

17 August 2020

Michael Hooper
Manager- Environment
John Holland Country Regional Network
Via email: Michael.Hooper@jhg.com.au

L001 Interim Audit Advice (0503-2006-001) – Tarago

Dear Michael,

1. Introduction and Background

Andrew Lau of JBS&G Australia Pty Ltd (JBS&G), was engaged on the 16 April 2020 by John Holland Rail Pty Ltd (John Holland, the client) to conduct a site audit at land that falls within the Goulburn – Bombala rail corridor at Tarago, and is part of the Tarago Station Rail Corridor, Tarago, NSW 2580. The site is identified as Part of Lot 22 DP1202608, occupying an area of approx. 7.7 ha ('the site'). The site is owned by Transport for NSW (TfNSW) and is zoned RU2 "rural landscape". The location of the site and the extent of the site area are shown in Figures 1 – 3, included in **Attachment 2**.

The site forms part of the rail corridor between Goulburn and Bombala and was in part occupied by a former ore loadout complex (OLC) that was located to the west of the railway tracks; the Tarago railway station lies to the east of the tracks. The railway line runs in a north east to south west direction through the site. To the north and west is Stewart St then agricultural paddocks, to the east is a residence (106 Goulburn St, "the Station masters cottage") and the Tarago railway station, thence Goulburn Street and residences, and to the south are paddocks and then residences. Tarago Public School is located less than 200 m to the north east of the site.

The site was notified to the EPA under section 60 of the *Contaminated Land Management Act 1997* (CLM Act 1997) in November 2018 and has been declared to be significantly contaminated land by the NSW EPA (Declaration Number 20201103; Area Number 3455, dated 25 March 2020) with the contaminating substance identified as lead. Reasons for the declaration provided by the EPA are as follows:

- "lead concentrations in soil within the rail corridor (Lot 22 DP1202608) exceed national guideline values for the protection of human health and the environment;
- "lead contamination has impacted adjacent land at 106 Goulburn Street, Tarago (Lot 1 DP816626), with soil also found to contain lead at concentrations exceeding national guideline values for the protection of human health and the environment;
- "there are complete exposure pathways to lead for occupants of 106 Goulburn Street, as well as potentially complete exposure pathways for persons working within the rail corridor; and
- "there are potentially complete exposure pathways for onsite and offsite ecological receptors."

In response to the declaration, TfNSW have entered into a Voluntary Management Proposal (VMP) (Notice Number 20201711) with the EPA. A requirement of the VMP is the appointment of a NSW

EPA accredited auditor. Andrew Lau is a Site Auditor accredited by the NSW Environment Protection Authority (EPA) under the CLM Act 1997 (Accreditation Number 0503).

The VMP requires works to be conducted at the site within deadlines that have been specified and this letter has been prepared to assess works conducted under the following requirements:

- T1: Investigation of Contaminant (lead) at or originating from the site, and
- T2: Development of an Action Plan to mitigate risks from the Contaminant originating from the Site to offsite receptors.

The documents reviewed in preparation of this interim audit advice are listed in **Attachment 3**.

2. Assessment of Investigations of Contaminant at or Originating from Site

A Detailed Site Investigation (DSI) has been prepared by Ramboll Australia (July 2020) (Ramboll (2020)). The Auditor has assessed the DSI in accordance with *the Consultants Reporting on Contaminated Land: Contaminated Land Guidelines*, NSW EPA, 2020 (EPA 2020).

2.1 Site History

The site history indicates that the site was used as an ore loadout complex for mineral concentrates transported by truck from a local mine via public roads. These were identified as zinc, lead and copper sulfides, together with some other metal sulfides, including iron sulfide. Ramboll (2020) indicated that the concentrate materials were transported from the local Woodlawn mine, tipped out and stockpiled before being loaded onto rolling stock for transport to Newcastle and Port Kembla. This is understood to have occurred from approx. 1978 to 1988. The former ore loadout complex was purpose built for the receipt, storage and loading of the ore concentrates. Aerial photo review suggests that the infrastructure associated with the former OLC was constructed between 1976 and 1985 and removed between 1997 and 2005.

