=-35.59053&z=18&bm=1&l=ge611:n:100,ge610:n:100,ge69:n:100,ge68:n:100,ge67:n:100,ge66:n:100,ge65:n:100,ge64:n:100,ge63:n:100,ge62:n:100,ge61:n:100,ge612:y:100,hi1:n:25,wa1:y:100,ut1:y:50,ad0:y:100> accessed 27/09/2021.

### **2.3 Hydrogeology**

A review of the Bureau of Meteorology's National Groundwater Information System (BOM, 2019) indicated that no registered groundwater bores are located within 1 km of the site.

The Hydrogeology Map of Australia (Geoscience Australia, 2000) indicates the Precinct is within an area of fractured or fissured aquifers of low to moderate productivity.

Groundwater monitoring wells installed during development of the Conceptual Site Model (Ramboll 2021a) identified the presence of two aquifers in the volcanic and sedimentary rocks around Copper Creek. These aquifers correlate with expectations based on regional information described above. A shallow aquifer in alluvium adjacent the Molonglo River was also identified. Reversible recharge / discharge between this alluvial aquifer and the Molonglo River driven by rainfall and surface water levels is considered likely.

### 3. DESCRIPTION OF RESIDUAL CONTAMINATION

Potential contaminant exposure risks for human health and the environment have been identified based on assessment against site-specific trigger levels for lead in soil and national criteria for other contaminants and other media relevant to the key exposure risks within the study area.

Lead was identified as the primary driver of potential risks to human health. Lead, zinc and other metals to a lesser extent were identified as drivers of potential risk to ecology.

Relative high, moderate and low potential risk areas within the Precinct have been 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.

Details of contaminant concentrations within private properties are not available except for the private residence on the mine site therefore risk levels associated with lead in soil at private properties have not been determined. 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

Interim water use guidelines have been developed and define measures to mitigate risks from public water related to exposure to contaminants from historical metalliferous mining and land-fill activities at Captains Flat. These 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.

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

High and moderate potential risks in public spaces areas are presented on Figures 1, Appendix 2.

There is a potential risk to private residents, members of the public and recreational users of the Precinct due to consumption of fish and home grown produce.

Potential contaminant exposure risks for the environment were identified in soil, sediment, surface water and groundwater. Contaminants in soil present exposure risks through direct ecological uptake though would also be expected to contribute to contaminant concentrations in surface water and sediment through run-off. Similarly, groundwater contamination could be expected to contribute to surface water contamination and associated risks. Potential risks associated with contamination in sediment and surface water were observed to extend past the downstream Precinct boundary.

A water treatment plant and reticulated watermains provide potable water within Captains Flat. Ramboll understands treated public water quality is managed under the NSW Health Drinking Water Monitoring Program. Management of the treated water supply is not considered further in this LMP.

The following data gaps remain in assessment of exposure risks:

- Assessment of contaminant impacts to the Molonglo River downstream of the Precinct or interactions with the alluvial aquifer and downstream water users
- Sediment contamination assumed to be present in the water supply dam has not been comprehensively assessed. Contaminant exposure risks are assumed to exist for benthic and aquatic ecology in the water supply dam. Comprehensive assessment of sediment in the water supply dam should be considered as part of ongoing surface water monitoring
- Effects of meteorological variability in contaminant mobility via airborne dust, surface water and groundwater migration pathways remains as a data gap however routine monitoring programs have been established for air quality and surface water and is proposed for groundwater
- Human health effects from contaminant exposure within Captains Flat and the downstream receiving environment. A systematic assessment of community health effects including blood lead monitoring would likely improve capacity to understand effects historic and current from current exposure scenarios and to assess the effectiveness of management measures once implemented
- Thorough assessment of contaminant concentrations within private properties
- Assessment of risk due to consumption of fish and home grown produce.

Addressing these data gaps would further refine assessment of contaminant exposure risks and management approaches.



## 4. MANAGEMENT FRAMEWORK

### 4.1 Roles and Responsibilities

The Precinct integrates a range of regulators, public land owners and private land owners. Each of these groups are stakeholders within the Precinct with responsibility for protecting human health and the environment. The key roles and responsibilities for stakeholders under this LMP are presented in Table 4-1.

**Table 4-1: Roles and Responsibilities**

Role	Responsibility
Department of Regional NSW" (including Regional Development and Resources Regulator (Legacy Mines Program)	<ul style="list-style-type: none"> <li>• Coordinate initial response and Taskforce.</li> <li>• Assess and manage major mine remediation works</li> <li>• Co-ordinate the development and revision of water use guidelines</li> <li>• Co-ordinate the development of public space abatement plans and the generic private property remedial action plan (RAP)</li> <li>• Co-ordinate development of a long term environmental management plan to manage contamination remaining after mine site rehabilitation, rail corridor remediation and public space abatement</li> <li>• To provide assistance in exploring funding opportunities to undertake ongoing management actions for Captains Flat.</li> <li>• Notification of the Captains Flat Lead Management Plan to stakeholders (see Section 7)</li> </ul>
Transport for NSW	<ul style="list-style-type: none"> <li>• Assess and manage rail corridor contamination</li> </ul>
Public land owners (QPRC and Crown Land)	<ul style="list-style-type: none"> <li>• Maintain ultimate responsibility for the implementation of this LMP across public land within the Precinct</li> <li>• Implement abatement plans for moderate and high risk areas as identified in Section 3. Separate abatement plans will be prepared for each of these areas.</li> <li>• Complete ongoing monitoring and maintenance of public spaces where abatement occurs using checklists on a regular basis.</li> <li>• Ensure any workers or contractors engaged to work on public land are made aware of their responsibilities under this LMP. This must be embedded as a requirement in contractor procurement / process documentation.</li> <li>• Implement controls to mitigate risks associated with exposure of members of the public to contamination on public land</li> <li>• Ensure compliance to the requirements of this LMP through surveillance and monitoring of workers and contractors completing work on public land</li> <li>• Provide a copy of this LMP to utility managers with assets passing through the Precinct and any future purchasers or occupiers of public land in the Precinct and attach a copy of the document to the contract of sale / lease (e.g.: through attachment of the LMP to s 10.7 planning certificates)</li> <li>• Maintain responsibility for revisions and amendments to this LMP if site conditions change</li> <li>• Track revisions and amendments, and ensure amendments are communicated to all stakeholders</li> <li>• Co-ordinate corrective actions to rectify non-conformances or complaints and undertake all stakeholder management including liaison with regulatory bodies and follow-up of all complaints</li> <li>• Jointly review effectiveness of this LMP following any incident or any other event that suggests this LMP is ineffective. Public land owners will each address issues on their respective lands.</li> </ul>

