



STANDARD REMEDIAL ACTION PLAN

RESIDENTIAL LAND IMPACTED BY FORMER PASMINGO COCKLE CREEK SMELTER

Standard Remedial Action Plan, Land Impacted by Former Pasmaico Cockle Creek Smelter

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Prepared for Lake Macquarie City Council by



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Definitions

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

CEnvP Scheme	Certified Environmental Practitioner Scheme through EIANZ.
CPSS CSAM	Certified Professional Soil Scientist – Contaminated Site Assessment and Management through Soil Science Australia.
Contractor	The person or company engaged to complete the remediation. The Contractor should have read and understood supporting material prepared by LMCC for the remediation of lead contamination associated with the former PCCS.
CLM Act	Contaminated Land Management Act 1997
Certified Environmental Consultant	The person or company engaged to complete validation works and validation reporting. It is recommended that the Environmental Consultant is certified through the Environment Institute of Australia and New Zealand Certified Environmental Practitioner Scheme (EIANZ CEnvP scheme - Site Contamination Specialist), Certified Professional Soil Scientist Contaminated Site Assessment and Management (CPSS CSAM) or equivalent.
EIANZ	Environment Institute of Australia and New Zealand
EPA	Environmental Protection Authority of NSW
EP&A Act	Environmental Planning and Assessment Act 1979
General Immobilisation Approval	A document prepared by NSW EPA for a particular waste type, as defined in the approval, identifying the mechanism by which the waste is immobilised and how this waste can be disposed with no further testing required for the contaminants listed in the approval.
LMCC	Lake Macquarie City Council
Long Term Environmental Management Plan	The plan that describes long term management requirements for contaminated soil remaining on a property.
NEPM (2013)	National Environment Protection (Assessment of Site Contamination) Measure 2013. NEPM (2013) includes generic health investigation levels for four different landuses (residential with access to soil; high density residential; recreational open space; commercial/ industrial) for common contaminants, including lead.
Remedial Action Plan	A plan that outlines the nature and extent of contamination and how that contamination is to be managed. Validation requirements to demonstrate that contamination has been managed are to be included.
Remediation and Validation Report	A report that details the works completed to manage contamination at a site. Sampling results from the remedial works are compared against site criteria to validate that the remediation was successful in removing contamination.
Standard Remedial Action Plan	This document. To provide context and detail regarding the remediation of residential land where lead

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contamination from the former Pasminco Cockle Creek Smelter (PCCS) is well known to exist.

Site Owner

The person or persons named on the Certificate of Title for the property

The Site

Either the whole lot or a portion of the lot to be remediated. The Site is defined in the development application submitted by the proponent and is included within Figure 1 attached to this document.

1. INTRODUCTION

A Remedial Action Plan is employed to assist in the management and/ or mitigation of contaminated materials and details the extent, works to be applied and verification requirements. This Standard Remedial Action Plan (the Standard RAP) was prepared for Lake Macquarie City Council (LMCC) to be used instead of site-specific remedial action plans for the remediation of residential land where lead contamination from the former Pasmenco Cockle Creek Smelter (PCCS) is known to exist.

This Standard RAP has been prepared to address Recommendation 13 of State of NSW and Environmental Protection Authority (EPA) (2016) *Lead Expert Working Group Report on Managing Residual Lead Contamination in North Lake Macquarie*.

Recommendation 13 states that *"Lake Macquarie City Council amends its Development Control Plan (DCP) 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, by assuming a level of contamination based on existing information, in order to reduce the cost of the development assessment process. The revised DCP describes standard remedial action plans, which are to the EPA's satisfaction, for routine development activities where risks are able to be adequately identified and managed"*.

In accordance with Recommendation 13, this Standard RAP outlines a standard remediation response that is designed to be appropriate for most development activities where contamination from lead has occurred via aerial deposition or the use of black slag as fill material. The goal of remediation as described in the Standard RAP is to remove or reduce to an acceptable level the human health risk from lead contamination such that the site is suitable for residential use and to ensure that development work does not result in an unacceptable exposure to lead.

The Standard RAP addresses contamination of land and does not include contamination of buildings that may have occurred as a consequence of aerial fallout of lead oxide. The Standard RAP addresses only human health risks and does not address ecological risks to terrestrial ecology or groundwater dependent ecosystems.

It is noted that contamination from PCCS includes other heavy metals such as arsenic, cadmium and zinc. Lead is the driver for the management of contamination from PCCS and the clean-up of lead also manages the clean-up of other heavy metals. Other contaminants not linked to PCCS that may be present on residential land, such as asbestos, are not covered under this Standard RAP. Where other contaminants are identified to be present, advice should be sought from an Environmental Consultant.

This Standard RAP includes:

Section 1 - Introduction

Section 2 - Background information on operations of PCCS and Environmental impacts of PCCS

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

Section 4 - Description of the nature and extent of contamination

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

Section 6 - Legislative and planning framework

Section 7 - Remediation, including remediation goal and remediation options

Section 8 - Remediation roles and responsibilities

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

Section 10 - Validation reporting requirements

Section 11 - Notification requirements to Council if contamination is capped

Section 12 - Long Term Environmental Management Plan requirements

Section 13 - Protocols to review and update the Standard RAP

2. BACKGROUND

2.1 Smelter Operations

The former PCCS was located in the suburb of Boolaroo in Lake Macquarie, approximately 13 km south west of the city of Newcastle and occupied an area of 191 hectares of land. PCCS commenced operations in 1897 with a focus on zinc production. Production of lead increased in 1961 with the commissioning of the Imperial Smelting Furnace. PCCS continued operations until September 2003 and an Administrator was appointed to manage the site at this time (State of NSW and EPA 2016). The location of PCCS is shown in **Figure 2-1**.

The process of lead and zinc production involved the Imperial Smelting Furnace process, where inputs of metal concentrates, fuel, pre-heated coke and briquettes were processed through a sinter plant and blast furnace. The outputs of the blast furnace included lead bullion and black slag. Zinc vapour was transferred to a condenser to produce zinc. Sinter gases were removed from the sinter plant and processed through an acid plant to produce sulfuric acid. Emissions associated with these processes included metal vapours, sulfuric acid, carbon monoxide and fine particulate matter (PM₁₀) (State of NSW and EPA 2016).

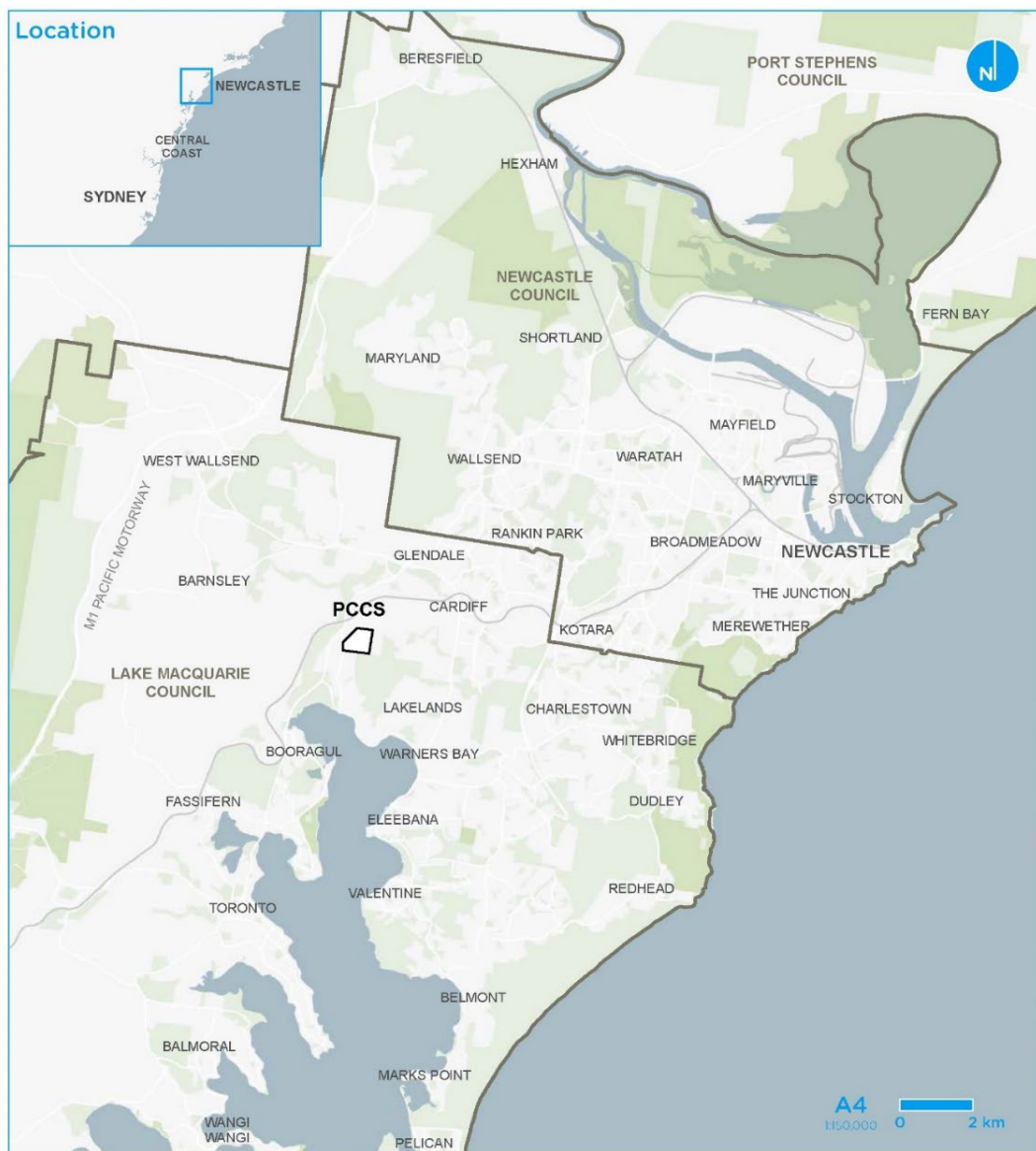


Figure 2-1: Location of PCCS

2.2 Environmental Impacts

Environmental issues associated with metal production at PCCS were first identified in the 1970s when testing of blood lead levels in children commenced (State of NSW and EPA 2016).

Environmental issues were identified to include aerial fallout of lead oxide and the use of a Smelter by-product (black slag) as fill material, which contains leachable concentrations of heavy metals.

Aerial fallout of lead oxide has impacted properties within the suburbs of Boolaroo, Argenton to the north and Speers Point to the south. Aerial fallout has occurred due to the following processes (State of NSW and EPA 2016):

- Emission of fumes/ aerosols from the blast furnace stack
- Fugitive emissions from the sinter building
- Emissions from molten lead
- Off-site movement of dust associated with waste product stockpiles and blast furnace periodic clean-outs
- Fugitive emissions from unloading and storage of concentrates
- Slag leaving the blast furnace area

Aerial fallout has resulted in the settling of lead oxide onto surface soils and buildings in the surrounding suburbs leading to lead contamination. The nature and extent of contamination is outlined in **Section 4**. The Conceptual Site Model for lead oxide fallout, which identifies sources of contamination, receptors of contamination and pathways between sources and receptors, is included in **Section 5**.

Black slag, a by-product of the smelting operation, was made available for use by the public as bulk fill from PCCS until 1994 (State of NSW and EPA 2016). A report prepared in 1992 identified that heavy metals within black slag, including lead, cadmium, copper and zinc, could leach from the slag into surrounding soils (Batley, 1992). Further information on what black slag is and how to identify black slag is included in Lake Macquarie City Council *Eco Fact Managing Black Slag Affected Soils*, a copy of which is include in **Appendix 1**. The nature and extent of contamination is outlined in **Section 4**. The Conceptual Site Model for black slag is included in **Section 5**.

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

3.1 Extent of Land to Which This RAP Applies

This Standard RAP applies as follows:

- To residential properties within the Lead Contamination Survey Grid that have been impacted by lead oxide fallout. The Lead Contamination Survey Grid is shown in **Figure 3-1** below; and
- To residential properties within the Lake Macquarie City Council area that have been impacted by the use of black slag as fill material.

A Lead Contamination Survey was completed in the early 1990s to assess the geographic extent of lead contamination in surface soil to the north, south and east of PCCS, and to a lesser extent the west. A total of 202 soil samples were collected. Lead concentrations in 70% of the soil samples exceeded the national health investigation level of 300 mg/kg (for a residential land use). The results of this study indicated that lead concentrations are most elevated at and within 400 m of PCCS, with lead concentrations reducing to levels below 300 mg/kg within 2 km (State of NSW and EPA 2016). From this survey, a Lead Contamination Survey Grid was established. This Standard RAP applies to residential properties within the Lead Contamination Survey Grid that are impacted by elevated lead concentrations. The location of the Lead Contamination Survey Grid is shown in **Figure 3-1**.

Black slag was widely distributed as fill material and could potentially be identified in any residential property within the Lake Macquarie City Council area. The Lake Macquarie City Council area is shown in **Figure 3-2**. This Standard RAP applies to any residential property within the Lake Macquarie City Council area where black slag is identified.

The Standard RAP applies to the Site proposed for development. The Site is defined in the development application submitted by the proponent.

3.2 Use of Land to Which This RAP Applies

This Standard RAP applies to residential properties only, including Council owned residential properties and NSW Housing owned residential properties. It does not apply to commercial or industrial properties, childcare facilities, schools, other Council owned properties, public spaces or roads. Owners of non-residential properties should seek advice from LMCC.

