



Rocherlea

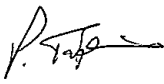

Human health risk assessment

Environment Protection Authority and Public Health Services

22 October 2024

➔ The Power of Commitment



Project name		Recycal Rocherlea Human Health Risk Assessment					
Document title		Rocherlea Human health risk assessment					
Project number		12634051					
File name		12634051_Recycal Rocherlea Summary Report EPA comment_revisions_V3.docx					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	1	J.Gough K.Dodd	P Topliss		P.Topliss		13 September 2024
S3	2	J.Gough K.Dodd	P Topliss		P.Topliss		16 October 2024
S4	0	J.Gough K.Dodd	P Topliss		P.Topliss		22 October 2024
[Status code]							
[Status code]							

GHD Pty Ltd | ABN 39 008 488 373

Contact:

Peter Topliss Technical Director - Contamination, Assessment and Remediation | GHD

2 Salamanca Square,

Hobart, Tasmania 7000, Australia

T +61 3 6210 0600 | F +61 3 8732 7046 | E hbamail@ghd.com | ghd.com

© GHD 2024

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Executive summary

Preliminary environmental sampling of dust in 2023 by the Tasmanian Environment Protection Authority (EPA) in the vicinity of an industrial estate at Rocherlea, Tasmania, found lead and other metals at elevated concentrations. GHD was subsequently engaged to conduct a comprehensive environmental investigation and human health risk assessment. This study, commissioned by the EPA and the Tasmanian Department of Health's Public Health Services (PHS) unit, aimed to assess the nature and extent of the contamination associated with dust emissions, its potential health impacts on the surrounding community and likely source or sources.

Key elements of the investigation and risk assessment can be summarised as follows:

1. Key events

- Dust emissions from the Recycal site located at 256 George Town Road, Rocherlea, have been ongoing for several years. These emissions relate to the operation of the shredder (commencing late 2019), shredder floc processing equipment (commencing late 2022), other site operations (e.g. moving material) and dust emitted directly from the shredder floc stockpiles.
- In February 2024 the EPA required Recycal Pty Ltd to cease shredding and shredder floc processing operations. In May 2024, the EPA applied a resin polymer cover to suppress dust from existing stockpiles of shredder floc. These measures have resulted in a marked reduction in metal deposition in dust to the surrounding area.
- In early 2024 PHS also engaged with the local community and recommended indoor cleaning for some nearby premises, to reduce contact with metal-enriched dust. This recommendation was also implemented at some of the commercial/industrial properties near the Recycal site, at Brooks High School and by the care providers to the east and south of the site. Several properties also implemented additional risk management protocols, including the cessation of outdoor activities.
- Free, voluntary blood lead testing of 73 local community members (from residents and workers who do not work with lead), collected during the period of the risk assessment, were in the normal range.

2. Project methodology

The investigation covered an area within approximately 500 m of the Recycal site, encompassing:

- Commercial and industrial properties to the southwest, south, and southeast.
- School zones to the southwest.
- Care facilities to the east, including respite care and accommodation services.
- Sports grounds and recreational facilities to the northeast.
- Residential zones to the south and east.
- Agricultural land to the north.

The investigation included the collection of soil, dust, air and water samples from across the investigation area and these samples were subject to analysis for a range of contaminants.

The investigation findings were used to inform the detailed human health risk assessment.

3. Key investigation findings

- The Recycal site was confirmed as the primary source of abnormally elevated concentrations of lead and other metals in surface dust and soil samples from the surrounding area.
- Lead was confirmed as the key contaminants of concern from a health risk perspective.
- Contaminated dust that was distributed by wind was identified several hundred metres from the Recycal site boundary, primarily downwind in a southerly direction.
- Commercial and industrial areas closest to Recycal showed the highest contamination concentrations, while residential areas, schools, and care facilities showed lower but still elevated concentrations.

- The application by the EPA of a resin polymer cover to the shredder floc stockpiles in May 2024 resulted in a marked reduction in metal deposition in the surrounding areas.

4. Key risk assessment findings

- In the absence of the interventions made by EPA and PHS, lead dust emissions from the Recycal site posed a moderate to high risk to the health of workers in nearby commercial/industrial properties. Relatively lower risks were identified for residential areas, schools, and care facilities.
- The application by the EPA of resin polymer to the shredder floc stockpiles in May 2024 resulted in a marked reduction in metal deposition in the surrounding areas, minimising ongoing health risks.
- The advice provided by PHS to remove visible dust from indoor surfaces in the commercial/industrial properties and care facilities surrounding the Recycal site and in Brooks High School was effective in minimising lead exposure when it was followed.
- PHS has provided specific advice on additional targeted cleaning at several commercial/industrial properties and after this specific advice is followed ongoing risks to the health of the local community are low.
- Several properties also implemented additional risk management protocols, including the cessation of outdoor activities. All outdoor activities can be safely resumed and PHS has also provided specific advice to individual properties to this effect.

5. Ongoing work

- The EPA is continuing to enforce the suspension of shredding and floc processing and undertaking ongoing monitoring to understand the nature and extent of dust emissions from the Recycal site.
- Once the shredder floc stockpiles are removed, additional risk management will be required of Recycal, including appropriate dust mitigation measures for the shredder and shredder floc processing equipment, control of shredder floc stockpile size, and mitigation measures for other dust creating activities.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.3 and the assumptions and qualifications contained throughout the Report.