Role	Responsibility
Department of Education	<ul style="list-style-type: none"> <li>Co-ordinate and implement an environmental management plan (EMP) specific to remnant contamination identified at the southern end of the school playing fields where the new preschool is located</li> </ul>
Department of Health	<ul style="list-style-type: none"> <li>Co-ordinate voluntary blood lead testing and provision of health advice relevant to potential contaminant exposure at Captains Flat</li> <li>Monitor Public Health notifications for blood lead levels for residents of Captains Flat.</li> </ul>
NSW EPA	<ul style="list-style-type: none"> <li>Regulate management of contamination at Captains Flat in accordance with regulation of contamination elsewhere in NSW</li> <li>Continue to provide private property testing services for those sites not yet tested.</li> <li>Provide guidance on 'Living Safely with Lead' to the Captains Flat community. Provide regulatory oversight and feedback on public space abatement plans and the generic private property remedial action plan</li> </ul>
QPRC	<ul style="list-style-type: none"> <li>Provide a dedicated point of contact for members of the public to support compliance with this LMP</li> <li>Amend development controls and land titles to ensure potential or known contamination is transparently communicated and managed in accordance with the LMP</li> <li>Show due diligence when assessing future development applications that the risk of exposure has been addressed.</li> </ul>
Private land owners	<ul style="list-style-type: none"> <li>To take reasonable care for their own health and safety and for the health and safety of those around them.</li> <li>To jointly maintain (in collaboration with the Legacy Mines Program or TfNSW as appropriate) fences along boundaries with the rail corridor and the mine site where livestock is kept on adjacent land.</li> </ul>
Utility Owners	<ul style="list-style-type: none"> <li>Ensure staff are made aware of the environmental management plan</li> <li>Keep records of staff and contractor inductions</li> </ul>

## 4.2 Legislative and Regulatory Framework

This LMP has been prepared to address the requirements of relevant legislation and codes. The key pieces of legislation applicable to this LMP are:

- *NSW Work Health and Safety Act 2011 (WHS Act)*
- *NSW Work Health and Regulation 2017*
- *Protection of the Environment Operations Act 1997*
- *Protection of the Environment Operations (Waste) Regulation 2014*
- *Contaminated Land Management Act 1997*
- *Biosecurity Act 2015*
- *Dividing Fences Act 1991*

The key codes of practice are:

- *SafeWork NSW Lead Guidance*
- *SafeWork Australia Code of Practice Managing Risks of Hazardous Chemicals in the Workplace*
- *NSW EPA LeadSmart – Work Smart: Tradespeople and Mining Industry Workers*
- *NHMRC Managing Individual Exposure to Lead in Australia – A Guide for Health Practitioners 2016*
- *Workplace Exposure Standards for Airborne Contaminants (SafeWork NSW 2018)*

### **4.3 Periodic Evaluation**

Systematic evaluation of the LMP must occur periodically to assess the LMP's effectiveness, efficiency, appropriateness and sustainability. A separate plan for evaluation should be prepared in accordance with the NSW Government Program Evaluation Guidelines (Department of Premier and Cabinet 2016)

### **4.4 Non-Compliance and Corrective Actions**

Where non-compliances and/or corrective actions are identified relating to public land these must be communicated to the relevant public land owner. Corrective actions should be administered by the relevant public land owner to the extent of the land owner's legislated powers.

### **4.5 Record Keeping**

Public land owners shall keep records of inductions, monitoring and inspections (as required in Section 6), that are relevant to their land. QPRC as the local regulator shall additionally maintain records of the assessment and management of contamination on private land. These records should be evaluated and used for completing the review of this LMP.

## 5. MANAGEMENT ACTIVITIES

Soil, surface water and groundwater within the Precinct are contaminated with metals including lead as the key driver of potential exposure risks. The primary routes of exposure to human health and the environment are from dust generation and the transport of soils or dissolved contaminants with surface water. These actions can result in dermal contact, ingestion and inhalation of contaminated soils and water. Activities causing soil disturbance can exacerbate the movement of contaminated soils.

The following management activities integrate:

- Abatement of moderate and high potential risk areas on public land
- Guidance for routine use of public land and surface waters by members of the public and workers based on the distribution of lead within the Precinct
- Recreational fishing
- Limitation on groundwater extraction
- Generic remedial actions for private property
- 'Living Safely with Lead' guidance

### 5.1 Public Space Abatement Plans

Abatement options were considered in the Abatement Options Assessment (Ramboll 2021b). Preferred abatement options for moderate and high potential risk areas (see Figure 1, Appendix 2) remain subject to regulatory approvals though are:

- To excavate all contaminated soil from Foxlow Parklet (QPRC) for placement in the mine site containment cell
- To cap the Crown Land road reserve adjacent the former preschool without excavation.
- To excavate shallow soils from the eastern embankment of the mine site (Crown Land) to a depth of 0.3 m to allow capping with clean soils and reinstatement of current landform levels. This option includes:
  - Provision for landform and drainage design
  - Embankment stabilisation after removal of shallow soils and placement of excavation spoil in the mine site containment cell. Provision for removal of upper 0.3 m of existing soils is made though may vary to achieve pre-cap design levels
  - Provision for improvement of drainage at the toe of the embankment. This provision is included to mitigate potential erosion of the contemplated low permeability capping system and to appropriately direct increase in run-off following construction of the low permeability cap. It is assumed that water coming downhill to Miners Rd will be managed under the mine site management program and that water from Miners Rd onwards will be clean post abatement
- To excavate shallow soils along the southern end of Foxlow Street to a depth of 0.1 m to allow capping with hardstand pavement to reinstate current landform levels (QPRC). Further removal of 300 m<sup>3</sup> of soil is included to allow for drainage tie-ins, in-situ tree / plant boxes etc. This option includes:
  - Placement of excavation spoil in the mine site containment cell
  - Construction of hardstand pavement along both sides of Foxlow Street from the Molonglo River bridge, south to Jerangle Road
  - Provision for drainage and street landscaping. This provision is included to mitigate potential increase in runoff from proposed hardstand to adjacent private properties
- To recontour the existing flood berms and cap with clean soils, raising the current landform levels (QPRC)

- To excavate shallow contaminated soils (limited to the southern end of the football field) to allow capping with clean soils that reinstates current landform levels (QPRC). This option includes installation of marker layer, 0.3 m clean soil and re-turfing the football field. Provision for underground irrigation system for the football field is also included to facilitate ongoing cap maintenance. The maintenance of hardstand pavement over the tennis / basketball courts and the playing surface of the football field as required to retain functionality of these facilities could be expected to result in ongoing maintenance as part of routine operations
- To excavate shallow soils at the former preschool to a depth of 0.3 m to allow capping with clean soils that reinstates current landform levels (Crown Land). Maintenance of existing levels is proposed to align with levels of the existing preschool building which is to be retained. This option includes placement of excavation spoil in the mine site containment cell

Separate abatement plans will be prepared for each of these areas. Abatement plans should be prepared in general accordance with provisions for remedial action plans described in the NSW EPA Consultants Reporting on Contaminated Land: Contaminated Land Guidelines (2020) noting that proposed public space abatement is focused on lead and co-located metals in soil that have resulted from historical metalliferous mining and land-fill activities at Captains Flat.