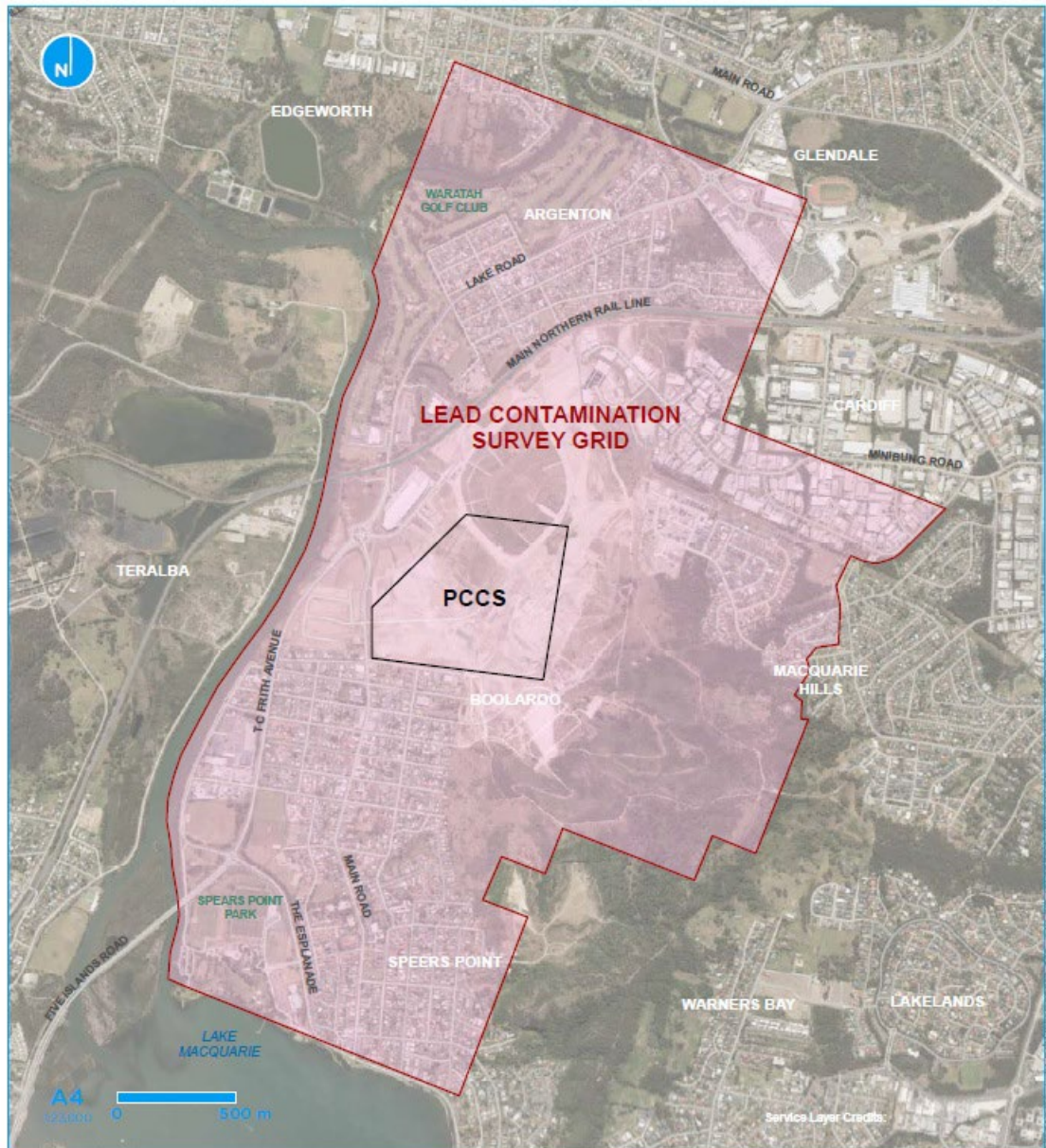


Figure 3-1: 1990s Historical Lead Contamination Survey Grid

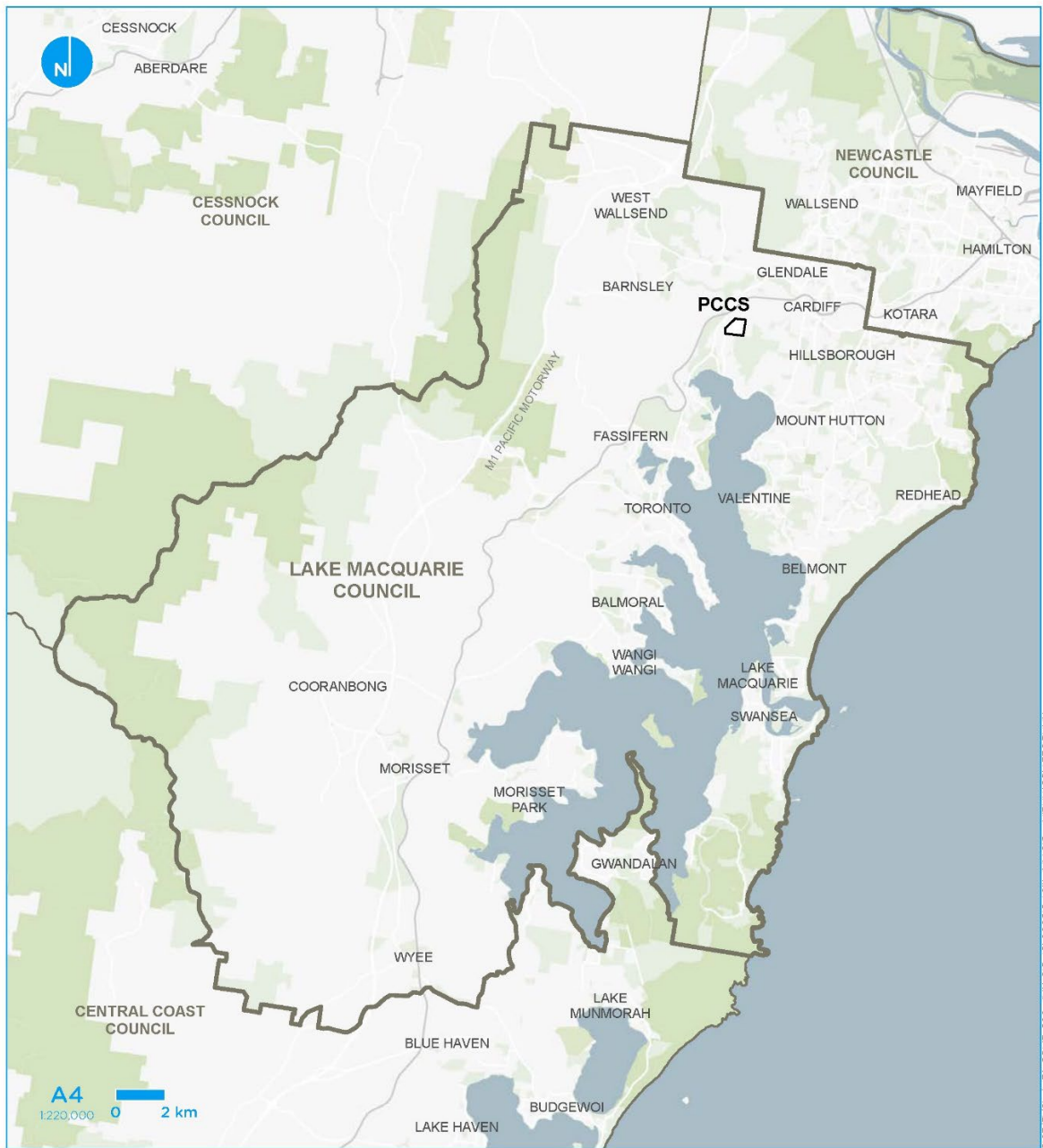


Figure 3-2: Lake Macquarie City Council Area

3.3 Definition of the 'Site'

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

The 'site' can be defined as follows:

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

The property owner should note that where the 'site' is defined as a portion of the Lot and contamination on the remainder of the Lot is not being addressed, the contamination status will not change. As a result, the notification of soil contamination will remain on the Section 10.7 Planning Certificate.

Where a Lot is proposed to be subdivided the 'site' shall be the whole of the newly formed allotment(s). Where there is no development existing on the Lot prior to subdivision, the 'site' shall be the whole Lot.

4. NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination is usually assessed at an individual site to determine whether remediation is required. As the operation of PCCS has led to widespread contamination within the Lake Macquarie City Council area, the nature and extent of contamination associated with operation of PCCS has been assessed on a broader scale as described below.

4.1 Site Acceptance Criteria

Contamination in New South Wales is assessed using National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1), known as NEPM (2013).

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

- HIL A: Residential land use with gardens and accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools)

The NEPM (2013) HIL A criterion for lead in soil is 300 mg/kg.

Note that HIL A excludes the keeping of poultry for egg consumption. If you keep poultry at your property, refer to the LMCC Eco Facts Sheet *Contaminated Land in Lake Macquarie City – Including the Pasmenco Lead Abatement Strategy Area*.

4.2 General Assumptions Made in Assessment of Contamination Associated with PCCS

This assessment assumes that residential properties within the Lead Contamination Survey Grid have been impacted by lead oxide fallout and that any residential property within the Lake Macquarie City Council area where black slag has been identified is impacted by lead contamination associated with that black slag.

A Preliminary Site Investigation or a Detailed Site Investigation is not required, unless a homeowner would like to confirm the presence/ absence of lead contamination prior to completing remediation.

This remediation strategy makes the following assumptions:

- That the only contaminant requiring assessment is lead
- That the only land use to be assessed is HIL A: Residential land use with gardens and accessible soil
- That data from previous investigations is of sufficient quality for the proposed decision-making purposes. The data provided in Table 4.1 and Table 4.2 is general in nature and is not reflective of the conditions at individual properties within the Lead Contamination Survey Grid

4.3 Aerial Fallout of Lead Oxide

As indicated in **Section 3.1**, a Lead Contamination Survey Grid was established in the early 1990s, identifying lead contamination in surface soils from the aerial fallout of lead oxide from PCCS. The study was presented in the Australian Journal of Public Health:

- Galvin et al. (1993) Living near a lead smelter: an environmental health risk assessment in Boolaroo and Argenton, New South Wales

Lead contamination in surface soils was assessed via a soil survey on a 200 m grid. The grid extended 2 km north, south and east of PCCS along the extent of residential development at the time of the study. The delineation of the western boundary was not reported in Galvin et al (1993) but appears to be along Cockle Creek and is likely due to the prevailing winds in this area. A total of 202 soil samples were collected from a depth of 0.05 m below ground surface for lead

analysis. Each sample was divided into three sub-samples for analysis at three different laboratories.

Lead concentrations ranged from 20 mg/kg to 21,460 mg/kg. The highest lead concentrations were identified in First Street, Boolaroo, on the southern boundary of PCCS. Statistical evaluation indicated that lead concentrations were significantly higher to the south of PCCS. Based on the data presented in Galvin et al. (1993), assumed average and maximum concentrations in residential areas of Boolaroo, Speers Point and Argenton are outlined in **Table 4-1**.

Table 4-1: Average and Maximum Lead Concentrations Associated with Aerial Fallout

Suburb	Average Lead Concentration	Maximum Lead Concentration
Boolaroo	2866 mg/kg	21,460 mg/kg
Speers Point	1296 mg/kg	<10,000 mg/kg
Argenton	776 mg/kg	<10,000 mg/kg

Average lead concentrations in residential areas of Boolaroo, Speers Point and Argenton exceed the NEPM (2013) HIL A criterion for lead in soil of 300 mg/kg.

4.4 Lead Abatement Strategy

To manage the immediate health risk from the presence of lead oxide in surface soils on residential properties within the Lead Contamination Survey Grid, a Lead Abatement Strategy (LAS) was implemented by the administrators of PCCS (Fitzwalter Group 2007).

The LAS involved investigation of shallow soils and implementation of abatement strategies depending on the concentrations identified in surface soil. The abatement strategies were designed to provide a barrier over lead impacted soil to reduce human exposure pathways and generally included adding topsoil, turf or mulch.

The LAS was implemented between 2013 and 2015 and of the 1969 eligible residential properties within the lead contamination survey grid, 1238 (63%) participated (State of NSW and EPA 2016). As shallow soils at each property that participated were sampled for lead analysis, site-specific lead data is available for those properties and was provided to the property owner at the time of the LAS.

4.5 Black Slag

As indicated in **Section 3.1**, black slag was widely distributed as fill material and could potentially be identified in any residential property within the Lake Macquarie City Council area. Black slag used as general fill in residential properties is expected to have a lead content of less than 1% or 10,000 mg/kg (State of NSW and EPA 2016). Black slag appears as a black metallic sand and is visually identifiable. Black slag can be within a discrete layer, or co-mingled with other soils and both occurrences are considered contaminated in the context of this standard RAP.



Plate 4-1: Typical examples of exposed Black Slag

Douglas Partners prepared a report for LMCC on black slag in 2010:

- Douglas Partners (2010) Report on the Management of Slag Affected Sites in Lake Macquarie Council Area

This report included a review of previous studies and assessment of lead concentrations in soil samples collected from LMCC public land. Average and maximum lead concentrations are outlined in **Table 4-2**.

Table 4-2: Average and Maximum Lead Concentrations Associated with Black Slag

Investigation	Average Lead Concentration	Maximum Lead Concentration
Morrison (2003), University Masters Degree Thesis	Not reported	41,400 mg/kg
Douglas Partners (2010) report	5853 mg/kg	Not reported

4.6 Exceptions to the Broad Classification

Exceptions to the broad classification of lead contamination associated with aerial fallout of lead oxide and use of black slag presented above can occur from either:

- Site-specific information obtained in the report prepared during the LAS (relates to lead contamination associated with aerial fallout only); or
- Site specific investigation (such as a Detailed Site Investigation) completed by an Environmental Consultant¹.