Contents

1. Introduction	1
1.1 Project objectives	2
1.2 Purpose of this report	2
1.3 Scope and limitations	2
2. Key events	4
3. Project methodology	5
3.1 Field and laboratory investigation	5
3.2 Human health risk assessment	5
4. Influence of meteorology	7
5. Key investigation findings	8
5.1 Contaminants of concern	8
5.2 Dust deposition monitoring	8
5.3 Extent of contamination	8
5.4 Specific findings by area	9
5.5 Other potential sources of contamination	9
6. Key risk assessment findings	10
6.1 How members of the community may be exposed to contamination	10
6.2 Health effects of lead exposure	10
6.3 Timeline of lead exposure	10
6.4 The process of quantifying risks	11
6.5 Risk assessment outcomes	12
7. Conclusion	14

Table index

Table 1	Sampling program	5
---------	------------------	---

Figure index

Figure 1	Core investigation area	1
Figure 2	Site annual windrose (2019 to 2023 - synthesised)	7
Figure 3	Overview of the process for quantifying risk (sourced from the US EPA)	11

1. Introduction

Preliminary environmental sampling of dust in 2023 by the Tasmanian Environment Protection Authority (EPA) in the vicinity of an industrial estate at Rocherlea, Tasmania, found lead and other metals at elevated concentrations. GHD Pty Ltd (GHD) was subsequently engaged by the EPA and Public Health Services (PHS) in March 2024 to complete a detailed environmental investigation and human health risk assessment (HHRA).

Consideration was given to existing operations in the industrial estate that could potentially be the source of lead and other metals in dust. Recycal Pty Ltd (Recycal) operates a large-scale scrap metal processing facility within the Rocherlea industrial estate. It receives diverse scrap metal items, which historically have been fed through a large metal shredder. Shredder floc, produced at the Recycal site since late 2019, is a by-product of metal shredding. Shredder floc is a contaminated material that contains various components including metals, hydrocarbons, plastics, wood, rubber, foam, and fine particles. Scrap metal and shredder floc processing, and stockpiling of large volumes of shredder floc in the yard at the Rocherlea site occurred with little to no dust mitigation.

The investigation conducted by GHD covered an area within approximately 500 m of the Recycal site (shown on Figure 1), encompassing:

- Commercial and industrial properties to the southwest, south, and southeast.
- School zones to the southwest.
- Care facilities to the east, including respite care and accommodation services.
- Sports grounds and recreational facilities to the northeast.
- Residential zones to the south and east.
- Agricultural land to the north.