### 5.1.1 Public Space Abatement Schedule

Public space abatement should occur as soon as is practical noting that abatement remains subject to planning as well as regulatory and budget approvals. Additionally, abatement must be sequenced between public land owners and with mine site and rail corridor remediation to mitigate potential for recontamination following abatement. A relative timeline is presented as Figure 4 to describe key considerations for the sequencing of public space abatement with mine site rehabilitation (integrating construction of a containment cell) and rail corridor remediation.



**Figure 4: Abatement sequencing considerations**

To reduce potential for recontamination of public spaces in the southern end of town after abatement, rehabilitation of the mine site uphill of the eastern embankment (by the Legacy Mines Program) should be considered as a precursor to public space abatement. Similarly, abatement of the eastern embankment should occur before abatement of other public spaces downhill in the southern part of town and rehabilitation of the mine site uphill of the rail corridor should occur before remediation of the rail corridor. Additionally, several of the preferred public space abatement options include placement of excavation spoil in the mine site containment cell. For these reasons mine site rehabilitation (integrating construction of the containment cell) may be required to start before rail corridor remediation and public space abatement.

## 5.2 Routine Management and Maintenance Activities

The principal hazard mitigation measure is to restrict access to contaminated public spaces that will remain until such time as abatement action is undertaken in moderate and high risk areas.

Additional hazard mitigation measures are provided in Table 5-1.

**Table 5-1: General Hazard Mitigation Measures**

Category	General Requirements
<b>Exclusion</b>	
<b>Exclusion Zones</b>	<p>Moderate and high risk areas should be demarcated as exclusion zones. Exclusion zones have been implemented at the mine site, the rail corridor and Foxlow Parklet. Further, access is restricted to the former preschool. Fencing and/or signage should be installed on Crown Land adjacent the former preschool, along the eastern embankment of the former mine site and along the southern end of Foxlow Street. Signage should warn of contaminant exposure risks in these areas.</p> <p>These areas are presented on Figure 1, Appendix 2.</p>
<b>Works that do not require soil disturbance</b>	
Administrative controls for onsite workers / contractors	<p>The details of this LMP must be communicated to all workers. This must be embedded as a requirement in contractor procurement / process documentation.</p> <p>All works must be completed so that visible airborne dust is minimised and if generated is maintained within exclusion zones described above.</p> <p>Vehicle access to moderate and high potential risk areas shall be minimised. If unavoidable, vehicles used shall not contain baby equipment, child car seats etc and should be kept free of other personal items to the extent practical.</p> <p>Decontamination including:</p> <ul style="list-style-type: none"> <li>• Hands should be washed before eating or drinking, smoking or shewing gum</li> <li>• Eating or drinking should be conducted in a clean dust free location</li> </ul>
PPE	<p>Workers in moderate and high potential risk areas shall wear: full length clothing (sleeves and trousers / overalls), enclosed footwear, protective eyewear and gloves suitable to the work being completed.</p>
Facilities	<p>The following facilities should be maintained for workers required to access moderate and high potential risk areas:</p> <ul style="list-style-type: none"> <li>• Clean and dust with wet towel/mop workers area for eating and drinking</li> <li>• Toilet facilities and wash up areas for decontamination</li> </ul>

Category	General Requirements
<p><b>Soil disturbance</b></p> <p>Note: Minor soil disturbance (less than 5 m<sup>3</sup>) can occur through implementation of all controls defined below. If larger soil disturbance is required, a specific EMP must be developed for the proposed scope of work. Specific EMPs must integrate all controls contained within this document.</p>	
<p>Mandatory administrative controls for any soil disturbance</p>	<ul style="list-style-type: none"> <li>• The details of this LMP must be communicated to all workers</li> <li>• If excavation of contaminated soils is required excavation must be completed so that visible airborne dust is minimised and if generated is maintained within exclusion zones described above. Excavation should not occur on windy days and dust must be suppressed during excavation e.g. through use of a water cart.</li> <li>• Any soil disturbance works shall occur under the supervision of an appropriately experienced environmental representative</li> </ul> <p>Decontamination</p> <ul style="list-style-type: none"> <li>• Personnel decontamination shall occur after leaving excavations areas by removing/washing/cleaning dusty work clothes, boots, shoes, tools, phones, hands/face/any other exposed body area. Cleaning should occur using a damp cloth/mop</li> <li>• Hands should be washed before eating or drinking, smoking or shewing gum</li> <li>• Eating or drinking should be conducted in a clean dust free location</li> <li>• Fingernails and toenails should be kept short</li> <li>• Showering should occur before returning home if feasible. Work gear should be kept separately from other clothing and washed separately.</li> </ul>
<p>Administrative controls - Machinery Operators</p>	<p>Where machinery is floated in for use in moderate or high potential risk areas a staging area must be established within a low potential risk area where loading and unloading from the float can safely occur. Machinery should by preference be selected with capacity for:</p> <ul style="list-style-type: none"> <li>• An enclosed cabin</li> <li>• Cabin air circulation system (air conditioning) equipped with high efficiency filter</li> <li>• Cabin seals in good condition to eliminate cabin dust intrusion</li> </ul> <p>At completion of works all soil must be removed such that machinery is free of site materials when entering the staging area for loading.</p>
<p>Administrative controls - Workers outside assisting excavation</p>	<p>Workers outside machinery should be used minimally.</p>
<p>PPE</p>	<p>The following PPE shall be worn at all times: full length clothing (sleeves and trousers / overalls), enclosed footwear, protective eyewear and gloves suitable to the work being completed.</p> <p>A P2 dust mask shall be worn by all workers onsite during excavation who are outside machinery with enclosed cabins.</p>

**5.3 Interim Water Use Guidelines**

Preparation of the Interim Water Use Guidelines was undertaken as part of the Conceptual Site Model (Ramboll 2021a) and the guidelines should be read in conjunction with that document. The Interim Water Use Guidelines detailed in Table 5-2 have been prepared as guidance to manage risks associated with exposure to contaminants from historical metalliferous mining and land-fill activities during use of public waters at Captains Flat. It is anticipated that these interim guidelines will be reviewed after mine site rehabilitation and abatement measures proposed for public lands within Captains Flat.