2.2 Geology, Hydrogeology, Topography and Hydrology

Ramboll (2020) reported that the regional geology suggests that the site is underlain by channel and flood plain alluvium (gravel, sand and clay), locally formed as calcrete overlying quaternary sedimentary rock.

The site has been found to be underlain by fill to various depths, comprising of clays with sand and gravel and railway line ballast rock. The natural materials underlying the fill was found to be clay with sand and gravel with one layer of gravel encountered at one investigation location.

Ramboll (2020) noted that regionally the shallowest groundwater aquifer is encountered in gravel at 5.5 to 18.6 m BGL with some deeper aquifers present in fractures in the underlying shale, siltstone and limestone from 50 to 74 m BGL. Groundwater from the shallow aquifer is anticipated to flow to the east towards the Mulwaree River.

Borelogs within the DSI (Ramboll 2020) indicated that groundwater was encountered at 6 - 8 m BGL during investigations, although the standing water levels in the wells on/closest to the site ranged from 4.4 to 7 m TOC, suggesting that the aquifer is semi-confined.

Water use surveys have been conducted in the area and groundwater is used by property holders in the area for a range of uses from drinking water, washing, gardening, filling a swimming pool and irrigation for agriculture, suggesting that the groundwater is fresh and potable with low salinity.

The site is relatively flat with a slight slope towards the east. Ephemeral drainage/cess lines pass through the site directing surface water flow towards three culverts where surface water flows beneath the railway lines:

- The northern most culvert directs water flows off site towards a dam on adjacent rural land;

- The central culvert directs water flows towards a shallow pond within the corridor then off site through a causeway on Boyd Street thence partially into a drain on the eastern side of Boyd St and partially across adjacent rural land; and
- The southern most culvert directs water towards a local water course is a tributary to the Mulwaree River that passes through rural land before discharging into the river.

Surface water flows towards the Mulwaree River approx. 550 m east of the site.

2.3 Previous Investigations

Analytical results for heavy metals and some other analytes from previous investigations were summarised by Ramboll in the DSI for soil sampling and analysis at the site. Results indicated that the site is impacted by metals, in particular lead. The lead concentrations in soil may present a risk to human health or the environment at the site and the potential exists for the offsite migration of lead, via surface water, groundwater and dust was also identified.

2.4 Conceptual Site Model

Ramboll present a preliminary conceptual site model (CSM) based on the site history and an assessment of the previous investigations. The preliminary CSM prepared by Ramboll included the following findings:

- Vertical migration of lead through soils appears to be limited to shallower soils due to heavy clay soils limiting infiltration, so the potential for groundwater to be impacted with lead from the site is considered to be low, despite test results showing elevated lead leachability;
- Analysis of dust samples at Tarago railway station showed the risk to users of the station to be low and acceptable;
- Analysis of dust samples from Goulburn Street showed the risk to pedestrians to be low and acceptable;
- Analysis of lead in internal and external dust and soil showed the risks to people at Tarago Public School from lead to be low and acceptable;
- Risks to residents of 106 Goulburn St (Stationmaster's cottage) were identified, due to exposure to lead in internal and external dust and in soil. Ramboll identified co-contribution from lead paint at the site;
- Residents in the Tarago area were potentially exposed to lead via outdoor dust inhalation and dermal contact with surface waters; and
- Potential risks to onsite ecological receptors (plants and animals) and off site ecological receptors (including livestock) were identified via dust/soil (dermal contact, incidental ingestion and outdoor dust inhalation) and via surface water (dermal contact, incidental ingestion and irrigation).

Some data gaps requiring further assessment were identified by Ramboll and included potential off site impacts of lead via groundwater and surface water pathways.