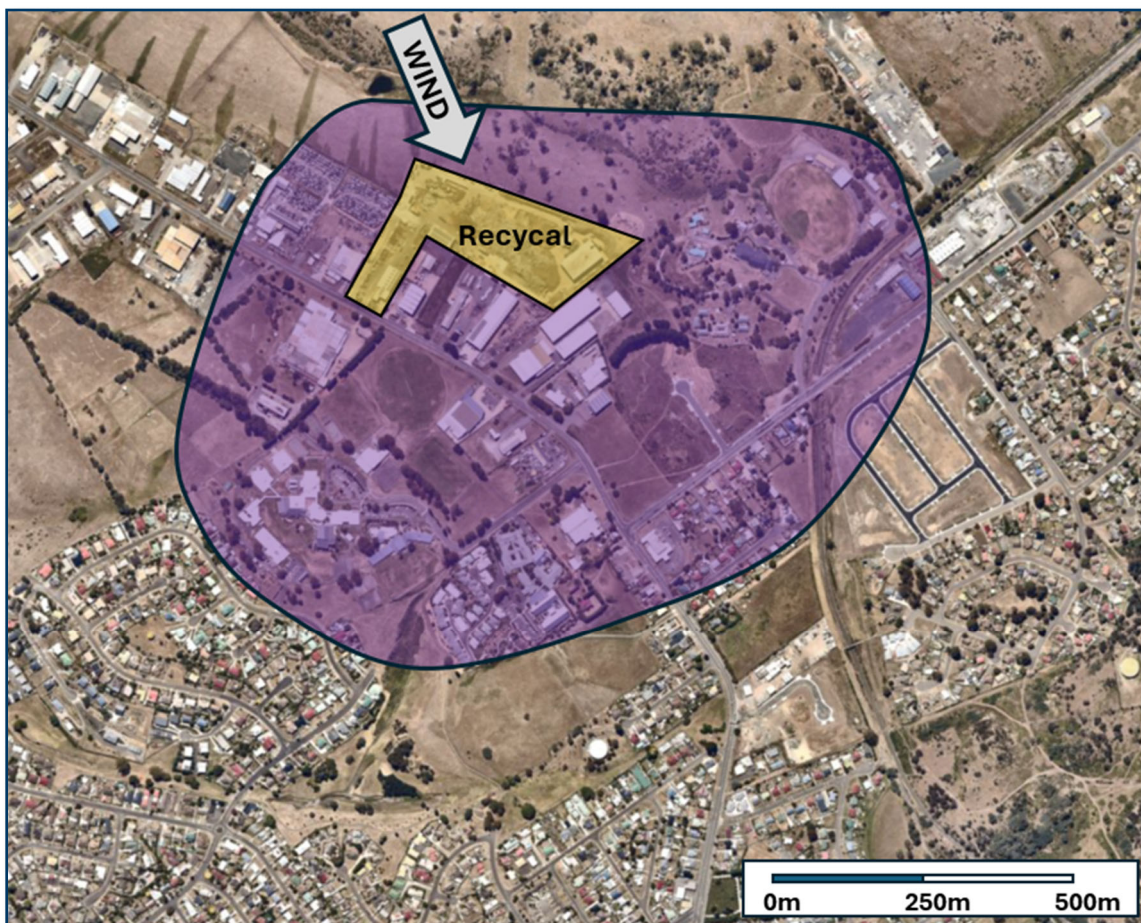


Figure 1 Core investigation area

1.1 Project objectives

The overarching purpose of the investigation program and risk assessment was to assist EPA and PHS to identify and manage the risks to human health that may be associated with the migration of dust from the Recycal site onto surrounding properties. Specific objectives included:

- Determining the spatial distribution of contamination in soil, air, dust, and rainwater tanks.
- Assessing the influence of meteorological conditions on contaminant dispersion.
- Comparing contamination in dust in and around the industrial estate with the constituents of shredder floc.
- Evaluating potential contributions from other local sources of contamination.
- Providing data to support the assessment of historic, current, and future health risks.
- Informing the EPA and PHS on the actions necessary to manage any identified risks.

1.2 Purpose of this report

Comprehensive and detailed reports on the environmental investigation and HHRA have been issued by the EPA to Recycal and other major stakeholders. These detailed reports contain an extensive technical dataset, detailed analyses, and specific recommendations. The purpose of this summary report is to present the key points in an accessible format for the broader community.

1.3 Scope and limitations

This report has been prepared by GHD for Environment Protection Authority and Public Health Services and Public Health Services and may only be used and relied on by Environment Protection Authority and Public Health Services and Public Health Services for the purpose agreed between GHD and Environment Protection Authority and Public Health Services as set out in this report.

GHD otherwise disclaims responsibility to any person other than Environment Protection Authority and Public Health Services and Public Health Services arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

GHD has prepared this report on the basis of information provided by Environment Protection Authority and Public Health Services and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has considered and/or tested for only those chemicals specifically referred to in this report and makes no statement or representation as to the existence (or otherwise) of any other chemicals.

Site conditions (including any the presence of hazardous substances and/or site contamination) may change after the date of this report. GHD expressly disclaims responsibility:

- *Arising from, or in connection with, any change to the site conditions; and*
- *to update this report if the site conditions change.*

Surface conditions can vary across a particular site and cannot be exhaustively defined by the investigations carried out prior to this report. As a result, it is unlikely that the results and estimations expressed or used to compile this report will represent

conditions at any location other than the specific points of sampling. A site that appears to be unaffected by contamination at the time of the report may later, due to natural causes or human intervention, become contaminated.

Except as otherwise expressly stated in this report, GHD makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or re-development of the site.

2. Key events

The timeline of key events leading up to and including the dust emissions assessment is as follows:

Late 2019

Limited shredder floc production commenced at the Recycal site, gradually increasing over time.

February 2022

A significant fire in the shredder floc storage shed led to the shredder floc being stored outdoors, exacerbating the potential for dust emissions.

Late 2022 to mid-2023

Additional downstream shredder floc processing equipment was installed and became operational in the first half of 2023.

August-October 2023, continuing to April 2024

EPA conducted preliminary dust sampling at sites in and around the Rocherlea industrial estate, identifying elevated concentrations of metals.

January 2024

Prompted by the identification of metal-rich dust, PHS began community engagement and issued health advice.

1 February 2024

EPA issued Environment Protection Notice (EPN 11589/1), halting shredder operations, halting shredder floc processing and requiring the shredder floc stockpiles to be covered or removed.

May 2024

EPA engaged a contractor to cover shredder floc stockpiles with resin polymer to achieve stockpile dust control.

March-June 2024

GHD completed detailed environmental testing and a human health risk assessment.

3. Project methodology

3.1 Field and laboratory investigation

In addition to a review and integration of previous environmental and shredder floc sampling data from the EPA and other consultants, to provide an understanding of contamination patterns over time, GHD conducted a comprehensive and staged investigation employing various methods of sample collection across different environmental media. The sampling program included:

Table 1 Sampling program

Sampling type	Description
Soil	224 primary surface soil samples (0-10mm depth) were collected along transects radiating from the Recycal site, at targeted locations, and in background reference areas.
Dust	Indoor and outdoor dust samples were collected using surface wipes (137 locations), pre-weighed filter swabs (37 locations, to clarify results from surface wipe samples), and dust deposition plates (23 locations, 2 rounds completed).
Air quality	Continuous monitoring was conducted using DustTrak™ samplers (3 locations) and periodic sampling with both the DustTrak's™ and MicroVol samplers (2 locations).
Blood	GHD also reviewed blood lead concentration data from a community testing program
Water	Sampling was undertaken at selected rainwater tanks (20 samples).
Bioaccessibility	9 shredder floc samples from 3 stockpiles.
Lead in paint	Conducted by portable x-ray fluorescence (XRF) analysis at 77 locations, plus 2 paint samples.
Meteorological	Continuous weather monitoring was conducted at two portable weather stations located outside of the northwest perimeter of the Recycal site.