The interim guidelines were developed considering the results of a water use survey conducted in the Precinct. The recommended frequencies and durations presented are not different from the current usage pattern as indicated by the water use survey. Hence there may not be a need to alter the current usage pattern of surface waters in the Precinct. However, contact with acidic discharge waters which are associated with discoloured water and/or sediments (yellow-orange) should be avoided where possible.



**Table 5-2: Summary of the interim water use guidelines**

Surface Water Body	Water Use Activity	Recommended Frequency of Use		Recommended Duration of Use			Recommendations
		Per month	Per Year	Per event (hours)	Per Month (hours)	Per Year (hours)	
Local water supply dam, Molonglo River and Copper Creek	Drinking (everyday)	0	0	0	0	0	Members of the public (adults and children) should use reticulated water.
	Recreational Drinking (Dam water only)	-	10	-	-	-	Members of the public should limit use of untreated dam water to 5-10L per year for potable purposes. The lower volume is applicable to children.
	Swimming	10	120	0.5 - 1	5 - 10	60 - 120	Members of the public should limit swimming in Precinct surface waters to 10-times per month for 30 to 60 minutes. The lower duration is applicable to children.
	Fishing	20	240	0.5 - 1	5 - 10	120 - 240	Members of the public should limit fishing in Precinct surface waters to 10-times per month for 30 to 60 minutes. The lower duration is applicable to children.
	Livestock watering	20	240	1	10	240	Members of the public should limit use of Precinct surface waters for livestock watering to 10-times per month for 60 minutes. It is considered unlikely that children may be watering livestock and so potential exposure of children to contaminants has not been considered further for this scenario.
	Pet Washing	20	240	0.5 - 1	5 - 10	120 - 240	Members of the public should limit use Precinct surface waters for pet washing to 10-times per month for 30 to 60 minutes. The lower duration is applicable to children.
Various drainage lines - main adit spring, acidic discharge drainage and smaller tributaries.	None	0	0	0	0	0	Frequent contact with acidic discharge waters which are associated with discolored water and/or sediments (yellow-orange) should be avoided where possible
<b>Groundwater</b>	Potable and non-potable	Exposure assessment will need to be conducted to determine suitability of any future use				Any future groundwater extraction bore should be appropriately licensed with water quality tested to determine suitability for intended use.	

Note that frequencies and durations are total for all of the surface water bodies considered.

Note: Recommendations are provided to limit exposure risks to contaminants associated with historical metalliferous mining and land-fill activities as identified in the Conceptual Site Model Captains Flat Lead Management Plan (Ramboll 2021) and do not apply to any other risk (eg: biological contamination).

#### **5.4 Recreational Fishing**

The interim water use guidelines address risks to human health associated with exposure to surface water during fishing. To address the potential risk from consumption of fish it is recommended that fish caught during recreational fishing in the Precinct not be consumed. Signage to this effect should be installed at the water supply dam and within the Precinct where fishing is known to occur.

#### **5.5 Limitation on Groundwater Extraction**

It is recommended that groundwater from within the Precinct, including from existing registered groundwater bores, not be extracted for beneficial use without a detailed assessment of groundwater quality and potential risks associated with the proposed usage.

It is noted that any future use of groundwater would require appropriate assessment for the proposed use and licensing under the *Water Act 1912*.

#### **5.6 Generic RAP for Private Property**

The Department of Regional NSW is coordinating preparation of a generic Remedial Action Plan for private property. This will include guidance on waste from residential properties with specific regard for lead.

#### **5.7 Living Safely with Lead Guidance**

Regional NSW provides 'Living Safely with Lead' lead guidance and other information relevant to contamination at Captains Flat on its website: [www.nsw.gov.au/regional-nsw/captains-flat](http://www.nsw.gov.au/regional-nsw/captains-flat).

To address the potential risk from consumption of home grown produce the NSW EPA fact sheet dated March 2021 available at the above link recommends to always use raised vegetable gardens with clean imported soil and wash vegetables before consuming.

## 6. INSPECTIONS, MAINTENANCE, MONITORING AND REPORTING

Inspection of engineered controls such as signage and fencing should occur at regular intervals as per the responsible organisation's inspection protocols.

Maintenance should occur on as needs basis.

Environmental monitoring should occur until baseline measurements of contaminant impacts are established that are representative of seasonal meteorological variability. Environmental monitoring should include:

- Continuous monitoring of meteorological conditions
- Air quality monitoring through measurement of metal concentrations in total suspended particulates (TSP)
- Surface water quality monitoring through measurement of metal concentrations on a quarterly basis
- Groundwater quality monitoring through measurement of metal concentrations on a bi-annual basis

Inspection and environmental monitoring reports should be prepared following the nominated periods and should be consolidated by the public land owners subject to the works.

## 7. COMMUNICATIONS AND NOTIFICATIONS

The following stakeholders are identified and should be notified of site contamination and controls defined here-in by the Department of Regional NSW:

- The Captains Flat community
- Members of the Captains Flat Taskforce and representatives from each organisation who are responsible for co-ordinating or completing works within the Precinct
- Queanbeyan and Braidwood visitor information centres as advertisers of the Captains Flat Heritage Trail
- Evoenergy / Icon Water as the custodian of the treated and reticulated water supply
- Telstra as the custodian of an underground communication service running through the Precinct
- Essential Energy as the custodian of an underground power service running through the Precinct
- SafeWork NSW should be notified if the work involves or is likely to involve lead risk work.

Notification shall include provision of a copy of this LMP.

## 8. REFERENCES

GHD 2018. Assessment of Remediation Options. Lake George Captains Flat Mine Review.

NSW EPA 2020a Practice Note: Preparing Environmental Management Plans for Contaminated Land.