Information on the concentration of lead in soil found during the LAS or during a site-specific Detailed Site Investigation by an Environmental Consultant can be used to document the extent of remediation required.

Where the 'site' being defined is a large area (>500 m²) it is recommended that a Detailed Site Investigation is undertaken to refine the remediation area and avoid potentially unnecessary remediation costs.

¹ As defined by the NSW EPA

5. CONCEPTUAL SITE MODEL

A Conceptual Site Model is a site-specific qualitative description of the source(s) of contamination, the pathway(s) by which contaminants may migrate through the environmental media, and the populations (human or ecological) that may potentially be exposed. This relationship is commonly known as a Source-Pathway-Receptor linkage. Where one or more elements of the Source-Pathway-Receptor linkage are missing, the exposure pathway is considered to be incomplete and no impact from contamination will occur.

Two Conceptual Site Models have been developed for lead contamination of land associated with PCCS and human receptors – one Conceptual Site Model for aerial fallout (**Section 5.3**) and one Conceptual Site Model for lead contamination of land from black slag (**Section 5.4**).

5.1 Lead Impacts to Human Health

Human health impacts associated with lead are well understood. NSW EPA has produced a series of lead fact sheets regarding potential sources of lead contamination, including contaminated soil, old paint, leaded petrol (phased out in the 1970s) and old plumbing or water tanks.

The Australian Government Department of Climate Change, Energy, The Environment and Water indicates that lead contamination can result in elevated blood lead levels, which can have harmful effects including anaemia, kidney problems and neurological or development effects, particularly in children.

The pathways for lead exposure to humans include the following:

- Incidental ingestion of soil and dust
- Inhalation of dust
- Ingestion of home-grown vegetables
- Dermal contact

The ingestion of eggs from keeping of poultry is not considered as an exposure pathway as this pathway is not included in the model used to develop HIL A of 300 mg/kg. As outlined in **Section 4.1**, if poultry are kept on your property for the consumption of eggs, refer to the LMCC Eco Facts Sheet *Contaminated Land in Lake Macquarie City – Including the Pasminco Lead Abatement Strategy Area*.

5.2 Lead Impacts to the Environment

Lead can also impact terrestrial ecology, including flora and fauna, and groundwater dependent ecosystems. The pathways for lead include the following:

- Direct uptake of bioaccessible lead from soil into plants
- Ingestion of plants with elevated lead concentrations by fauna
- Leaching of lead from soil into surface water and groundwater and uptake via:
 - The plant root system
 - Consumption of contaminated water by fauna and groundwater dependent ecosystems

Lead impacts to the environment are widespread throughout the Lead Contamination Survey Grid. As the Standard RAP is not intended to address ecological impacts, ecological receptors are not included in the conceptual site model. However, remediation of lead contaminated surface soils and black slag will result in a reduction of exposure by an improvement for ecological receptors.

5.3 Conceptual Site Model of Lead Contamination from Aerial Fallout

Lead contamination from aerial fallout of lead oxide has the potential to impact human health, as outlined above.

The **source** of contamination was aerial fallout of lead oxide during the operation of PCCS which ceased in 2003. The **current source** of contamination is lead oxide fallout remaining in surface soils of residential properties.

Human receptors of this contamination are adults and children living in these residential properties and their visitors.

There are several **exposure pathways** between the current source and receptors. The primary exposure pathways are incidental ingestion of soil and dust and inhalation of dust. Ingestion of home-grown vegetables is a minor pathway. Dermal contact with soil and dust is a negligible pathway (ASTDR, 2017).

The visual representation of the Conceptual Site Model is shown in **Figure 5-1**.

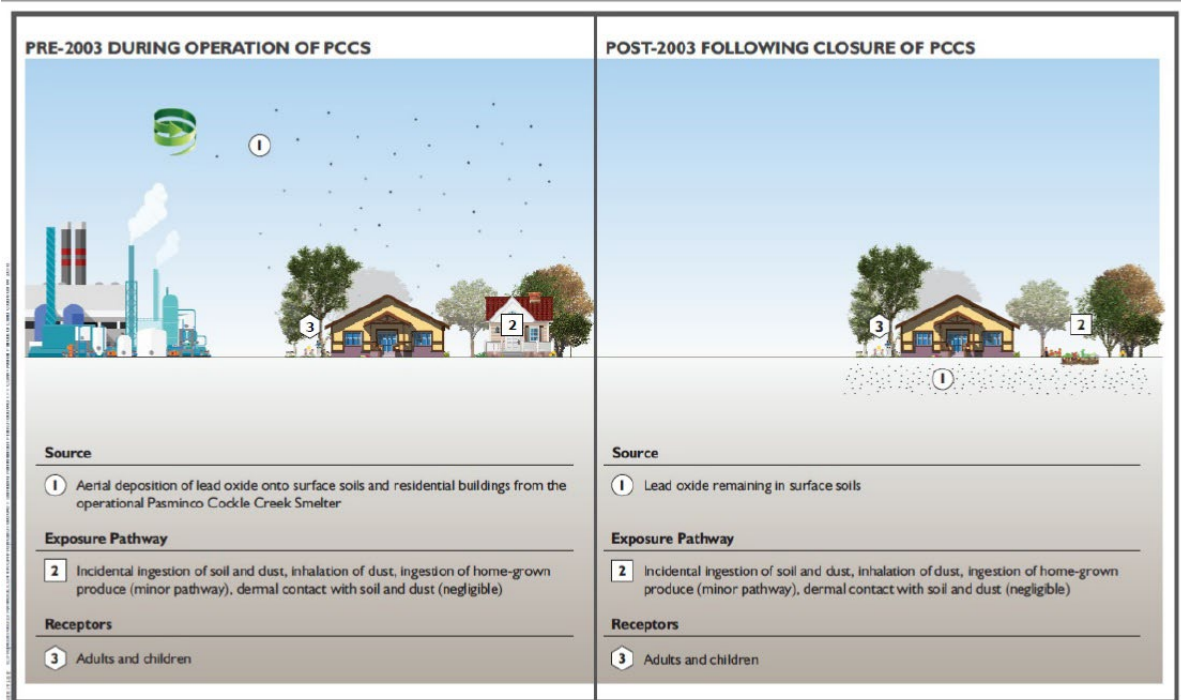


Figure 5-1: Conceptual Site Model for lead oxide fallout

5.4 Conceptual Site Model of Lead Contamination from Black Slag

Lead contamination of land from black slag also has the potential to impact human health. Black slag was made available to the public for use as fill material from the 1960s until 1994. The **source** of contamination is black slag that was used as fill material in residential properties in Lake Macquarie.

Human receptors of contamination are adults and children living in these residential properties and their visitors.

Exposure pathways for black slag are the same as for soils impacted by lead oxide fallout. The main exposure pathways are incidental ingestion of soil and dust and inhalation of dust. Ingestion of home-grown vegetables is a minor pathway. Dermal contact with soil and dust is a negligible pathway.

The visual representation of the Conceptual Site Model is outlined in **Figure 5-2**.

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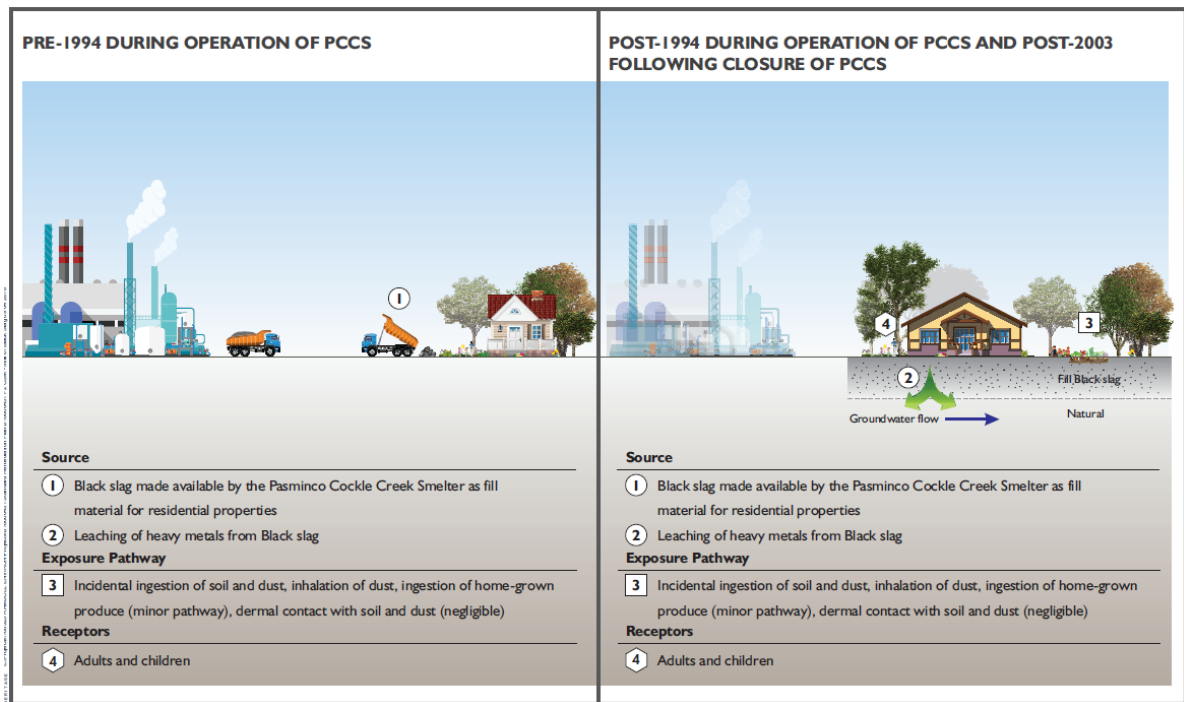


Figure 5-2: Conceptual Site Model for black slag

6. REGULATORY APPROVALS

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

Table 6-1 Key Relevant Legislation and Regulations

Legislation or Regulation	Relevance
<p><i>State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 4 Remediation of Land (formerly SEPP 55)</i></p>	<p>Under the SEPP, remediation work are permissible in any zone, regardless of any provision in another environmental planning instrument (such as a local environmental plan). SEPP 55 also establishes:</p> <p>Category 1 remediation works: remediation that requires development consent. This includes remediation that is: designated development; likely to have a significant impact on ecological values; deemed as requiring development consent by another SEPP; within a sensitive land zone under a local environmental plan; or not consistent with a contaminated land planning guideline made by the relevant council.</p> <p>Category 2 remediation works: remediation which does not require development consent. This is any remediation that is not deemed category 1 remediation works. While development consent is not required, the Council is required to receive written notification of the proposed remediation at least 30 days prior to the commencement of remediation.</p> <p>The works completed under this RAP are likely to be Category 2 remediation works, however as this RAP is likely to be used in conjunction with a request for approval for development, development consent of the remedial works will by default be approved through a development consent process.</p>
<p><i>Contaminated Land Management Act 1997 (CLM Act)</i></p>	<p>Under the CLM Act, EPA regulates contaminated sites where the contamination is significant enough to warrant regulation. Contaminated sites that are not regulated by EPA are managed by local councils through land use planning processes. PCCS was declared a remediation site in 2002 (Declaration Number 21027) for metal contaminants, in particular lead, cadmium and zinc. A Remediation Order (Notice 223008) was issued in 2003 and varied in 2017. Remediation commenced in 2003 and was completed in 2020.</p> <p>Residential properties within the Lead Contamination Survey Grid may meet the triggers to report contamination to NSW EPA, however it is not intended that these sites be notified. NSW EPA is satisfied that these sites are being adequately managed.</p>
<p><i>Protection of the Environment Operations Act 1997 (POEO Act)</i></p>	<p>Under the POEO Act is it an offense to pollute waters. Where dewatering is required as part of the development works, the water needs to be of appropriate quality for discharge. Advice should be sought from the Environmental Consultant.</p>
<p><i>Lake Macquarie Local Environment Plan (LMLEP) 2014</i></p>	<p>The Lake Macquarie LEP is the key local land use planning document for the Lake Macquarie local government area. The LMLEP aims to make local environmental planning provisions for land in Lake Macquarie City in accordance with the relevant standard environmental planning instrument under Section 3.20 of the Environmental Planning and Assessment Act 1979. The LMLEP outlines permitted and prohibited development, exempt and complying</p>