Note: An appropriate number of Quality Assurance/Quality Control (QA/QC) samples were collected for each of the various media sampled.

Samples were analysed for a range of potential contaminants, focusing on those identified in shredder floc:

- Metals, including cadmium, chromium, copper, lead, nickel, zinc and others.
- Polychlorinated biphenyls (PCBs).
- Total petroleum hydrocarbons (TPH).
- Polycyclic aromatic hydrocarbons (PAHs).

A robust QA/QC program was implemented to ensure data reliability, including:

- Field duplicates: Collected at a rate of 1 per 20 samples.
- Laboratory duplicates and matrix spikes.
- Field blanks and equipment rinsate samples.
- Use of National Association of Testing Authorities (NATA)-accredited laboratories.
- Chain of custody documentation.
- Adherence to sample holding times and preservation techniques.

3.2 Human health risk assessment

A Human Health Risk Assessment (HHRA) is a study that looks to evaluate the potential impacts of hazards in the environment on the health of the community. In Australia, the approach used for environmental health risk assessments is described in the Environmental Health Standing Committee (enHealth, 2012) publication,

Environmental Health Risk Assessment: - Guidelines for assessing human health risks from environmental hazards¹.

The HHRA process is an important component of an environmental contamination investigation because it informs the advice or actions required to protect human health.

Based on the outcomes of the investigation program, the primary focus of the HHRA was lead. The HHRA followed the steps outlined by enHealth (2012), including the following:

- **Issues identification**, which established the objectives of the HHRA and identified the problem.
- **Toxicity assessment**, which established the relationships between lead exposure and potential adverse health effects.
- **Exposure assessment**, which used a blood lead modelling process to estimate the lead exposure that may be experienced by people within the community surrounding the Recycal site.
- **Risk characterisation**, which combined the results of the toxicity assessment and exposure assessment, to estimate the size and nature of past, current or future health risks
- **Uncertainty and sensitivity assessment**, which evaluated the uncertainty associated with the HHRA and sensitivity of the assessment outcomes to the various assumptions and inputs

Importantly, the enHealth (2012) process used in the HHRA:

- Looked at the risks to the health of the community as a whole and did not identify specific individuals who might be exposed to metal-enriched dust in the vicinity of the Recycal site.
- Incorporated conservative assumptions around toxicity and exposure, to ensure that public health is protected.

¹ <https://www.health.gov.au/resources/publications/enhealth-guidance-guidelines-for-assessing-human-health-risks-from-environmental-hazards?language=en>

4. Influence of meteorology

Meteorological conditions play an important role in understanding the distribution of contaminants from the Recycal site. The climate in the area is classified as temperate with no dry season (mild summer). Data from nearby Bureau of Meteorology stations at Ti Tree Bend and Launceston Airport were analysed to characterise the local climate. A synthesised meteorological model was developed for the investigation area using five years of data from the aforementioned stations. The local wind speeds and direction are shown for the annual synthesised windrose in Figure 2. A wind rose shows a pattern of wind that includes the frequency of both wind speed and direction. These wind patterns are particularly significant for dust dispersion and show a dominance of winds from the north-northwest, at speeds less than 5 metres/second (less than 18 kph).