NSW EPA 2020b Contaminated Land Guidelines: Consultants Reporting on Contaminated Land

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

NSW Department of Premier and Cabinet 2016 NSW Government Program Evaluation Guidelines

NSW Parliamentary Counsel's Office 2011 Work Health and Safety Act 2011 (WHS Act)

NSW Parliamentary Counsel's Office 2017 Work Health and Regulation 2017

NSW Parliamentary Counsel's Office 1997 Protection of the Environment Operations Act 1997

NSW Parliamentary Counsel's Office 2014 Protection of the Environment Operations (Waste) Regulation 2014

NSW Parliamentary Counsel's Office 1997 Contaminated Land Management Act 1997

NSW Parliamentary Counsel's Office 2015 Biosecurity Act 2015

NSW Parliamentary Counsel's Office 1991 Dividing Fences Act 1991

Ramboll 2021a Conceptual Site Model – Captains Flat Lead Management

Ramboll 2021b Abatement Options Assessment – Captains Flat Lead Management Plan

## 9. LIMITATIONS

Ramboll Australia Pty Ltd prepared this report in accordance with the scope of work as outlined in our proposal to Regional NSW and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses is proposed as part of this investigation, based on past and present known uses of the Precinct. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous.

Site conditions may change over time. This report is based on conditions encountered at the Site at the time of the report and Ramboll disclaims responsibility for any changes that may have occurred after this time.

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 Regional NSW and may not be relied upon by any other person or entity without Ramboll's express written permission.

**APPENDIX 1**  
**TASKFORCE REVIEW OF THE REPORT ON MANAGING RESIDUAL LEAD**  
**IN NORTH LAKE MACQUARIE FOR LAKE MACQUARIE**

## Captains Flat Taskforce Review of Lake Macquarie Lead Expert Working Group Recommendations

Recommendation	Taskforce Comments	Taskforce Determination
<p><b>Recommendation 1:</b> Lake Macquarie City Council, funded by the NSW Government, establishes a role for ongoing community involvement to monitor ongoing issues and to identify future issues regarding legacy lead contamination in Lake Macquarie through a risk communication framework. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• A risk-based tool would assist and administer grants based on contamination risk to the community.</li> <li>• Recommendation takes into account that Lake Macquarie Council was funded to undertake a particular activity.</li> </ul>	<p>Not required. QPRC advised that there is no specific extra resource requirement for this work as it will be undertaken by its current team.</p>
<p><b>Recommendation 18:</b> The NSW Government establishes an ongoing funding stream for Lake Macquarie City Council to develop and maintain a <b>small interdepartmental team to manage additional legacy lead issues beyond the usual remit of local government</b> (subject to council approval and availability of a sufficient funding source). The team is responsible for:1 expanding record keeping and mapping of known contamination and remediation2 providing funding support and advice to public and private landholders wishing to undertake voluntary soil assessment and property remediation3 following up on any Hunter New England (HNE) Health investigations regarding high blood lead levels to identify site remediation options4 managing access to a local repository within the Lower Hunter for lead-contaminated soils5 identifying a point of contact for community enquiries about living with lead and voluntary management measures6 regularly engaging with HNE Health regarding blood lead levels tested by GPs and outcomes of follow-up investigations7 expanding engagement collateral to include advice on maintaining contamination barriers and hygiene, and improving links to and from HNE Health information. Implementation of this recommendation will facilitate a streamlined approach across the local government area consistent with LMCC’s Development Control Plan, LMCC’s Environmental Management Plan for Contaminated Land in Council’s Care and Control, and the National Environment Protection (Assessment of Site Contamination) Measure 1999. Establishment of a grant system for administering funding mad a big difference in Lake Macquarie. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• Land assessment panel was established at Lake Macq. To determine DA for contaminated lands. The Panel also prepared accompanying policies and procedures, with approx. 10 people in the team.</li> <li>• \$200,000 in grant funding per year to assist residents in undertaking contamination testing/remediation works on their properties.</li> <li>• The question was raised whether this recommendation is transferable in a smaller setting such as Captains Flat?</li> <li>• Quantity of contaminated residential sites in Lake Macq was 3000 in the contamination zone, plus others scattered throughout. Their database included 1000’s of contaminated properties.</li> <li>• What’s the support we need to build and provide to council?</li> <li>• Are the tools and support from other agencies a more realistic option?</li> <li>• Council needs to assess the DA’s but what is the mechanism and how will this be supported?</li> </ul>	<p>Not required. QPRC noted that the recommendation to establish an interdepartmental team is more applicable to larger townships with extensive contamination. The situation at Captains Flat is not comparable with regards to contamination trends and scale, and the community response required. QPRC has advised that a Contaminated Land Policy is in draft and could include a recommendation that a panel be formed to assess any contaminated land parcels in the LGA (not only those within Captains Flat). However, QPRC has further indicated that this recommendation is not required at this time, given that the Taskforce representatives are currently acting as a panel should QPRC require specific information.</p>



## Captains Flat Taskforce Review of Lake Macquarie Lead Expert Working Group Recommendations

Recommendation	Taskforce Comments	Taskforce Determination
	<ul style="list-style-type: none"> <li>• Taskforce needs to take into consideration if QPRC want these things?</li> <li>• Noted that this may be an option if council require extra support.</li> </ul>	
<p><b>Recommendation 19:</b> Lake Macquarie City Council, the EPA and NSW Health develop a risk-based decision management tool, in consultation with the community, to identify and prioritise access to services supported by the proposed funding stream described in Recommendation 18. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• Risk based decision management tool for grant program</li> <li>• \$200k a year – finished this year. 200 applications for varying level assessments.</li> <li>• Risk tool identified blood lead level issues. Lead health impacts would be a factor in determining amount of funding received.</li> <li>• If no blood lead levels resident would receive 50%.</li> </ul>	<p>Not required. This recommendation is only relevant if there is a grant program operating. The Taskforce does not envisage establishing a grant program.</p>
<p><b>Recommendation 7:</b> Lake Macquarie City Council continues to maintain a central database of contaminated land in Lake Macquarie City, including records of initial contamination status, abatement and remediation, current contamination status and land use, and changes in land use. Should this be considered for implementation at Captains Flat?</p>		<p>Already undertaken. While a QPRC register for contaminated sites already exists, the register does not include the soil test results for private property where the EPA has not been provided permission to share the information. Information will become available where a property owner completes a DA.</p>