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Legislation or Regulation	Relevance
<p><i>Protection of the Environment Operations (Waste) Regulation 2014</i></p>	<p>development and includes principal development standards. The LMLEP includes specific requirements for redevelopment of PCCS at Boolaroo.</p> <p>The Regulation makes requirements relating to non-licensed waste activities and waste transporting.</p> <p>The Regulation exempts certain waste streams from the full waste tracking and record keeping requirements. A Notice of Exemption for Pasmenco naturally immobilised waste was granted under Part 9 of the Regulation. The exemption applies to Pasmenco Immobilised Waste referred to in Immobilised Contaminants Approval 2020/01 from a residential property. This exemption is in place until 19 January 2025. An extension of the Notice of Exemption has been granted until January 2020. Following January 2020, information regarding waste tracking should be sought from NSW EPA website.</p> <p>Part 1 of Schedule 1 of the Regulation lists wastes transported within NSW or interstate and required to be tracked. This includes "Lead; lead compounds" and "Soils contaminated with a substance or waste that is referred to in this Part". These tracking requirements apply to soils excavated outside the LAS for disposal off site.</p>
<p><i>General Approval of The Immobilisation of Contaminants in Waste</i></p>	<p>In accordance with Part 10 and Clause 101 of the Protection of the Environment Operations (Waste) Regulation 2014, NSW EPA has issued a General Immobilised Contaminants Approval (2020/01) for "metallurgical furnace flue dust or excavated soil that contains metallurgical furnace flue dust that is located at residential premises inside the Pasmenco Lead Abatement Strategy (LAS) Area at Cockle Creek, NSW 2284". This Approval does not apply to metallurgical furnace slag or metallurgical furnace slag impacted soil.</p> <p>The approval indicates that the waste is naturally immobilised and provides information on packaging requirements, waste assessment requirements, disposal restrictions, waste management requirements and waste tracking and notification requirements.</p> <p>This Approval commenced on 17 January 2020 and is valid until 19 January 2025 unless sooner amended or revoked. This Approval replaces general immobilisation approval number 2017/02 which has been revoked. A copy of this Approval is included in Appendix 2.</p>
<p><i>Waste Tracking Exemption, Pasmenco Naturally Immobilised Waste</i></p>	<p>Under Part 9 of Protection of the Environment Operations (Waste) Regulation 2014, NSW EPA has granted an exemption to waste tracking for Pasmenco naturally immobilised waste referred to in Immobilisation Approval 2020/01. The waste tracking exemption applies to waste delivered to an appropriately licensed landfill by a householder or waste collected from a householder and exempts the consignor, transporter and receiver from waste tracking.</p> <p>The waste tracking exemption commenced on 8 January 2020 and is valid until 19 January 2025. A copy of this waste tracking exemption is included in Appendix 3.</p>
<p><i>Natural Disaster Exemption from the waste levy for waste arising from the Pasmenco Lead Smelter</i></p>	<p>Under Clause 21 of the Protection of the Environment Operations (Waste) Regulation 2014, NSW EPA has approved an exemption from the waste levy for the following types of waste:</p> <ul style="list-style-type: none"> • Metallurgical furnace slag • Metallurgical furnace slag contaminated excavated materials • Metallurgical furnace flue dust

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Legislation or Regulation	Relevance
	<ul style="list-style-type: none"> • Metallurgical furnace flue dust impacted excavated materials • Any mixture of these materials <p>The exempt waste must be located within residential premises inside the Pasmenco Lead Abatement Strategy (LAS) Area at Cockle Creek, NSW 2284. The exemption of the waste levy is valid at Awaba Waste Disposal Facility and Summerhill Waste Management Centre, effective from 17 January 2020 until January 2024. A copy of the waste levy exemption is included in Appendix 4.</p>
<i>Designated Waste Certificate</i>	<p>Under Part 10, Clause 106 of the Protection of the Environment Operations (Waste) Regulation 2014, NSW EPA has provided a Designated Waste Certificate to be given to the receiving facility to certify that the soil being received for disposal has been classified in accordance with immobilised Contaminants Approval GAI2020/01. One section of the Designated Waste Certificate is to be completed by the 'responsible person', likely to be the site owner or remediation contractor and a second section is to be completed by the receiving facility. A copy of the Designated Waste Certificate is included in Appendix 5.</p>
<i>Environmental Planning and Assessment Act 1979 (EP&A Act)</i>	<p>The EP&A Act establishes the land use controls and the development approval process in New South Wales. Under the EP&A Act, a Section 10.7(2) Planning Certificate is mandatory when purchasing a property. It is a certificate that details the development potential of a parcel of land including planning restrictions that apply. A Section 10.7(2) Planning Certificate details the contaminated land status of a property in the LMCC area in accordance with Council <i>Policy Managing Contaminated or Potentially Contaminated Land in Lake Macquarie</i>.</p> <p>The Resilience and Hazards SEPP is an environmental planning instrument under the EP&A Act. Any remediation that is deemed a category 1 remediation works under the SEPP would require development consent under Part 4 of the EP&A Act. If any remediation was determined to be category 1 remediation works it is expected to be of a scale that would require a development application to be submitted to LMCC.</p>
<i>Lake Macquarie Development Control Plan (LMDCP) 2014</i>	<p>The LMDCP includes specific information pertaining to development in rural zones, residential zones, business zones, industrial, business park and infrastructure zones, recreation and tourist zones and environment protection zones. It also provides information on development for subdivisions, specific land uses, town centre area plans, precinct area plans and heritage areas. A specific Precinct Area Plan has been developed for Pasmenco covering the former PCCS site and former Incitec site.</p>
<i>Council Policy Managing Contaminated or Potentially Contaminated Land in Lake Macquarie</i>	<p>This policy forms the basis of the management of land within the LMCC area which is either contaminated or potentially contaminated. This Policy indicates that LMCC will maintain a database of contaminated or potentially contaminated land and information on remediation, abatement or site audits of work undertaken within the LMCC area; include this information on Planning Certificates; consider contamination issues during the rezoning and development assessment process; and communicate this Policy to the community.</p>

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

Legislation or Regulation	Relevance
<i>Water Management Act 2000</i>	A controlled activity approval is required for works in or within 40 metres of a natural watercourse. Each proponent should assess whether their property is within 40 metres of a natural watercourse. If so, controlled activity approval will be required.
<i>Water Act 1912</i>	A groundwater interception licence is required for works that intercept groundwater. However minor temporary dewatering activities that are estimated to be less than three megalitres per year (including both construction dewatering and subsequent managed inflows) will generally not require a licence or approval from the Office of Water. Groundwater is not expected to be intercepted during the works. In the unlikely event it is intercepted, it is likely to require dewatering of less than three megalitres per year. It is therefore unlikely that a water access licence would be required for any sites remediated following this Standard RAP.
<i>Mine Subsidence Compensation Act 1961</i>	Some sites may be located within a designated Mine Subsidence District and liaison with the Mine Subsidence Board would be required.

7. REMEDIATION

7.1 Remediation Objective

Residential properties within the Lead Contamination Survey Grid and residential properties within the Lake Macquarie Council area with black slag fill material are assumed to have lead concentrations in soil exceeding NEPM (2013) HIL A of 300 mg/kg.

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

7.2 Remediation Options

The remediation goal may be met via three options:

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

7.2.1 Excavation and Off-site Disposal

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

The Section 10.7 Planning Certificate can be updated, following notification to Council, and the record of contamination can be removed or amended depending on remediation boundary in relation to the Lot. Further detail is provided in the flow chart in **Section 7.3**.

7.2.2 On-site Capping

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

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

- Concrete slab
- Permanent hardstand paving

It is not anticipated under the Standard RAP that other capping types such as clay or geosynthetic clay layer (GCL) would be used. In the event that these capping types are planned, a site-specific remediation strategy is required.

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

- 1. On-site capping of lead impacted soils is not a suitable remediation strategy where contamination extends below the groundwater surface. For conservatism, contamination should not extend to within 0.5 m above the encountered groundwater surface.** This restriction is expected to only be relevant to black slag as aerial deposition is predominantly limited to surface impact.
- 2. Contaminated soils are not to be capped within 900 mm of a boundary i.e. the edge of the capped area must be >900 mm from the boundary.**

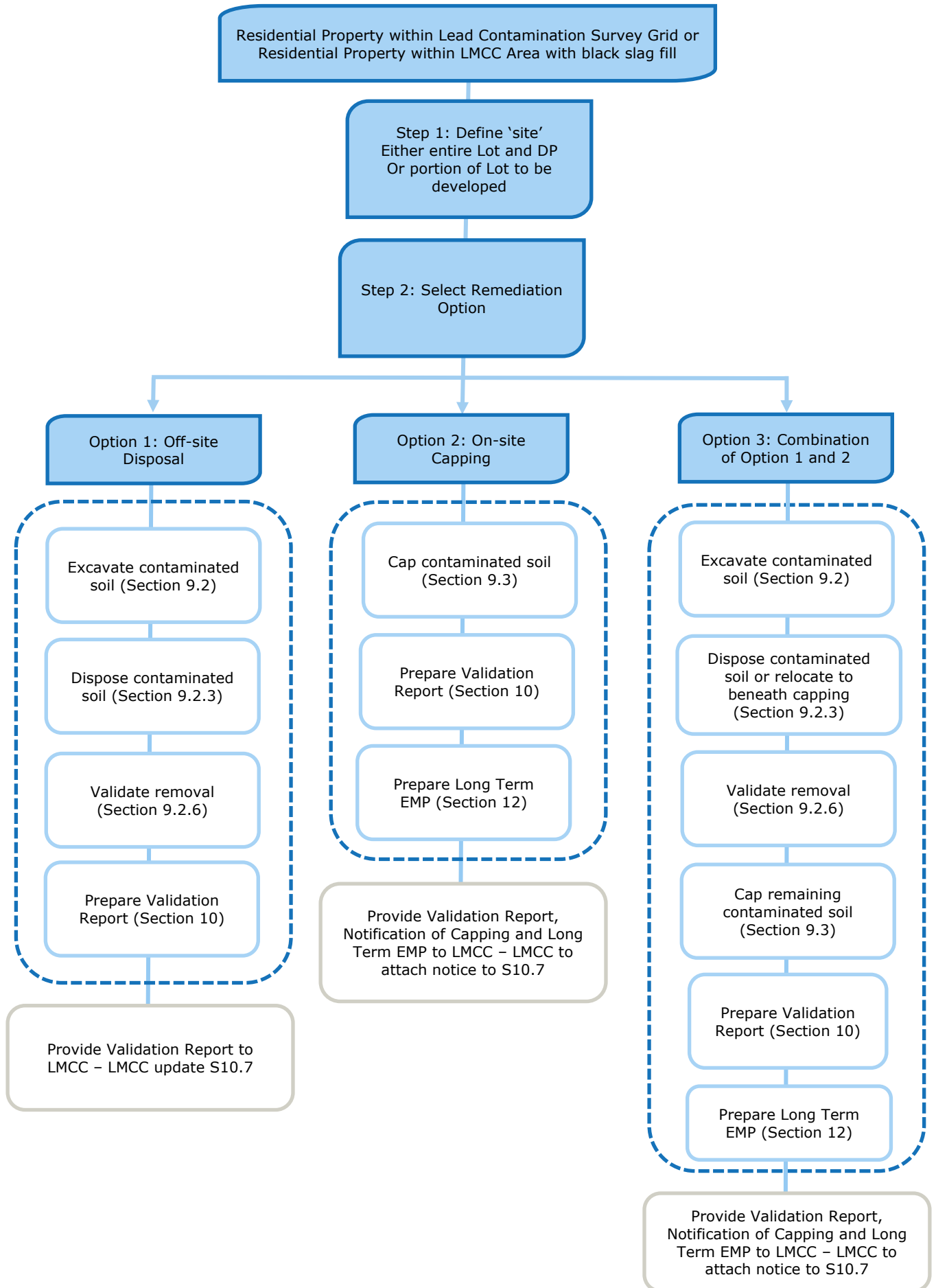
A Notification of Capping is required to allow notification of the capped contaminated soil on the planning certificate held with Council. The existence of the capping will be included on the Section 10.7 Certificate.

Long term management will be via a Long Term EMP, which will detail management requirements. The existence of the Long Term EMP will be included on the Section 10.7 Planning Certificate. A template for the Long Term EMP is included in **Appendix 9**.

7.3 Remediation Outcomes

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

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8. REMEDIATION ROLES AND RESPONSIBILITIES

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

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

Entity	Role	Responsibilities
Property Owner	To coordinate remedial works	<ul style="list-style-type: none"> Engage Contractor to complete remedial works Engage Environmental Consultant to validate remedial works Provide documentation of remedial works (Remediation and Validation Report) to LMCC Provide Long Term EMP to LMCC Manage capped contamination in accordance with Long Term EMP (if on-site capping is completed)
LMCC	To provide development approval and to maintain contaminated land database	<ul style="list-style-type: none"> Maintain a contaminated land database within the LMCC area Develop supporting material for contractors regarding the remediation of lead contamination Review the RAP provided in conjunction with the development application. Document completed remedial works on contaminated land database Document the property status on the Section 10.7 Planning Certificate
Suitably qualified and experienced Contractor	To complete remedial works	<ul style="list-style-type: none"> Read and understand supporting material prepared by LMCC for the remediation of lead contamination associated with PCCS Liaise with Property Owner to complete remedial works – site establishment, remediation, validation, waste disposal and reinstatement
Appropriately qualified Environmental Consultant	To complete validation works and reporting	<ul style="list-style-type: none"> Completion of validation sampling Preparation of Remediation and Validation Report Preparation of Long Term EMP (if on-site capping is completed)

9. REMEDIAL ACTION WORK PLAN

Remedial works are to be completed by a suitably qualified and experienced Contractor with support from an appropriately qualified Environmental Consultant.

9.1 Site Establishment

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

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

9.2 Remediation Methodology – Excavation and Off-site Disposal

9.2.1 Surface Soil Impacted by Fallout of Lead Oxide

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

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

9.2.2 Soil Impacted by Black Slag Fill

Where black slag has been used as fill material, black slag requires excavation and off-site disposal. Excavation shall continue until the full lateral and vertical extent of the black slag has been identified and removed.

Black slag is visually distinguishable from surrounding natural soils. Black slag comprises a black granular material, which may be shiny or dull. Particle sizes generally range from coarse grit (1-2 mm in diameter) to fine dust (<0.05 mm in diameter) (DP 2010). It is often noticeably heavier than soil or gravels of a similar size.