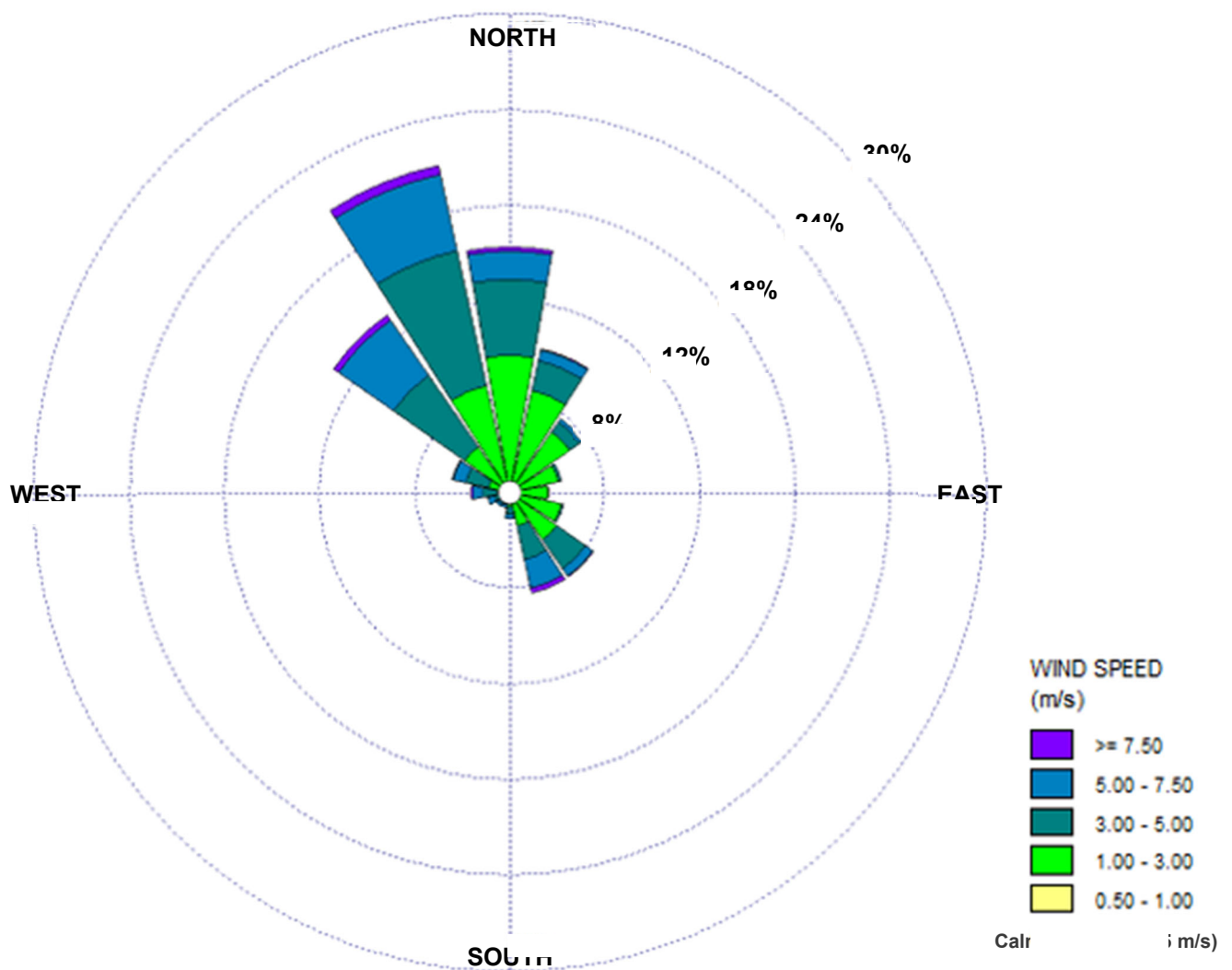


Figure 2 Site annual windrose (2019 to 2023 - synthesised)

To gain site-specific meteorological data, two automatic weather stations were installed at 2m and 10m heights outside of the northwest perimeter of the Recycal site. This on-site monitoring provided data on wind speed and direction, temperature, relative humidity, and atmospheric pressure, allowing for a more precise understanding of how weather conditions influence dust dispersion from the site.

5. Key investigation findings

5.1 Contaminants of concern

Several key contaminants of concern were identified, primarily associated with the shredder floc material at the Recycal site. Analysis of shredder floc samples collected by EPA between April 2023 and March 2024 showed high concentrations of metals, including cadmium, chromium, copper, lead, nickel, and zinc. Some of these metals were present at concentrations exceeding the guidelines published by Australian health and environmental regulators for commercial/industrial properties.

Zinc was found to be the dominant metal in shredder floc, followed by copper, lead, and nickel. The ratios of these metals in on-site dust samples differed somewhat from the stockpile samples, with higher proportions of lead and cadmium in on-site dust. This difference may be attributed to the finer particle sizes in airborne dust compared to the bulk shredder floc.

In addition to metals, high concentrations of total recoverable hydrocarbons (TRH) and polychlorinated biphenyls (PCBs) were detected in some shredder floc samples.

Lead was confirmed as the key contaminant of concern in floc material and dust from a health risk perspective. Bioaccessibility testing was used to determine how much lead is potentially absorbed if ingested by a human. Testing of shredder floc samples showed relative lead bioaccessibility up to a third of the total concentrations indicating that a portion of the lead could potentially be absorbed in the human gastrointestinal tract.

5.2 Dust deposition monitoring

Dust deposition monitoring provided insights into both historical accumulation and ongoing emissions from the Recycal site. Historical dust accumulation, assessed through surface swab sampling, showed the highest concentrations in commercial/industrial properties with large entrances adjacent to the Recycal site.

Ongoing emissions were monitored using deposition plates over two observation periods: before and after the application of a resin polymer to the shredder floc stockpiles in May 2024. The initial monitoring period showed significant deposition of metals, particularly lead, with concentrations decreasing with distance from the Recycal site, but detectable at least 500 m away.

Importantly, the follow-up monitoring period after the resin polymer application showed a marked reduction in metal deposition, particularly in downwind areas. This reduction was observed even in peripheral areas over 500 m from the site, suggesting the effectiveness of the application of resin polymer as a dust control measure.

5.3 Extent of contamination

A clear pattern of environmental contamination is apparent, extending from the Recycal site into the surrounding area. Soil contamination is most pronounced in areas immediately adjacent to the site, particularly in the prevailing downwind direction, with progressively decreasing concentrations the further sample locations are from the Recycal site.

Surface soil samples (0-10 mm) consistently showed higher concentrations of metals compared to underlying soil samples (10-50 mm), providing strong evidence of relatively recent contamination through surface dust deposition rather than underlying soil characteristics. The spatial distribution of elevated metal concentrations in soil generally aligns with proximity to the Recycal site and prevailing wind directions, extending over 200 m from the site boundary in some directions. PCBs and TRH were not detected in soils (or dust) at concentrations of concern in the study area.