## Captains Flat Taskforce Review of Lake Macquarie Lead Expert Working Group Recommendations

Recommendation	Taskforce Comments	Taskforce Determination
<p><b>Recommendation 2:</b> Lake Macquarie City Council provides a point of contact and means of disseminating educational materials among the community, agencies and external stakeholders, and updated materials are distributed as they become available. Communication activities may include, but are not limited to:1 a voluntary code of practice within the real estate industry to ensure that tenants and landowners are appropriately informed of any lead-contaminated soils at residential properties2 a dedicated point of contact within Lake Macquarie City Council for agencies to provide and discuss new educational materials3 information about managing capped contaminated material4 information on living with lead in the environment5 information on the process for assessing development applications on contaminated land6 information via Dial Before You Dig on working with lead-contaminated soils. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• Dial before you Dig – didn't really happen at Lake Macq. They found it was difficult to influence Dial before you Dig.</li> <li>• Recommended to remove reference for dial before you dig from the Infographic.</li> <li>• Rather use Council as source.</li> <li>• Responsibility for recommendation would need to be determined.</li> <li>• Too difficult to enact based on part responsibility.</li> </ul>	<p>Already underway. All contamination information is noted on the Section 10.7 Planning Certificate The sale of a property will trigger provision of lead contamination information to the new owner. Council will send a welcome pack to new property owners, containing "Living with lead" information. Communication activities will be transferred to QPRC when education material is developed.</p>
<p><b>Recommendation 10:</b> The EPA investigates the impacts of Pasmenco smelter slag on water quality in the Lake Macquarie region, especially where slag is either permanently inundated by, or in intermittent contact with, surface water or groundwater. The EPA then provides recommendations to the NSW Office of Water in relation to the suitability of groundwater extraction in affected areas. Noting that the current program is limited to the Precinct boundaries. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• Covered by the groundwater bores as part of the project.</li> <li>• Taskforce is looking as part of their monitoring process.</li> <li>• Water systems are very different.</li> <li>• Recommended: Broader research project as it is a key knowledge gap.</li> <li>• Potential to partner with the university in the long run.</li> <li>• Highlight the information gap and give the responsibility to one of the agencies that has carriage for this area.</li> <li>• Understanding the chemistry of water sources</li> <li>• Present issues for water users?</li> <li>• Surface water and ground water part of the water monitoring captured in the CSM and water usage guidelines.</li> <li>• 2 projects – one relates to the town water supply: given that the reservoir</li> </ul>	<p>Already underway. Precinct groundwater is being sampled and tested as part of current Lead Management Plan development. Other water "data gaps" will be identified in the Lead Management Plan for recommended future assessments.</p>

## Captains Flat Taskforce Review of Lake Macquarie Lead Expert Working Group Recommendations

Recommendation	Taskforce Comments	Taskforce Determination
	<p>is deep enough you will get stratification at the bottom of the reservoir, whether that presents a problem to the residents – unsure.</p> <ul style="list-style-type: none"> <li>• Currently QPRC undertakes water sampling for town water supply as required by NSW health guidelines. These guidelines do not take stratification events into consideration. A research project may inform the current processes of monitoring.</li> <li>• Unable to answer with a monitoring design, but rather with a research project. Seasons and weather influence results. Research over 2-3 different summers to determine.</li> <li>• Intensive sampling when you have stratification happening</li> </ul>	
<p><b>Recommendation 11:</b> The EPA continues to develop an <b>environmental liabilities management framework</b> to provide a predictable, transparent and consistent approach for the management of risks associated with environmental liabilities. In support of the development of this framework, the EPA reviews existing legislation to streamline its operation by identifying gaps, inconsistencies and areas that could benefit from new approaches, such as appropriate regulatory instruments for managing the financial risks associated with on- and off-site contamination. Should this be considered for implementation at Captains Flat?</p>		<p>Not required. An Environmental Liabilities Management Framework is in final stages of approval but not needed for Captains Flat.</p>
<p><b>Recommendation 12:</b> Lake Macquarie City Council revises its Contaminated Land Policy so that section 149 planning certificate notations differentiate between remediated land with soil levels above and below the residential Health Investigation Level for lead. Should this be considered for implementation at Captains Flat?</p>		<p>Already undertaken. QPRC Contaminated Land Policy currently in draft (as per Recommendation 18 above).</p>

## Captains Flat Taskforce Review of Lake Macquarie Lead Expert Working Group Recommendations

Recommendation	Taskforce Comments	Taskforce Determination
<p><b>Recommendation 13:</b> Lake Macquarie City Council amends its <b>Development Control Plan (DCP)</b> for development of land known to be contaminated with atmospheric lead or black slag from the smelter. The revised DCP describes a streamlined approach for the assessment of residential soil contamination, <b>by assuming a level of contamination based on existing information, in order to reduce the cost of the development assessment process.</b> The revised DCP describes <b>standard remedial action plans</b>, which are to the EPA's satisfaction, for routine development activities where risks are able to be adequately identified and managed. Development of a generic RAP made a big difference in Lake Macquarie. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• At Lake Mcq- the DCP is a guideline prepared by Council Consultant and approved by auditor.</li> <li>• Is it transferable to CF? Yes, general process is fairly similar.</li> <li>• Part of current Ramboll contract.</li> <li>• Ramboll trying to have Lake Macq. version released to write up for CF.</li> </ul>	<p>Agreed. To be developed as part of the current Lead Management Plan.</p>
<p><b>Recommendation 20:</b> Lake Macquarie City Council develops a streamlined approach for the assessment of residential lead contamination within the local government area and ensures the degree of risk is appropriately matched to the level of action. Should this be considered for implementation at Captains Flat?</p>		<p>Already undertaken. To be captured under the QPRC Contamination Policy and the Lead Abatement Plans in the Lead Management Plan.</p>
<p><b>Recommendation 17:</b> Lake Macquarie City Council continues to apply conditions of development consent that require tracking and appropriate disposal of contaminated soil. Should this be considered for implementation at Captains Flat?</p>		<p>Already undertaken. To be captured as part of the QPRC Contamination Land Policy and the generic private property lead abatement guidance.</p>
<p><b>Recommendation 6:</b> The Department of Planning and Environment, in consultation with the EPA and Lake Macquarie City Council, works with utilities and public authorities to apply measures comparable with LMCC Environmental Management Plan for Contaminated Land in Council's Care and Control. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• DPIE public utilities need to align with council procedures.</li> <li>• Would have to be developed specific to region.</li> <li>• Links to Contaminated Land Policy.</li> </ul>	<p>Agreed, recommended for inclusion in EMP.</p>