9.2.3 Waste Classification and Disposal

9.2.3.1 Soils for Off-Site Disposal Generated within the LAS Boundary

Surface soil impacted by the fallout of lead oxide from residential properties within the Pasmenco Lead Abatement Strategy (LAS) Area can be classified for disposal to landfill using General Immobilisation Approval No. 2020/01. A copy of the immobilisation approval is included in **Appendix 2**. This approval allows for lead impacted soils to be automatically classified as General Solid Waste (non-putrescible) without the need for analytical classification.

General Immobilisation Approval 2020/01 does not apply to black slag. To dispose of black slag to landfill further assessment and classification is required. Please refer to the NSW EPA website at: <https://www.epa.nsw.gov.au/working-together/community-engagement/community-committees/lmc-review-lead-exposure-management/lead-soil-disposal-for-lake-macquarie-residents> for more details.

The process for disposal of surface soil impacted by the fallout of lead oxide is as follows:

- For waste subject to the General Immobilisation Approval 2020/01, no analytical assessment is required except where other contaminants listed in Tables 1 and 2 of the Waste Classification Guidelines are contained within the subject waste – other contaminants must be assessed in accordance with the Waste Classification Guidelines
- The waste can only be disposed at landfills licensed to receive General Solid Waste (non-putrescible)

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- NSW EPA has granted an exemption of waste tracking for excavated soil impacted by lead oxide from within the Pasminco Lead Abatement Strategy (LAS) Area, see **Appendix 4**
- A Designated Waste Certificate is to be completed by the site owner and the receiving facility, see **Appendix 5**
- Awaba Waste Disposal Facility has been granted an exemption from the waste levy for excavated soil impacted by lead oxide from within the Pasminco Lead Abatement Strategy (LAS) Area, see **Appendix 6**
- Residents should contact the relevant landfill prior to the start of excavation works to confirm the procedures for disposal of excavated soil impacted by lead oxide
- In accordance with the Immobilisation Approval, excavated soil impacted by the fallout of lead oxide should be handled, packaged and transported with the appropriate health, safety and environmental controls to prevent or minimise human and environmental exposure to the materials, or cross contamination

9.2.3.2 Soils for Off-Site Disposal Generated Outside the LAS Boundary

To dispose of soils that are generated outside the LAS boundary and are contaminated with black slag, contact NSW EPA for further information on waste disposal on a case by case basis. .

9.2.4 Disposal Verification

The Contractor shall report the disposal of the waste material to the appropriate landfill by providing the Environmental Consultant with landfill dockets documenting the tonnage of waste disposed. The landfill dockets must be included in the Remediation and Validation Report.

9.2.5 Imported Fill

All fill imported to the site shall be documented by the Contractor, including landscaping materials. All soils and landscaping materials shall be validated by the Environmental Consultant PRIOR to being received at the site to confirm these are Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM).

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

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

9.2.6 Validation of Remediation

The Environmental Consultant shall complete validation sampling and analysis. Validation samples shall be collected from the base of the remedial excavation prior to backfilling as necessary.

The number of validation samples to be collected shall be determined by Table 2 in NSW EPA (2022) Sampling Design Part 1: Application, which is based on minimum number of sampling points required to detect a contamination hot spot.

Validation samples shall be collected and analysed as follows:

- On a grid-based pattern across the base of the remedial excavation
- From the walls of the remedial excavation if the depth of the wall exceeds 200 mm
- Either directly from the surface by hand or with the use of hand tools i.e. trowel
- Wearing dedicated disposable nitrile gloves, which are to be changed between sampling locations
- Where hand tools or other equipment is used, decontamination by washing the equipment with a phosphate-free detergent and rinsing in potable water should be undertaken
- Collected into laboratory-supplied acid-rinsed glass jars with Teflon[®] lined lids

- One intra-laboratory duplicate sample is to be collected for analysis at the primary laboratory
- One inter-laboratory duplicate sample is to be collected for analysis at a secondary laboratory
- Validation samples shall be stored in an ice-filled cooler box for transportation to the laboratory
- Validation samples shall be transported to the laboratory under Chain of Custody conditions
- Laboratory analysis shall be completed for lead by a laboratory NATA accredited for this analysis

Lead concentrations within the validation samples shall be compared to NEPM (2013) HIL A guideline of 300 mg/kg. In the event that validation samples are below the HIL A guideline, the remediation will be considered to be complete.

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

9.3 Remediation Methodology – On-site Capping

9.3.1 Area to be Capped

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

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

9.3.2 Notification of Capping

The Notification of Capping details where contamination remains permanently capped on site. A template for the Notification of Capping is included in **Appendix 7**. The Notification of Capping includes details of the nature of the marker layer and capping material. The capped area is to be marked on a site plan. A survey of the capped area is required for the Notification of Capping in circumstances where the location of the cap cannot be visually identified.

9.3.3 Long Term Environmental Management Plan

The Long Term EMP details where contamination remains on the site and the management measures to be implemented by the site owner to manage risk associated with the on-site retention of contaminants. Requirements for a Long Term EMP are included in **Section 12**. A template for the Long Term EMP is included in **Appendix 8**.

9.3.4 Validation of Remediation

The Environmental Consultant shall complete validation of the capping works. Validation is to include:

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

9.4 Work Health and Safety Plan

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

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

A generic Safe Work Method Statement for lead remediation on a residential property has been included in **Appendix 9**.

9.4.1 Assignment of Responsibilities

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

New employees shall be given induction training on safety issues and responsibilities.

9.4.2 Personal Protective Equipment

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

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

The following PPE shall be considered:

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

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

9.5 Construction Environmental Management Plan

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

The CEMP includes requirements relating to site access, hours of operation, air controls, noise control, erosion and sediment control, surface water and groundwater control, traffic control, spill response and managing wastes. The CEMP is required for all remedial works and is separate to the Long Term EMP required for long-term management of contaminated land.

9.5.1 Site Access

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

9.5.2 Hours of Operation

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

- 7.00 am to 6.00 pm, Monday to Friday
- 7.00 am to 1:00 pm on Saturdays
- At no time on Sundays or public holidays

9.5.3 Air Controls

9.5.3.1 Dust Control

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

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

9.5.3.2 Odour

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

Should odours be encountered during remedial works, this may be an indicator of other contamination. If odours are identified, remedial works should stop and the source of the odour be investigated by the Environmental Consultant.

9.5.4 Noise Control

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

The following noise control measures shall be implemented:

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

9.5.5 Erosion and Sediment Control

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

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

1. Diversion of surface water upslope of the excavation and stockpile areas.
2. Stockpile soil on flat land where possible and out of any drainage lines.
3. Line the base of stockpiles with plastic to prevent contamination of underlying soils.
4. Cover stockpiled material completely to prevent wind-blown dust or sediment runoff during rainfall events.
5. Install sediment fence down slope of completely covered soil stockpiles to capture any runoff.
6. Inspect the erosion and sediment controls weekly, before and immediately following rain events and maintain controls as required.
7. Inspect vehicle access point after each vehicle leaves site and remove any material tracked offsite and place back onsite in a location where it cannot cause water pollution.
8. The Contractor is to keep themselves informed of weather conditions and the potential for rain events and proactively manage the site.
9. Refer to the NSW Blue Book for details and diagrams at <https://www.environment.nsw.gov.au/research-and-publications/publications-search/managing-urban-stormwater-soils-and-construction-volume-1-4th-edition>

9.5.6 Surface Water and Groundwater Control

9.5.6.1 Surface water

Surface soils impacted with lead oxide are unlikely to leach significant concentrations of lead to surface waters.

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

The following control measures shall be implemented:

- Erosion and sediment controls outlined in **Section 9.5.5**
- Water collected within excavations shall be directed through at least one sediment trap prior to flowing offsite or being discharged.

- The water shall have a Total Suspended Solids measurement of less than or equal to 50mg/L and a pH between 6.5 and 8.5. The Contractor is responsible for ensuring all water discharged or flowing offsite complies and shall be able to provide proof of compliance where requested by a Regulator.
- Refer to the NSW Blue Book for details and diagrams of sediment traps at <http://www.environment.nsw.gov.au/resources/water/BlueBookVol1.pdf>

9.5.6.2 Groundwater

Groundwater is unlikely to be encountered during the remediation of lead oxide impacted surface soils.

Groundwater may be encountered during the remediation of black slag, depending on the depth at which the black slag was used as fill material. In the event that groundwater is encountered during remediation works, an Environmental consultant shall be contacted for advice.

9.5.7 Traffic Control

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

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

In addition, the Contractor should consider the following measures:

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

9.5.8 Spill Response

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

Examples where spills could occur are:

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

9.5.9 Waste Materials

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

9.6 Contingency Plan

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

Table 9-1: Contingency Plan

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

9.7 Emergency Response Plan

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

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

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

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

9.8 Community Consultation

Prior to the commencement of remediation, the land owner should notify their immediate neighbours of their intention to complete remediation of lead-impacted soil on their property.

10. VALIDATION REPORTING

A Remediation and Validation Report is to be prepared by the Environmental Consultant detailing the completed remedial works and validation sampling undertaken. The report shall be prepared in accordance with NSW EPA (2020) *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines*.

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

- Scope of work
- Site description
- Description of lead contamination
- Remediation activities undertaken, including extent of excavation works and photographic records
- Material disposal information, including landfill dockets and completed Designated Waste Certificate
- Validation sampling including comparison of lead concentrations to NEPM (2013) HIL A of 300 mg/kg
- A statement indicating the suitability of the site for residential land use

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

- Scope of work
- Site description
- Description of lead contamination
- Capping activities undertaken, including extent of marker layer, capped area and type of capping
- Survey record or area marked on a plan showing capped area
- Notification of Capping (completed using template in **Appendix 7**)
- That the capped area shall be notated on a planning certificate issued under Section 10.7 of the Environmental Planning and Assessment Act
- A statement indicating the suitability of the site for residential land use
- The Long Term EMP (**Appendix 8**).

11. NOTIFICATION OF CAPPING

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

The Notification of Capping is to:

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

A template of the Notification of Capping for the on-site containment option is included in **Appendix 7**. This template is to be updated by property owners at the completion of capping.

12. LONG TERM ENVIRONMENTAL MANAGEMENT PLAN TEMPLATE

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

The Long Term EMP shall:

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

A template of the Long Term EMP for the on-site capping option is included in **Appendix 8**. This template is to be completed by the Environmental Consultant in consultation with the property owners at the completion of capping. The property owner must also notify LMCC that a Long Term EMP applies to the property. The existence of the Long Term EMP will be listed on the property's Section 10.7 Planning Certificate.

13. PROTOCOLS TO REVIEW AND UPDATE RAP

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

- Change in Council Policy Managing Contaminated or Potentially Contaminated Land in Lake Macquarie
- Review or update of LMLEP (2014) or LMDCP (2014) when relevant to contaminated land management
- Review or update of EPA endorsed guidelines or policies, including a change to HIL A
- Review or update of relevant NSW legislation, including Resilience and Hazards SEPP
- Update to NSW EPA General Immobilisation Approvals

If otherwise not triggered by the events above, the Standard RAP will be reviewed every four years at a minimum, as per LMCC policy.

14. REFERENCES

Agency for Toxic Substances and Disease Registry (ASTDR) (2017) Case Studies in Environmental Medicine, Lead Toxicity

Batley (1992) Leachability of lead and other trace metals from lead-zinc smelter slag, Investigation Report CET/LHIR077, report prepared by CSIRO for Pasminco Metals Sulphide Pty Ltd

Douglas Partners (2010) Report on the Management of Slag Affected Sites in Lake Macquarie Council Area

Fitzwalter Group (2007) Lead Abatement Strategy Implementation Documentation

Galvin et al. (1993) Living Near a Lead Smelter: An Environmental Health Risk Assessment in Boolaroo and Argenton, New South Wales

Grace and MacFarlane (2016) Assessment of the Bioaccumulation of Metals to Chicken Eggs from Residential Backyards

Morrison (2003) Are they really a problem? An Examination of the Chemistry and Oral Accessibility of base metal smelter slags in North Lake Macquarie, NSW