Dust contamination showed a similar pattern but extended further than soil contamination. Dust samples from commercial/industrial properties adjacent to or immediately downwind of the Recycal site showed the highest concentrations of lead and other metals. Results from the dust investigation show that elevated metal concentrations in dust emissions from the Recycal site could extend beyond 500 m, reaching sensitive receptors such as schools, public spaces, care facilities, and residential areas.

Water contamination from dust fallout was considered through sampling of rainwater tanks at a nearby aged care facility, approximately 500 m south of the Recycal site. Several tanks showed elevated concentrations of metals, particularly lead and nickel. While the Recycal site dust emissions may contribute to this contamination, the variability in results makes it difficult to quantify any Recycal contribution, compared to other potential sources.

5.4 Specific findings by area

Evidence of a contaminant plume emanating from the Recycal site was identified from the investigation, primarily influenced by the prevailing north/north-westerly winds. The extent of the plume varied depending on the environmental medium. In soil, elevated concentrations above the calculated ambient background concentrations were generally observed within approximately 200 m of the site boundary. However, in dust, the evidence of contamination extends further, in some cases beyond 500 m.

Commercial/industrial areas immediately adjacent to the Recycal site showed the highest concentrations of contamination in both surface soil and dust samples. Concentrations of lead-enriched dust adjacent to the Recycal site were over 10 times higher compared to peripheral locations within the investigation area. This high concentration of contamination is mainly due to the proximity of these sites to the Recycal site. The school zone and nearby recreational facilities presented lower but still elevated lead dust concentrations. Care facilities in the area showed variable lead dust loadings. The lead dust concentrations from the school zone, nearby recreational facilities and care facilities were generally lower than those found in commercial properties but still higher than background concentrations.

The investigation did not find evidence of elevated metal concentrations in soil within the residential areas to the south and southeast of the Recycal site. There was some limited evidence of metals in dust samples in residential areas but the risk assessment concluded that there is unlikely to have been a risk to the health of people residing in these areas (see Section 6).

Three background areas selected for comparison showed consistently lower concentrations of metals than the areas closer to the Recycal site. It should be noted that even these areas have been subject to some contaminant input related to human activity (e.g. from traffic emissions), making it challenging to establish a true "natural" background concentration for the region. This underscores the importance of considering the broader industrial context of the area when interpreting results.

Overall, the spatial distribution of contamination aligns closely with the proximity to the Recycal site and prevailing wind directions. The investigation found evidence of lead-enriched dust over 500 m from the Recycal site, primarily in downwind directions.

5.5 Other potential sources of contamination

While the investigation clearly identified the Recycal site as the primary source of contamination, it also considered potential contributions from other nearby industrial activities. Several industrial sites located immediately south of Recycal were of particular interest due their operational activities.

Analysis of soil and dust samples downwind of the alternate sites did not show evidence of a significant contribution to the overall contamination plume from other industrial sites.

These findings support the conclusion that while other industrial activities in the area may contribute to some degree of contamination, the primary source of metals contamination, particularly lead, in the investigation area is attributed to emissions from the Recycal site.

6. Key risk assessment findings

6.1 How members of the community may be exposed to contamination

The investigation program identified that dust emissions from the Recycal site have resulted in the presence of metals including lead, cadmium and zinc in soil and deposited dust at abnormal concentrations in the surrounding properties. Of these metals, lead is the primary contaminant of concern from a health risk perspective because the lead levels in dust in the surrounding properties were more uniformly elevated, than the cadmium and zinc levels. Lead exposure was therefore the focus of the HHRA.

Prior to the application of resin polymer to the shredder floc stockpiles (in May 2024) dust emissions may have travelled more than 500 m from the Recycal site boundary to the south and southeast. The properties in this area are primarily commercial/industrial facilities and the people employed most likely to have come into contact with lead-enriched dust are those that work in this area. Brooks High School and several care providers are also located near the edges of the dust plume to the south and east respectively, with residential properties located around the fringes of the dust plume to the southeast.

The investigation program did not identify high concentrations of lead in airborne dust samples collected from around the Recycal site. The primary way that people may be exposed to dust emissions from the Recycal site is therefore via the incidental ingestion of dust that has settled on surfaces. Incidental ingestion occurs mainly through hand-to-mouth activities, such as putting objects in the mouth, chewing fingernails or not washing hands before eating.

The investigation program identified higher concentrations of lead in soil samples collected near the downwind boundaries of the Recycal site than in soil samples collected from background locations. The lead concentrations in soil did not however exceed relevant standards, which reflects the relatively short period over which dust emissions from the Recycal site are likely to have occurred. Given that high concentrations of residual contamination are not present in soil, the removal of visible settled dust from surfaces is an effective way for members of the community to reduce lead exposure.

6.2 Health effects of lead exposure

The measurement of blood lead concentrations is the recommended course of action when a source of lead exposure is suspected in a community. It is well established that blood lead concentrations above 10 micrograms per decilitre ($\mu\text{g}/\text{dL}$) can have harmful effects on many organs and bodily functions.

Children are more susceptible to the adverse effects of lead exposure than adults, due to their rapidly developing neurological systems. Lead also readily crosses the placenta and infants can be exposed to lead via breastmilk. In particular there is also evidence that blood lead concentrations $<10 \mu\text{g}/\text{dL}$ in infancy and early childhood can be associated with declines in neurological function, reductions in intelligence and behavioural changes.