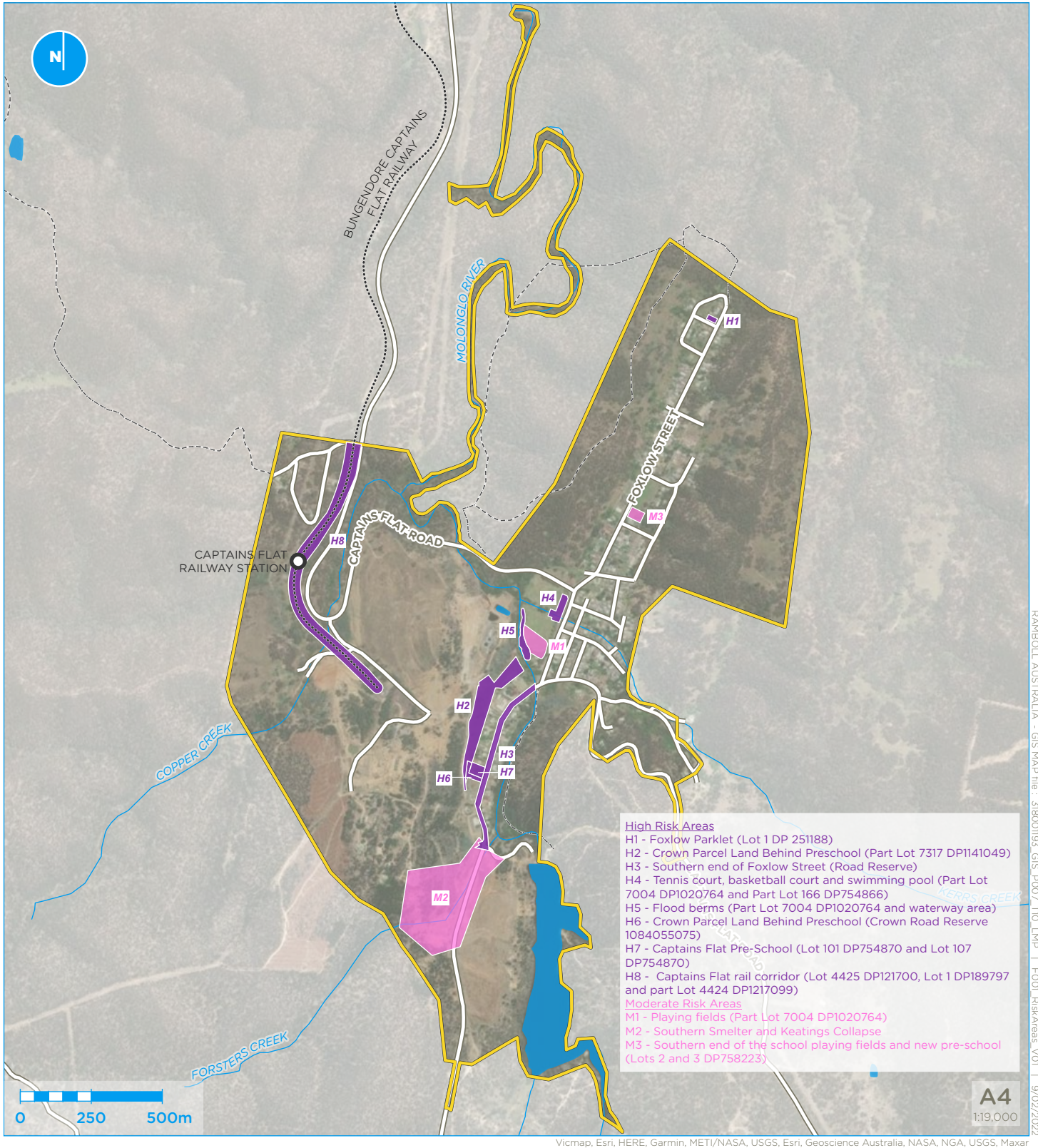
## Captains Flat Taskforce Review of Lake Macquarie Lead Expert Working Group Recommendations

Recommendation	Taskforce Comments	Taskforce Determination
<p><b>Recommendation 16:</b> The EPA considers all appropriate options for the disposal of contaminated materials associated with legacy lead contamination as a result of smelting activities in Lake Macquarie City, taking into consideration:1 affordability2 public accessibility3 suitability of the facility to contain the materials received. This made a big difference in Lake Macquarie. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• EPA TCLP testing has enabled the residential and education facilities soils to be classified as general solid waste for disposal at landfill, based on lead concentrations. Other contaminants TBC.</li> <li>• Discussion about keeping the contaminated soil in the area it came from (Captains Flat). Crown Lands awaiting advice from EPA regarding this issues (being able to call the precinct, the one "premise" or "site")</li> </ul>	<p>Agreed. Crown Lands and EPA considering options.</p>
<p><b>Recommendation 8 &amp; 9 (para):</b> The EPA and Council continue to monitor surface water and groundwater until abatement occurs and then reviews a requirement for ongoing water quality monitoring upon conclusion of remediation activities. Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>• surface water monitor and groundwater – containment cell approval pending – would need ongoing monitoring.</li> <li>• Key piece if Legacy Mines Program wants to demonstrate effectiveness of program.</li> <li>• Noted the use of the word "monitoring" can indicate a very indirect approach. It may be a combination of monitoring, modelling and research. Many of the identified gaps should be treated as research projects, as it will be a more direct approach to defining the issue. May be best expressed as filling information gaps.</li> </ul>	<p>For further consideration. Monitoring will occur as required and could be captured under the long-term Lead Management Plan.</p>