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

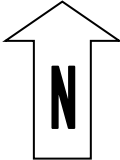
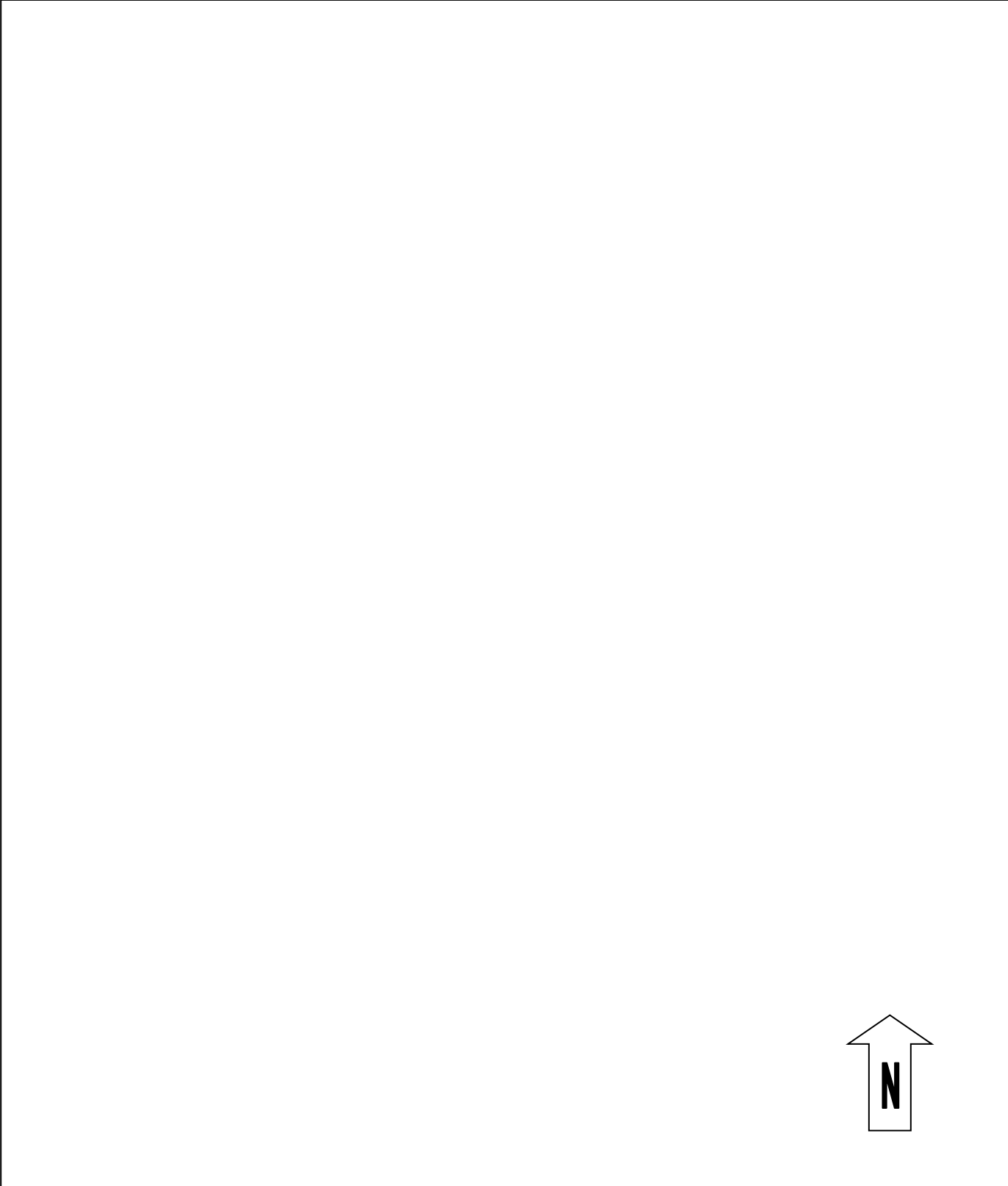
NSW EPA (2022) *Sampling design part 1 – application and Sampling design part 2 - interpretation*

NSW EPA (2016) Lead, Your Health and the Environment Fact Sheet

NSW EPA (2020) *Consultants Reporting on Contaminated Land, Contaminated land Guidelines*

State of NSW and EPA (2016) Lead Expert Working Group Report on Managing Residual Contamination in North Lake Macquarie

<https://www.dccew.gov.au/environment/protection/chemicals-management/lead>



Site Owner:

Lot and DP:

Figure 1: Site Location Plan

Include a plan showing the site location above

APPENDIX 1
LMCC ECO FACT SHEET MANAGING BLACK SLAG AFFECTED SOILS

MANAGING BLACK SLAG AFFECTED SOILS

Tip Sheet

WHAT IS BLACK SLAG?

Black slag is a by-product of the Pasminco Cockle Creek (lead and zinc) Smelter, which operated in Boolaroo until 2003. Black slag (also called black sand or black grit) was distributed from the smelter between the 1960s and 1990s, and was frequently used as a filling material in landscaping and engineering works in the local area due to its excellent drainage properties, easy handling, load bearing capacity, and abundant supply.

Black slag may be found in foreshore reserves, parks, sports fields, drains, retaining walls, roadways, and on private property.

HOW DO I RECOGNISE BLACK SLAG?

The black slag in Lake Macquarie City is a black, gritty or granular material, which may be shiny or dull, with particles ranging from coarse grit (1-2mm in diameter) to fine dust (less than 0.05mm in diameter).

Black patches on the ground are typical of sites where black slag is present, as shown in image 1 and 2.



Image 1: Close up of black slag



Image 2: Typical example of exposed black slag

HOW DO I KNOW IF A SITE IS SLAG AFFECTED?

You can call Council's Customer Service Centre on 4921 0333 to check whether a particular property or site is listed in Council's database of contaminated land. However, this database is not exhaustive, as Council may not have been made aware of many sites where black slag is present. In this case, visual identification and reporting of black slag is important. If you are concerned about, or suspect the presence of, black slag; please contact Council's Customer Service Centre.

WHAT ARE THE HEALTH RISKS?

In most cases, black slag deposits in Lake Macquarie City present a low health risk if the slag is covered and an adequate barrier is in place to prevent exposure. Black slag contains varying concentrations of heavy metals including lead, copper, zinc, arsenic, chromium, and cadmium. The main contaminant of concern is lead.

Lead concentrations in black slag affected soils may impact human health if the slag is ingested (from hand to mouth) or if the dust is inhaled in quantities above safe health thresholds, with young children and pregnant women most at risk. Consult your doctor if you are concerned about your exposure to black slag. Council recommends that residents take precautions to minimise their exposure to black slag.

WHAT PRECAUTIONS CAN I TAKE?

On residential sites, there are simple things you can do to reduce the potential health risks associated with exposure to black slag affected soils. Cost effective 'cap and contain' techniques that establish a physical barrier over slag deposits, combined with sound housekeeping and ongoing maintenance of topsoil and grass, or other appropriate cover material, over contaminated soil can help reduce the potential problem. Removal and off-site disposal is a more expensive alternative solution with the benefit that no on-going site maintenance is required.

CAP AND CONTAIN TECHNIQUES	HOUSEKEEPING AND MAINTENANCE	PUBLIC EDUCATION
<ul style="list-style-type: none">✔ Grassed areas: Import and spread 200 mm of clean topsoil. Cover with new turf, or with pavers or gravel where grass is difficult to maintain (for example, in shaded areas or areas in high traffic areas).✔ Gardens: Cease growing vegetables in black slag affected soils. Spread 200 mm of 'clean' topsoil over the surface and convert area to lawn (or to a paved/ gravel /concrete asurface). Advice on avoiding the harmful effects of contamination during gardening (including vegetable gardens) is published in the World Health Organisation's "Contaminated Soils in Gardens" factsheet, and the NSW Ministry of Health – Hunter New England District "Lead in North Lake Macquarie" website.✔ Children's play areas: Treat with clean top-soil to a depth of 200 mm and cover with new turf or paving. Ensure sand pits are filled with clean imported sand from professional landscaping materials suppliers.	<ul style="list-style-type: none">✔ Contaminated soil from the garden may enter the house on footwear or clothing. Place durable mats at all points of entry and clean regularly, depositing accumulated soil into the household garbage bin. Leave yard shoes outside the house.✔ Regularly clean floors by wet mopping.✔ Remove dust from toys and furniture using a damp cloth.✔ Adopt routine washing of children's hands after playing in the garden or on the floor.	<ul style="list-style-type: none">✔ Wear gloves when direct contact with slag is unavoidable.✔ Wear disposable overalls in high or prolonged contact situations.✔ Avoid hand to mouth gestures.✔ Wash hands before eating or smoking.✔ Avoid generating dust. Dampen the slag to minimise dust disturbance.✔ Wear a disposable dust mask (type P1 or P2) if dust is unavoidable.

HOW DO I REPORT BLACK SLAG CONTAMINATION TO COUNCIL?

Council welcomes as much information as possible on the location of black slag affected sites in the City. New sites will be investigated and managed in accordance with Council's policies and processes - including being documented in Council's **Contaminated or Potentially Contaminated Land Database**.

Please report information about black slag affected sites to Council's Customer Service Centre on 4921 0333.

WHERE CAN I FIND OUT MORE?

NSW Environment Protection Authority

www.epa.nsw.gov.au/clm
131 555

NSW Ministry of Health, Hunter New England Local Health District

www.hnehealth.nsw.gov.au
1800 063 635

Pasminco

www.pasminco.com.au

FACT SHEETS

WHO Contaminated Soil in Gardens Fact sheet

The Lead Group fact sheets

Lead, your health and the environment

NEED FURTHER ASSISTANCE?

4921 0333 @ COUNCIL@LAKEMAC.NSW.GOV.AU LAKEMAC.COM.AU

APPENDIX 2
IMMOBILISATION APPROVAL 2020/01

Immobilised Contaminants Approval

Pursuant to Part 10 of the *Protection of the Environment Operations (Waste) Regulation 2014* (Waste Regulation), the New South Wales Environment Protection Authority (EPA) has granted the following Immobilised Contaminants Approval.



A) Approval Number

2020/01

This Approval replaces general immobilisation approval number 2017/02 which is hereby revoked.

B) Duration of Approval

This Approval is valid until 19 January 2025 unless sooner amended or revoked.

C) Waste to which this Approval applies

This Approval applies to metallurgical furnace flue dust or excavated soil that contains metallurgical furnace flue dust that is located at residential premises inside the Pasminco Lead Abatement Strategy (LAS) Area at Cockle Creek, NSW 2284 (Annexure A – Map of Pasminco Lead Abatement Strategy Area).

This Approval **does not** apply to metallurgical furnace slag or metallurgical slag contaminated excavated materials (Annexure B – Metallurgical slag and metallurgical slag impacted soil). Metallurgical slag waste or metallurgical slag impacted excavated soil must be assessed on a case by case basis via a specific Immobilised Contaminants Approval.

D) Contaminants to which this Approval applies

This Approval applies to the following contaminants:

- Arsenic (As)
- Beryllium (Be)
- Hexavalent chromium (Cr(VI))
- Lead (Pb)
- Nickel (Ni)

E) Responsible Person

The person or class of persons to whom this Immobilised Contaminants Approval is granted are the persons who generate the waste to which this Approval applies. Responsible persons must comply with the conditions of this Approval.

F) Mechanism of immobilisation

Waste subject to this Approval is considered naturally immobilised.

G) Conditions of Approval

- **Packaging requirements**

Dusty materials must be bagged or drummed or otherwise contained to avoid dust generation during handling.

Excavated materials contaminated by metallurgical furnace flue dust should be handled, packaged and transported with the appropriate health, safety and environmental controls to prevent or minimise human and environmental exposure to the materials, or cross contamination.

- **Waste assessment requirements**

For waste subject to this Approval, no further analytical assessment is required. The naturally immobilised Pasminco furnace flue dust waste has been classified as general solid waste (non-putrescible) based on the total and leachable concentrations of the contaminants referred to in Part D of this Approval.

Note: Any contaminants listed in Tables 1 and 2 of the Waste Classification Guidelines (other than those referred to in part D of this Approval) that are contained within the naturally immobilised Pasminco furnace flue dust waste must be assessed in accordance with the Waste Classification Guidelines.

- **Disposal restrictions**

A waste facility receiving waste subject to this Approval must be legally able to receive such waste.

Naturally immobilised Pasminco furnace flue dust waste may only be disposed of at solid waste landfills that have currently operating leachate management systems, and which are licensed to receive that particular class of waste, and that have licence conditions to receive waste subject to immobilisation approvals with this type of disposal restriction.

- **Waste Management Requirements**

The responsible person should ensure the landfill is permitted by conditions in its Environment Protection Licence to receive waste subject to an immobilisation approval.

- **Waste tracking and notification requirements**

The responsible person must ensure a designated waste certificate is given to the receiving facility in relation to the waste.

Note: A separate waste tracking exemption has been granted by the EPA in relation this waste.

The responsible person is required to keep records of the management and disposal of excavated materials which are not classified as general solid waste (non-putrescible) for a period of at least 3 years from the date on which the waste is disposed of off-site.

H) Definitions

In this Approval:

Waste Classification Guidelines means the Waste Classification Guidelines Part 1: Classifying Waste (November 2014) published by the EPA and available at www.epa.nsw.gov.au

Asela Atapattu
Director Hazardous Materials Chemicals and Radiation
By Delegation
Environment Protection Authority

Date: 15 January 2020

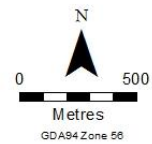


Legend

 Pasmenco LAS Area

**Pasmenco
Lead Abatement Strategy
(LAS Area)**

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NSW Environment Protection Authority (EPA) and its employees
disclaim liability for any act done on the information in the
map and any consequences of such acts or omissions.
Imagery: NearMap, 23 July 2017



Annexure A – Map of Pasmenco Lead Abatement Strategy Area



Annexure B – Metallurgical slag on soil surface (top), as in-fill below topsoil (bottom left) and zoomed metallurgical slag on soil surface impacted soil (bottom right)

While metallurgical slag has been observed at ground level, it is more common as in-fill material located 150-200 mm below ground level with a layer thickness up to about 200 mm. Metallurgical slag is discernible from flue dust by its black colour. Slag impacted soil will have a black colouration associated with it rather than an ordinary brown appearance of flue dust impacted soil.

APPENDIX 3
WASTE TRACKING EXEMPTION

Waste Tracking Exemption

Pasminco Naturally Immobilised Waste

Protection of the Environment Operations (Waste) Regulation 2014

Notice of exemption granted under Part 9 in relation to waste tracking

By this notice the Environment Protection Authority (EPA) grants the following general exemption. The notice exempts the persons or classes of persons described herein from certain requirements in relation to the transportation and tracking of waste. The terms used in this notice have the same meaning as in the *Protection of the Environment Operations Act 1997* (the Act) and the *Protection of the Environment Operations (Waste) Regulation 2014* (the Regulation).

1. This exemption has effect from the date of publication and remains in force until 19 January 2025 or amended by a notice published in the Government Gazette.