Most people in Australia live in places where there are small amounts of lead in food, drinking water, air, dust, soil, and paint. Blood lead concentrations among Australians are typically less than $5 \mu\text{g}/\text{dL}$. Under the Tasmanian Public Health Act 1997, a blood lead concentration above $5 \mu\text{g}/\text{dL}$ indicates that a person has been exposed to lead at a level that is above typical background exposures and therefore requires additional investigation. Accordingly, this value was adopted as the toxicity reference value for the HHRA.

6.3 Timeline of lead exposure

Dust emissions from the Recycal site have been ongoing for several years, from both the operation of the shredder commencing late 2019, and shredder floc processing equipment commencing late 2022, other site operations (e.g. moving material) and dust emitted directly from the shredder floc stockpiles. The Recycal site has been subject to recent regulatory action by the EPA, that has resulted in the cessation of shredding and shredder floc processing (in February 2024) and covering of the shredder floc stockpiles (in May 2024).

In early 2024 PHS also engaged with the local community and recommended indoor cleaning for some nearby premises, to reduce contact with metal-enriched dust. This recommendation was also implemented at some of the commercial/industrial properties near the Recycal site, at Brooks High School and by the care providers to the east and south of the site. Several properties also implemented additional risk management protocols, including the cessation of outdoor activities.

Given these factors, it is likely that the dust emissions from the Recycal site and the extent to which members of the community are exposed to lead have reduced in 2024, relative to historical concentrations. To address this issue, the HHRA considered the following timeline of exposure scenarios:

Historical: The lead exposure that occurred before May 2024 comprising:

- The shredder and shredder floc processing equipment stopped operating (February 2024) and the shredder floc stockpiles were covered (May 2024), as a result of the intervention by the EPA.
- Risk mitigation measures were implemented at some of the properties surrounding the Recycal site as recommended by PHS (January 2024).

The historical exposure scenario can also be used to provide an indication of the exposure that may occur if the Recycal site were to return to full operations in the future.

Current: The lead exposure occurring after May 2024, following:

- The cessation of shredding and shredder floc processing activities, covering of the shredder floc stockpiles and implementation of risk mitigation measures at some properties.

6.4 The process of quantifying risks

The process used in the HHRA for quantifying the health risks associated with exposure to a chemical in the environment includes the following steps, as illustrated in Figure 3:

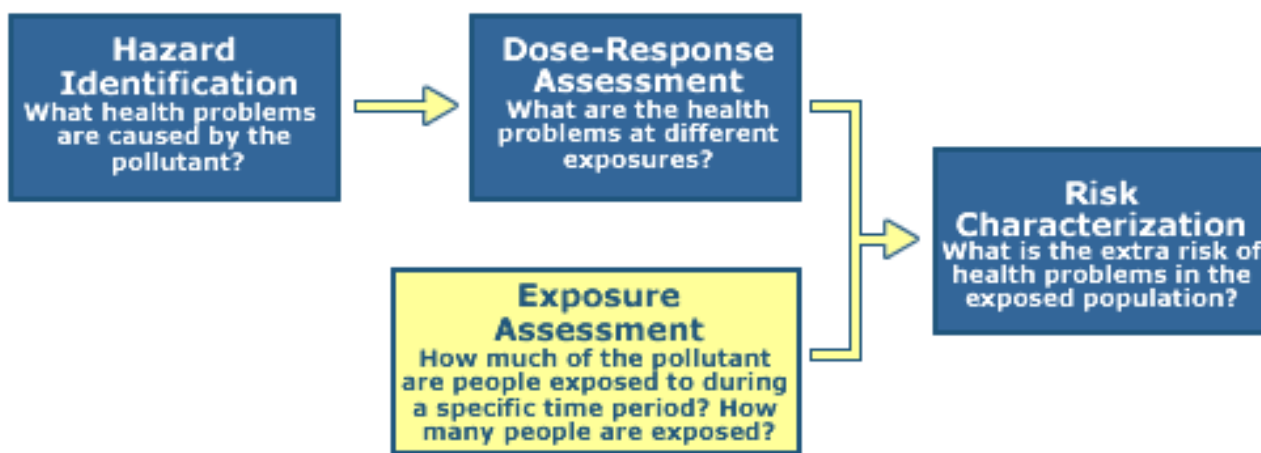


Figure 3 Overview of the process for quantifying risk (sourced from the US EPA²)

Given the factors outlined in Section 6.2, the focus of the HHRA was to understand whether the presence of lead-enriched dust within the properties surrounding the Recycal site could result in blood lead concentrations in members of the local community above 5 µg/dL. Lead exposure was estimated using a combination of the lead concentrations measured in the environment during the investigation program and modelled estimates of human intake over time. The modelling approach used in the HHRA was consistent with both Australian and international standards.

² <https://www.epa.gov/risk/conducting-human-health-risk-assessment>

For each of the properties surrounding the Recycal site, the risk that the intake of lead will result in blood lead concentrations above the reference value of 5 µg/dL was characterised as low, moderate or high. Practically speaking, a low risk should be interpreted as meaning that the lead impacts identified are acceptable and that no action is required. Conversely, moderate and high risks should be interpreted as meaning that the lead impacts identified are potentially unacceptable and that additional targeted data collection and/or action to reduce the presence of lead-enriched dust is warranted.