## Captains Flat Taskforce Review of Lake Macquarie Lead Expert Working Group Recommendations

Recommendation	Taskforce Comments	Taskforce Determination
<p><b>Recommendation 21:</b> Lake Macquarie City Council continues to maintain an up-to-date environmental management plan (EMP) for dealing with legacy lead contamination on land within council's care and control. The EMP is reviewed every five years, or following new recommendations on lead exposure from health or environmental agencies (e.g. National Health and Medical Research Council, National Environment Protection Measures, etc.). Should this be considered for implementation at Captains Flat?</p>	<ul style="list-style-type: none"> <li>The EMP outlines how Council is to respond to reports of contamination.</li> </ul>	<p>Will occur as part of the Lead Management Plan.</p>
<p><b>Recommendation 15:</b> The Department of Planning and Environment, in consultation with the EPA and Lake Macquarie City Council, considers the relevant management measures proposed in this report as part of its State Environmental Planning Policy review program. Should this be considered for implementation at Captains Flat?</p>		<p>EPA advised this is complete for Lake Macquarie. QPRC to review as part of future SEPP updates.</p>
<p><b>Recommendation 22:</b> The NSW Government provides the EPA with support for the establishment and operation of a statewide Lead Strategy Group to act as a conduit between the EPA and local councils or other appropriate local bodies across New South Wales. The EPA strategy group is responsible for promoting effective communications and resolving enquiries relating to statewide lead contamination issues. The EPA strategy group acts as:• a first point of contact for future lead-related research in New South Wales• a platform upon which research findings are communicated• a conduit through which relevant authorities may be notified of changes to relevant policies, guidelines and technical documents. Should this be considered for implementation at Captains Flat?</p>	<p>Lead Strategy Group – holistic review of lead issues across the state. Captains Flat is discussed on the group. Recommendation should be about how Captains Flat relates to the LSG.</p>	<p>Completed. This Lead Strategy Group (LSG) exists with the current Chair being the EPA representative on the Captains Flat Taskforce. There is scope for Taskforce to provide a further delegate on the Lead Strategy Group if seen necessary by the TF in the future.</p>
<p><b>Recommendation 14:</b> The Department of Planning and Environment, in consultation with the EPA and Lake Macquarie City Council, takes steps to ensure that Exempt and Complying Development that is likely to result in the disturbance of contaminated soil within Lake Macquarie City is appropriately managed to minimise harm to human health and the environment. Should this be considered for implementation at Captains Flat?</p>		<p>Completed by EPA. SEPP (Exempt complying development codes) 2008. To capture QPRC will need to change its LEP for Environmentally Sensitive Areas. A future consideration for QPRC.</p>

## **APPENDIX 2 FIGURES**



**Legend**

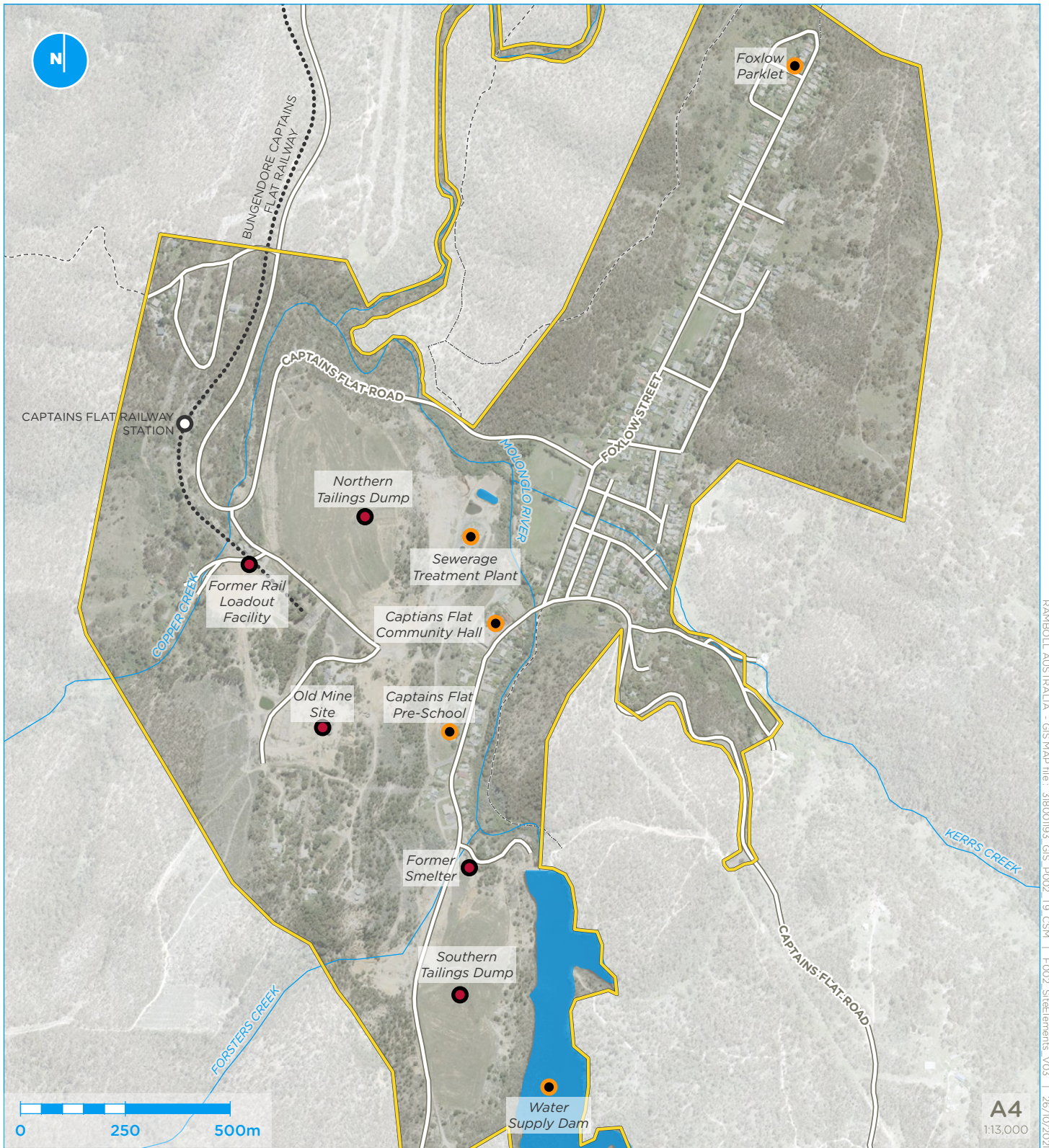
- Precinct boundary
- Risk areas
  - High\*
  - Moderate

\*Risk areas presented are limited to public spaces. Areas of the former mine that are now privately owned are not presented as risk areas. Abatement / remediation of the mine site and the rail corridor are considered separately to the Captains Flat LMP.

**Figure 1 : Precinct Location and Risk Areas**  
Captains Flat Lead Management Plan

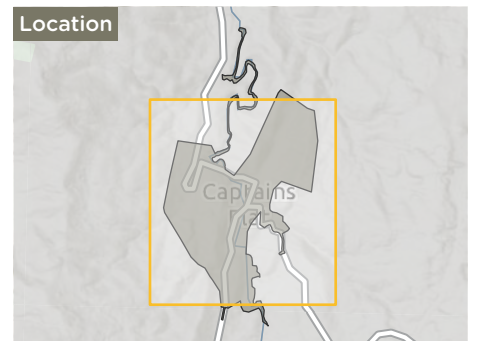
RAMBOLL AUSTRALIA - GIS MAP file - 31800193\_GIS\_P007\_T10\_LMP | F001\_RiskAreas\_V01 | 9/02/2022





**Legend**

- Precinct boundary
- Receptors and source areas
- Receptor
- Source area



**Figure 2 : Site elements**

Captains Flat Lead Management Plan - CSM