Waste to which the exemption applies

2. This exemption applies to Pasminco naturally immobilised waste referred to in Immobilised Contaminants Approval 2020/01 that is trackable waste.
3. This exemption applies to such waste delivered by a householder or collected from a householder.
4. It exempts
 - a. a consignor;
 - b. a transporter; and
 - c. a receiverof waste to which this exemption applies from Part 4 of the Regulation, but only in so far as Part 4 applies by virtue of Clause 41(1)(a) of the Regulation.
5. An exemption under this notice has effect only if the waste is transported to a place that can lawfully be used as a waste facility for that waste.

Conditions relating to the exemption of receivers

6. A receiver is exempt under this notice only if the receiver complies with the following conditions. For each load of waste transported, the receiver must make a record of the:
 - (i) amount of waste received
 - (ii) date on which the waste is delivered to the receiver.

Interstate movement of waste to which Part 3 applies

7. This notice does not exempt any person or class of person from Part 4 of the Regulation in so far as Part 4 applies by virtue of clause 41(1)(b) of the Regulation.

Dangerous Goods requirements

8. This notice does not exempt any person or class of person from any requirement under the *Road and Rail Transport (Dangerous Goods) Act 1997* or the Regulations made under that Act.

Definitions:

- **Householder** – person who owns, or rents, or lives in a house or tenement, and generates Pasmenco naturally immobilised waste.
- **Pasmenco naturally immobilised waste** – Metallurgical furnace flue dust or metallurgical furnace flue dust impacted excavated materials or any mixture of those materials that is located at residential premises inside the Pasmenco Lead Abatement Strategy (LAS) Area at Cockle Creek, NSW 2284 (Annexure A - Map).

Dated: 8 January 2020

A SELA ATAPATTU

Director Hazardous Materials, Chemicals and Radiation

(On behalf of the Environment Protection Authority)

Annexure A – Map

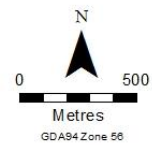


Legend

 Pasmenco LAS Area

Pasmenco Lead Abatement Strategy (LAS Area)

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map and any consequences as such acts or omissions.
Imagery: NearMap, 23 July 2017



**APPENDIX 4
WASTE LEVY EXEMPTION**



Waste levy exemption for waste arising from the Pasmenco Lead Smelter

Under clause 21 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation), the Environment Protection Authority (EPA) has approved the exemption from the waste levy for the types of waste listed below.

Types of exempt waste:

Metallurgical furnace slag or metallurgical furnace slag contaminated excavated materials or metallurgical furnace flue dust or metallurgical furnace flue dust impacted excavated materials or any mixture of those materials that is located at residential premises inside the Pasmenco Lead Abatement Strategy (LAS) Area at Cockle Creek, NSW 2284.

Exemption Number

EX000774

Exemption period

This approval is effective from 17/01/2020 and will be valid through to 31/01/2024.

Eligible disposal facilities

Operator Name	Facility Name	EPL
Lake Macquarie City Council	Awaba Waste Disposal Facility	5873
Newcastle City Council	Summerhill Waste Management Facility	5897
Suez Recycling & Recovery	Newline Road Landfill	7628

Conditions

- Waste is not exempt under this clause from the calculation of the contribution payable by the occupier of a scheduled waste facility if the occupier fails to comply with any requirement under Division 1 of Part 3 of the *Protection of the Environment Operations (Waste) Regulation 2014* with respect to the waste.

Record-keeping requirements

Records must be kept of the types and amounts of waste disposed of under this exemption, including waste facility receipts (also known as weighbridge records).

Exemptions may be audited by the EPA to ensure compliance with the conditions and record-keeping requirements. Records must be made available for inspection by an authorised EPA officer on request.

For further information contact Austin Jacob at (02) 9995 5725 or waste.levydata@epa.nsw.gov.au or the EPA at 131 555.

Approved by EPA Lead, Data, Intelligence and Insights 22/10/2021

APPENDIX 5
NSW EPA DESIGNATED WASTE CERTIFICATE

Designated Waste Certificate



Under Part 10, clause 106 of the Protection of the Environment Operations (Waste) Regulation 2014.

This certificate is given to the receiving facility described in this certificate to certify that the soil being received for disposal has been classified in accordance with Immobilised Contaminants Approval GIA2020/01. This Approval authorises, or does not prohibit, soil impacted with Pasmenco metallurgical furnace flue dust and sourced from within the Pasmenco Lead Abatement Strategy area, being taken to the receiving facility for disposal.

1 To be completed by the responsible person

Person or Company to which the Immobilised Contaminants Approval applies:

Full name or company name	
Trading as (if applicable)	
ABN/ACN	
EPL number (environment protection licence)	
Address	
Postcode	
Telephone (primary)	
Telephone (secondary)	

Details of waste:

Contaminants of concern:	
Volume of waste:	

I declare that all waste described in this certificate has been classified in accordance with an Immobilised Contaminants Approval GIA2020/01 and that the Approval authorises, or does not prohibit, the waste being taken to the receiving facility described in this certificate for disposal, and that all of the above information is true and correct.

Name and position :	
Signature:	
Date:	

2 To be completed by the receiving facility

Full name of facility receiving waste:	
ABN/ACN:	



Full name of facility receiving waste:	
EPL number:	
Address:	
Postcode:	
Telephone:	
Email:	

I hereby acknowledge acceptance of waste described in Part 1

Name and position :	
Signature:	
Date:	

Published by:

Environment Protection Authority
59 Goulburn Street, Sydney NSW 2000
PO Box A290, Sydney South NSW 1232
Phone: +61 2 9995 5000 (switchboard)
Phone: 131 555 (NSW only – environment information and publications requests)
Fax: +61 2 9995 5999
TTY users: phone 133 677, then ask for 131 555
Speak and listen users: phone 1300 555 727, then ask for 131 555
Email: info@environment.nsw.gov.au
Website: www.epa.nsw.gov.au

Report pollution and environmental incidents

Environment Line: 131 555 (NSW only) or info@environment.nsw.gov.au
See also www.epa.nsw.gov.au

January 2020

**APPENDIX 6
PROCEDURE FOR ACCEPTANCE OF LEAD CONTAMINATED SOIL AT
AWABA WASTE MANAGEMENT FACILITY**

Procedure for Acceptance of Lead Contaminated Soil from the Pasmenco Lead Abatement Strategy Area, at the Awaba Waste Management Facility

Contaminated soil from eligible residents in the Lead Abatement Strategy Area (LAS) near the former Pasmenco lead and zinc smelter in Boolaroo is now accepted at the Awaba Waste Management Facility (AWMF).

The Environment Protection Authority has waived the waste environment levy and reclassified lead contaminated soil from the LAS area as a general solid waste, allowing Council to accept contaminated soil from the LAS at AWMF.

Who and what is covered by the waste levy exemption

The waste levy exemption is governed by the NSW EPA, and is only available to residential properties (not commercial or industrial businesses) within the LAS area (see Attachment 1).

The EPA's Immobilised Contaminants Approval (ICA) and waste levy exemption, only applies to lead contaminated soil. The ICA is valid until 19 January 2025. The Waste Levy Exemption is valid until 17 January 2022. The ICA does not apply to any other type of waste generated by building or renovation works, such as asbestos impacted soil, clean fill, black slag, or demolition waste. Landowners should take care to ensure that lead contaminated soil is segregated from other waste streams in those situations where soil removal forms part of other works.

Segregated lead contaminated soil must also meet the following disposal requirements to manage the potential health impacts from handling lead contaminated soils.

Disposal Procedures for Lead Contaminated Soil

Because of the potential health impacts and community concerns associated with exposure to lead, a comprehensive set of procedures for the disposal of lead contaminated soils (LCS) at the AWMF have been developed in consultation with health professionals to minimise exposure risks to residents, contractors and Council staff.

Lead contaminated soil must be handled in a way that prevents it from escaping into the environment during excavation, loading, transportation and disposal. It is mandatory that all lead contaminated soil deliveries are presented at the AWMF by either:

- a) In the specially supplied bulka bags supplied free of charge by Council.

All bulka bags must be presented half-filled (0.5 m³) and sealed. The bag has a top covering flap that should be folded over the soil after filling, tied off and all four corner lifting loops drawn into the centre of the top of the bag and duct taped.

All bags must be clean, securely fastened and free of any damage, rips or holes, including damage to the lifting eyes.

The bags will be inspected by AWMF staff upon arrival at the weighbridge and prior to unloading. Refer to Attachment 2 for acceptable and unacceptable presentation of bulka bags for lead contaminated soil.

or

- b) Alternatively, the LCS can be **sampled and tested by a NATA registered laboratory** to determine the lead content. If this certification indicates the lead level of the LCS to be below the threshold of 600mg/kg, then this certified LCS can be transported to, and disposed of, at the AWMF without the need for bulka bags.

The LCS must be sampled in accordance with Australian Standard 4482.1-2005, Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds.

The LCS must then be analysed in accordance with the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 1999 as amended 2013), Schedule B2 Guideline on Site Characterisation. The lead levels of the soil must be below the threshold of 600mg/kg, in accordance with Column C of Table 2 of Schedule B7 Section 3 of the NEPM 2013. This certified LCS can then be transported to the AWMF without the need for bulka bags.

or

- c) Alternatively, previous soil testing undertaken by the EPA may be used to determine the lead concentration of the soil for the property. If this previous soil testing indicates the lead level of the LCS to be below the threshold of 600mg/kg, then this LCS can be transported to, and disposed of, at the AWMF without the need for bulka bags.

If pursuing this option, you must contact Council to formally confirm the lead concentration in the soil for the property.

David Brake
Group Coordinator Waste Operations
Phone: 4921 0094
Email: dbrake@lakemac.nsw.gov.au

Lead contaminated soil not presented in line with these requirements, or accompanied by a NATA registered laboratory certification, or Council's formal confirmation, indicating the lead levels are below 600mg/kg, will not be accepted for disposal.

Disposal Process

1. Contact Council's Waste Services Department on 4921 0094 to arrange the pick-up of sufficient free bulka bags and a roll of duct tape to contain the soil for transport and disposal.
2. Bulka bags and duct tape can be collected free of charge from:
 - a. Council's Works Depot Reception at 18-32 Creek Reserve Road Boolaroo from 8am to 4pm weekdays.
3. Proof of identity and address from where the LCS is coming from must be provided to receive the bulka bags and duct tape. Proof of identity and address may be in the form of current copies of:
 - a. Council Rates Notice
 - b. Lease agreement
 - c. Drivers licence
 - d. Utilities rates notice (power, water, gas)
4. At the time of collecting the bulka bags and duct tape the following details will be recorded:
 - a. Name
 - b. Address
 - c. Contact phone number(s)
 - d. Form of proof of identity
 - e. Approx amount of LCS to be disposed (m³)
 - f. Number of bulka bags provided
5. A minimum of 24 hours notice must be given to the Coordinator of the Awaba Waste Management Facility (AWMF) on [4921 0778](tel:49210778) prior to the disposal of all quantities of LCS.
6. At the time of booking, the following details will be recorded in the AWMF's LCS booking diary:
 - a. Name
 - b. Address
 - c. Contact phone number(s)
 - d. Approx amount of LCS to be disposed (number of bulka bags or m³)
 - e. Date LCS to be disposed
 - f. Vehicle details or contractor that will be transporting the LCS.
Note: AWMF staff may not be able to unload bulka bags from some types of vehicles.

Conditions of disposal:

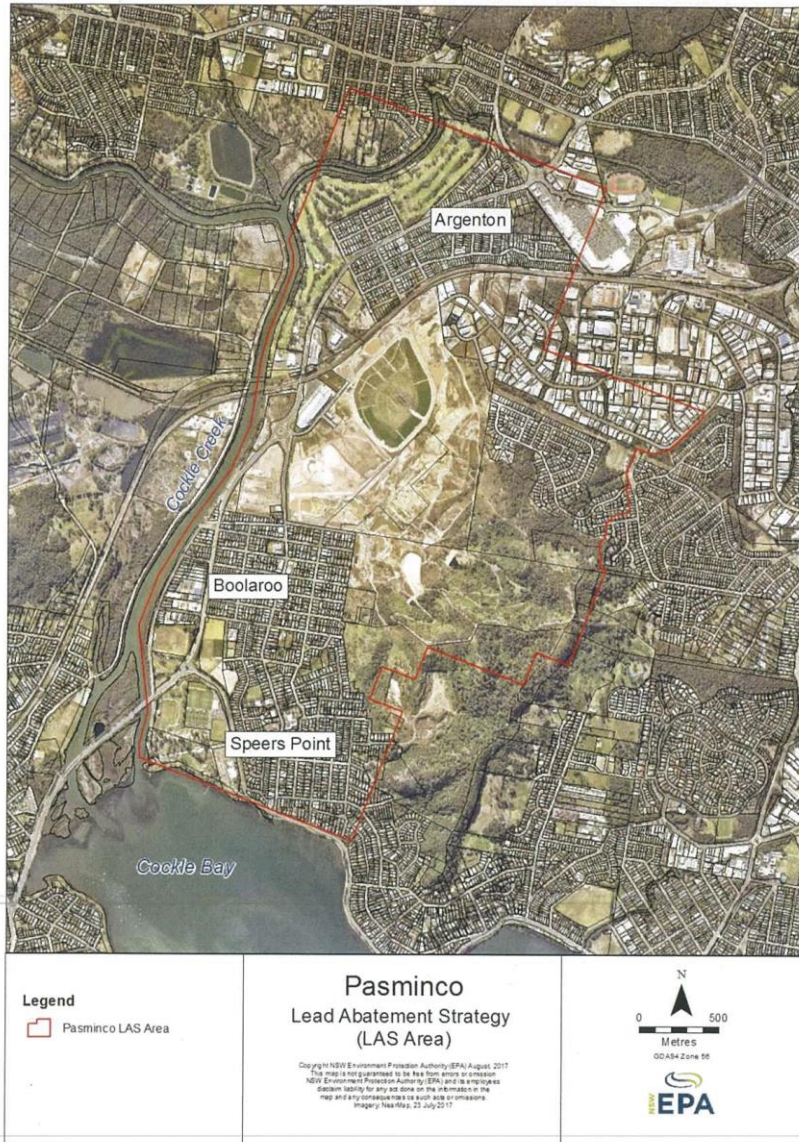
1. LCS material may be disposed at the AWMF between 8am and noon, Monday to Friday.
2. LCS will not be accepted during wet weather. Contact the AWMF on [4921 0778](tel:49210778) to confirm if the site is suitable.
3. To avoid the creation of dust LCS must be completely contained in the bulka bags, provided free of charge by Council, or in a covered truck if accompanied by a NATA registered laboratory certificate.
4. If presenting LCS for disposal not in bulka bags, a copy of the NATA registered laboratory certification, or Council's formal confirmation, indicating the lead levels are below 600mg/kg, must be provided to the AWMF weighbridge operator.
5. Proof of identity and address (as per above) must also be provided at the AWMF when disposing the LCS
6. A completed EPA "Designated Waste Certificate" (included in this information pack, and copy attached) must be provided to the weighbridge operator when disposing the LCS
7. AWMF staff will inspect each load of LCS using CCTV located at the weighbridge. If a load does not visibly comply, it will be rejected.
8. It is your responsibility to share your name and address with staff at the Facility, as well as the nature of the load to ensure correct charges apply.
9. The 2020/21 charge for LCS is \$269.00 per tonne (minimum charge \$20.00)
10. If the LCS is presented in bulka bags, Council will unload the bulka bag(s) from your vehicle using available plant on site. There may be delays in the unloading process due to plant availability. Council will not be held responsible for any delay or damage to vehicles or trailers etc during the unloading process.
11. If during the unloading, a load is deemed to not comply with Council's requirements, for example the bulka bag breaks, then the AWMF Site Supervisor will decide how best to proceed. This may result in the unloaded portion of LCS having to be removed from site.