6.5 Risk assessment outcomes

In accordance with Objective 1 of the HHRA the following questions have been answered:

Did the dust emissions from the Recycal site represent a risk to the health of the local community prior to the intervention of EPA and PHS?

The HHRA concluded that, in the absence of the interventions made by EPA and PHS, lead dust emissions from the Recycal site could have posed an unacceptable risk to the health of people using the surrounding properties. Hence, the intervention by the EPA to reduce dust emissions from the Recycal site and the risk mitigation measures recommended by PHS were warranted.

In particular, the HHRA found that prior to the interventions by EPA and PHS there was a moderate to high risk that the concentrations of lead-enriched dust that were present in the commercial/industrial properties to the south and east of the Recycal site could feasibly lead to blood lead concentrations above the reference value of 5 µg/dL in workers.

Lower risks were identified for Brooks High School and the care providers to the east of the site. Cleaning protocols implemented at these properties prior to the investigation program (on the advice of PHS) meant that it was not possible to obtain an accurate picture of historical lead concentrations at these properties.

Similarly, while the investigation program provided some evidence of lead impact within the residential areas around the fringes of the dust plume, suitable sampling locations were limited. Notwithstanding this, the available evidence did not suggest that there it is likely to have been a risk to the health of people residing in these areas.

Blood lead testing was made available to residents and workers in February 2024. All results received at the time of this report from people who do not work with lead were normal. Not all workers and residents from the affected area had blood testing performed therefore it cannot be concluded that the historical lead dust emissions from the Recycal site were acceptable.

Do the dust emissions from the Recycal site represent a risk to the health of the local community following the intervention of EPA and PHS?

The investigation program demonstrated that the actions taken by EPA, including requiring the cessation of shredder and shredder floc processing operations and applying resin polymer cover to the shredder floc stockpiles have significantly reduced dust emissions from the Recycal site.

In the absence of elevated metals concentrations in soils, ongoing risks to the health of the local community are therefore low, provided that the PHS advice to remove visible dust from indoor surfaces has been followed. During the investigation program, significant concentrations of indoor dust were observed at several of the commercial/industrial properties surrounding the Recycal site. Removal of this residual metal-enriched dust would be an effective way to minimise ongoing lead exposure. PHS has provided specific advice to each of the properties where targeted cleaning was recommended.

Several properties also implemented additional risk management protocols, including the cessation of outdoor activities. Based on the outcomes of the investigation program and HHRA, all outdoor activities can be safely resumed. PHS has also provided specific advice to individual properties to this effect.

Is there a chance that the Recycal site could represent a risk to the health of the local community in the future

In the absence of elevated metals concentrations in investigation area soils, risks to the community in the area surrounding the Recycal site would be low under a theoretical future scenario where residual deposited dust has

been cleaned from indoor surfaces, the existing shredder floc stockpiles are removed, the shredder and shredder floc processing equipment does not return to operations without dust mitigation.

Decisions regarding the future operations of the Recycal site and management of the shredder floc stockpiles had not been made at the time of the preparation of this report. The resin polymer shredder floc covering, which breaks down over time, is not a permanent solution to the issue of metal-enriched dust emissions from the shredder floc stockpiles and the potential exists that emissions will reoccur in the future as the polymer resin becomes less effective and/or weather conditions change.

The EPA is continuing to enforce the suspension of shredding and floc processing and undertaking ongoing monitoring to understand the nature and extent of dust emissions from the Recycal site. Once the shredder floc stockpiles are removed, additional risk management will be required of Recycal, including appropriate dust mitigation measures for the shredder and shredder floc processing equipment, control of shredder floc stockpile size, and mitigation measures for other dust creating activities. .

7. Conclusion

A comprehensive environmental investigation and human health risk assessment were conducted in 2024 in response to preliminary environmental sampling of dust by the Tasmanian Environment Protection Authority (EPA) in the vicinity of an industrial estate at Rocherlea, Tasmania, which found lead and other metals at elevated concentrations. The evidence clearly links elevated concentrations of metals, particularly lead, in soil and dust to emissions from the Recycal site, with contamination distribution strongly influenced by prevailing wind patterns.

While the investigation program and risk assessment validated concerns about dust emissions, actions taken by the EPA and PHS in 2024 effectively minimised the impact of elevated metal concentrations in dust and significantly reduced ongoing risks to the community.

The cessation of shredder and shredder floc processing operations and application of a dust suppression resin polymer covering to the shredder floc stockpiles have reduced ongoing emissions from the Recycal site and provided a foundation for informed future decision-making by regulatory authorities and the site operators. A legacy of historical contamination remains a focus for continued attention and management, emphasising the need for a more considered approach to the future regulation and operation of the Recycal site. Specifically, continued monitoring, effective dust management, and targeted remediation efforts will be required moving forward to protect community health.

Dust emissions from the Recycal site and the impact to the surrounding area will continue to be closely monitored, with a strong commitment to maintaining public health and safety. The success of future risk management will depend on ongoing collaboration between authorities and the local community on appropriate risk management protocols, updated environmental requirements for the Recycal site and compliance by Recycal with those requirements.



ghd.com

→ **The Power of Commitment**