Questions:

Please contact the below if you have any questions regarding the process for the disposal of LCS at the AWMF:

David Brake
Group Coordinator Waste Operations
Phone: 4921 0094
Email: dbrake@lakemac.nsw.gov.au

Attachment 1






Annexure A – Map of Pasmenco Lead Abatement Strategy Area

Attachment 2

[Type text]

ACCEPTABLE, UNACCEPTABLE AND IDEAL WAYS TO PRESENT LEAD CONTAMINATED SOIL FOR DISPOSAL

	<p><u>Unacceptable & Rejected</u></p> <ul style="list-style-type: none">• Bulka bag overfilled• Inside top Flap (visible in foreground) is not tied off,• Corner lifting hooks not secured• Soil able to escape containment
	<p><u>Acceptable & Received</u></p> <ul style="list-style-type: none">• Bulka bag half filled• Inside flap covering soil and tied off• Corner lifting hooks pulled to centre and secured• Exterior of bag clean
	<p><u>Ideal</u></p> <ul style="list-style-type: none">• New bags now available• Half filled• Inside top flap is tied off covering soil• Corner lifting hooks pulled to centre of bag and secured with duct tape• Exterior of bag clean

Attachment 3

Designated Waste Certificate



Under Part 10, clause 106 of the Protection of the Environment Operations (Waste) Regulation 2014.

This certificate is given to the receiving facility described in this certificate to certify that the soil being received for disposal has been classified in accordance with Immobilised Contaminants Approval GIA2020/01. This Approval authorises, or does not prohibit, soil impacted with Pasmenco metallurgical furnace flue dust and sourced from within the Pasmenco Lead Abatement Strategy area, being taken to the receiving facility for disposal.

1 To be completed by the responsible person

Person or Company to which the Immobilised Contaminants Approval applies:

Full name or company name	
Trading as (if applicable)	
ABN/ACN	
EPL number (environment protection licence)	
Address	
Postcode	
Telephone (primary)	
Telephone (secondary)	

Details of waste:

Contaminants of concern:	
Volume of waste:	

I declare that all waste described in this certificate has been classified in accordance with an Immobilised Contaminants Approval GIA2020/01 and that the Approval authorises, or does not prohibit, the waste being taken to the receiving facility described in this certificate for disposal, and that all of the above information is true and correct.

Name and position :	
Signature:	
Date:	

2 To be completed by the receiving facility

Full name of facility receiving waste:	Awaba Waste Management Facility
ABN/ACN:	81 065 027 868



Full name of facility receiving waste:	Awaba Waste Management Facility
EPL number:	5873
Address:	367 Wilton Road Awaba NSW
Postcode:	2283
Telephone:	49210333
Email:	council@lakemac.nsw.gov.au

I hereby acknowledge acceptance of waste described in Part 1

Name and position :	
Signature:	
Date:	

Published by:

Environment Protection Authority
59 Goulburn Street, Sydney NSW 2000
PO Box A290, Sydney South NSW 1232
Phone: +61 2 9995 5000 (switchboard)
Phone: 131 555 (NSW only – environment information and publications requests)
Fax: +61 2 9995 5999
TTY users: phone 133 677, then ask for 131 555
Speak and listen users: phone 1300 555 727, then ask for 131 555
Email: info@environment.nsw.gov.au
Website: www.epa.nsw.gov.au

Report pollution and environmental incidents

Environment Line: 131 555 (NSW only) or info@environment.nsw.gov.au
See also www.epa.nsw.gov.au

January 2020

APPENDIX 7
NOTIFICATION OF CAPPING

NOTIFICATION OF CAPPING
INSERT PROPERTY ADDRESS

Notification of Capping Form

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

Table 1: Site Particulars

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

Soils impacted with lead from the former Pasminco Cockle Creek Smelter have been capped on this property. Soils impacted with lead comprised *Please tick as appropriate:*

Shallow soils impacted by aerial fallout

Black slag or black slag impacted soils

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

Soils have been capped in accordance with the Standard Remedial Action Plan, Ramboll, May 2018

Soils were capped on the _____ (insert date)

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

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

Capping material comprises (material and thickness) _____

The marker layer comprises _____

I am aware that this Notification of Capping form will be registered in Section 10.7 of the Planning Certificate held with Lake Macquarie City Council.

Name of land owner _____

Signature of land owner _____

Date _____

Attachments:

Site plan showing extent of capping

APPENDIX 8
LONG TERM ENVIRONMENTAL MANAGEMENT PLAN

Intended for
Insert Land Owner

Document type
Report

Date
DATE

Project Number

LONG TERM ENVIRONMENTAL MANAGEMENT PLAN

INSERT PROPERTY ADDRESS

Revision	Date	Prepared by ¹	Checked by	Approved by	Signature

¹ Appropriately Qualified Contaminated Land Consultant

CONTENTS

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2.	CONTAMINATION STATUS OF THE SITE	2
3.	CAPPING	2
4.	CONTROL MEASURES	2
5.	RESPONSIBILITIES	3
6.	HOW TO COMPLETE SITE WORKS	3
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LIST OF TABLES

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Table 3-1: Capping Details	2
Table 5-1: Responsibilities	3

1. INTRODUCTION

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

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

Table 1-1: Site Particulars

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

This Long Term EMP includes information pertaining to the following:

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

2. CONTAMINATION STATUS OF THE SITE

This property is located within the Lake Macquarie City Council (LMCC) area and has been impacted by lead contamination associated with the former Pasminco Cockle Creek Smelter (PCCS). Lead contamination due to PCCS may have occurred either via:

- Aerial deposition of lead oxide onto surface soils
- Filling of land with black slag, made available from PCCS until 1994

The nature of contamination at this property is listed in **Table 3-1**.

Capping has been undertaken at the site in accordance with the 'Standard Remedial Action Plan, Land Impacted by Pasminco Cockle Creek Smelter' (The Standard RAP).

This Long term EMP and the associated control measures to maintain the cap are in effect until the land can otherwise be demonstrated to be suitable for residential use without restriction.

3. CAPPING

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

Table 3-1: Capping Details

Description	TO BE PROVIDED
Area of the property capped	Describe the extent and location of the capping, survey plan to be included
Nature of contamination	Lead oxide fallout or black slag (DELETE INCORRECT OPTION)
Type of capping and thickness	Concrete or hardstand paving approximately # mm thick (DELETE INCORRECT OPTION)
Surrounding ground surface	Grass, concrete, hardstand paving, constructed building (DELETE INCORRECT OPTION)

4. CONTROL MEASURES

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

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

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

5. RESPONSIBILITIES

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

Table 5-1: Responsibilities

Entity	Responsibilities
Property Owner	<p>The property owner is responsible for ensuring that the cap remains in place in perpetuity. The property owner is responsible for completing future site works beneath the cap in accordance with the requirements outlined in Section 6.</p> <p>A copy of the EMP shall be kept in the care and control of the property owner or managing agent and be made available to any persons carrying out works on the property, which may result in breaching the cell or capping layer.</p> <p>If the cap is to be removed, it is the property owner's responsibility to remediate the lead contaminated soil below the cap.</p> <p>It is the responsibility of the property owner to provide this Long Term EMP to Council and to tenants where the property is rented.</p>
LMCC	<p>It is the responsibility of LMCC to notify the presence of this Long Term EMP on Section 10.7 Certificate.</p> <p>Once received from a property owner or Principal Certifying Authority, LMCC shall maintain a copy of the EMP on file.</p>

6. HOW TO COMPLETE SITE WORKS

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

6.1 Personal Protective Equipment Requirements

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

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

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

- Hard hat
- Safety glasses
- Steel capped boots

6.2 Reinstatement of the Cap

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

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

6.3 Documentation of Excavated Soil

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

Surface soil impacted by the fallout of lead oxide from residential properties within the Pasminco Lead Abatement Strategy (LAS) Area can be classified for disposal to landfill using General Immobilisation Approval No. 2020/01. This approval allows for lead impacted soils to be automatically classified as General Solid Waste (non-putrescible) without the need for analytical classification. Classification of waste following the NSW EPA Waste Classification Guidance is

required for landfill disposal of soils containing other contaminants or originating from outside the LAS area.

Black slag can be classified under General Approval of the Immobilisation of Contaminants in Waste No. 2009/07. This approval specifically applies to metallurgical furnace slag and/or metallurgical furnace flue contaminated natural excavated materials. Under the Approval, material can be classified according to leachable concentrations (using the toxicity characteristic leachable procedure) of lead and selected other contaminants. For Pasminco black slag, arsenic and cadmium are considered other contaminants of concern. Total concentrations of the contaminants do not apply to the waste classification.

Any assessments to classify black slag should be undertaken by an appropriately qualified and experienced environmental consultant.

Further information on General Approval of the Immobilisation of Contaminants in Waste No. 2009/07 is available here: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wasteregulation/gia-2009-07-metallurgical-furnace-slag.pdf>

Classification of waste following the NSW EPA Waste Classification Guidance is required for landfill disposal of soils originating from outside the LAS area.

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

6.4 Importation of Material

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

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

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

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

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

6.5 Construction Environmental Management Plan

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

**APPENDIX 9
SAFE WORK METHOD STATEMENT**

High risk construction work:	<input type="checkbox"/> Risk of a person falling more than 2 metres (in this case into an excavation)	<input type="checkbox"/> Work on a telecommunication tower	<input type="checkbox"/> Demolition of load-bearing structure
	<input type="checkbox"/> May involve disturbing asbestos	<input type="checkbox"/> Temporary load-bearing support for structural alterations or repairs	<input type="checkbox"/> Work in or near a confined space
	<input type="checkbox"/> Work in or near a shaft or trench deeper than 1.5 m or a tunnel	<input type="checkbox"/> Use of explosives	<input type="checkbox"/> Work on or near pressurised gas mains or piping
	<input type="checkbox"/> Work on or near chemical, fuel or refrigerant lines	<input type="checkbox"/> Work on or near energised electrical installations or services	<input type="checkbox"/> Work in an area that may have a contaminated or flammable atmosphere
	<input type="checkbox"/> Tilt-up or precast concrete elements	<input type="checkbox"/> Work on, in or adjacent to a road, railway, shipping lane or other traffic corridor in use by traffic other than pedestrians	<input type="checkbox"/> Work in an area with movement of powered mobile plant
	<input type="checkbox"/> Work in areas with artificial extremes of temperature	<input type="checkbox"/> Work in or near water or other liquid that involves a risk of drowning	<input type="checkbox"/> Diving work
<p>NOTE: Work must be performed in accordance with this SWMS. This SWMS must be kept and be available for inspection until the high risk construction work to which this SWMS relates is completed. If the SWMS is revised, all versions should be kept. If a notifiable incident occurs in relation to the high risk construction work in this SWMS, the SWMS must be kept for at least 2 years from the date of the notifiable incident.</p>			

Safe Work Method Statement (SWMS)				
Site Activities:	Travel to and from site		Site Details:	Residential properties within the Lead Contamination survey Grid within LMCC area
	Excavation of lead contaminated surface soils			
	Loading of contaminated soil into trucks			
			Activity Date:	To be provided
			Site Contact:	To be provided
			Client Contact Phone:	
Emergency Information.	Lake Macquarie Private Hospital Ph. 4943 3122		Emergency Contact	000
Risk Assessment prepared by:		Signature	Date 2	
Risk Assessment reviewed by:		Signature	Date	

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

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

Designated Site Supervisor			
Name	Contact Phone	Signature	Date

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

Risk Matrix

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