2.5 Investigations Reported in the DSI

To investigate the data gaps to inform action and management plans, Ramboll conducted a number of investigations including the following:

- Sampling and analysis of the footprint of the former OLC via advancement of 20 testpits through the fill profile including depths in the underlying natural material. The auditor notes that the former OLC footprint is 1.5 ha of the total 7.7 ha site, that is the subject of the VMP.

In addition to soil samples sent for laboratory analysis, assessment for lead was undertaken using a hand held X-Ray Fluorescence Spectrometer (XRF).

- Sampling and analysis at 43 separate properties in the vicinity of the site. Different media were assessed (soil, rainwater tank water and sediment, groundwater bore water, interior dust and paint). These included publicly accessed places such as the public school, town hall, Tarago CWA etc and 36 private residences.
- Assessment of nature strips and road verges within Tarago township and along the road from the Woodlawn mine to the former OLC.
- Surface water and sediment sampling at locations both on the VMP site and off site.
- Groundwater sampling and analysis from six on site wells and two off site wells to assess potential contamination and groundwater flow direction.

2.6 Ramboll Conclusions

In considering the results, Ramboll concluded the following:

- Lead had been delineated within the rail formation and adjacent shallow soils and drainage lines;
- Lead was found at depth within the soil at the former OLC but is not considered likely to present a risk to human health or the environment;
- Lead was found to not have impacted groundwater at the site, nor off site and no further investigation is warranted;
- Off site migration of lead and other metals has occurred via surface water;
- Surface water impacts of lead to the Mulwaree River were not observed;
- Off site migration of lead has occurred via air borne dust and elevated concentrations of lead in rainwater tank sediment and internal dust were identified close the site;
- Dust monitoring has commenced and is ongoing;
- All contaminant concentrations measured in rainwater tanks at all locations were below the Australian Drinking Water Guidelines¹;
- and guidelines relevant for all potable uses and unimpacted by contamination from the site; and
- High metal concentrations have been identified in local public road reserves but appear to be unrelated to the rail corridor, with the exception of Boyd St.

2.7 Ramboll Recommendations

Ramboll made several recommendations as follows:

- Further investigation to confirm the extent of off site migration via surface water;
- Further investigation to delineate lead impacts at depth within the footprint of the former loadout complex buildings;
- Remediation is required on site and off site to address risks associated with lead contamination;

¹ Australian Drinking Water Guidelines, National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand, 2011 (NHMRC/NRMMC 2011)

- An Action Plan should be developed to mitigate risks associated with lead contamination until remediation can occur; and
- Ongoing monitoring of surface water and air quality should occur until a long term remedial strategy is implemented and proven to be effective.

2.8 Audit Opinion/Requested Actions

The auditor has reviewed the DSI and is satisfied with the conclusions and recommendations presented by Ramboll.

Ramboll have identified a number data gaps and recommended that further works be undertaken to address the data gaps. The auditor requests that the scope(s) and any Sampling, Analysis and Quality Plans for these works be provided to the auditor for review prior to work commencing.

3. Assessment of the Action Plan

A remediation action plan (RAP) is being prepared by Ramboll as required by the VMP, but prior to its implementation impacts from contamination both on and off site require management. To this end, Ramboll have prepared *Tarago Lead Management Action Plan*, Ramboll, July 2020 (“the Action Plan”). The Action Plan defines a smaller area as “the site” than is covered by the VMP, and for this assessment, the smaller area will be referred to as ‘the AP site’.

3.1 Objective

The objective of the Action Plan is to address risks from exposure to the lead from the AP site, due to the presence of lead containing ore. The Action Plan does not address other lead sources that may be present on site or in the community such as lead paint.

Specific actions outlined include the following:

- Measures to prevent further off site migration via air borne dust or surface water;
- Monitoring to assess the effectiveness of these measures;
- Removal of contaminated sediment from affected rainwater tanks surrounding the tanks;
- Measures to prevent members of the public from accessing the site; and
- Controls for rail workers accessing the site.

3.2 Interim Measures

The Action Plan tabulates the roles and responsibilities for managing the lead impact on the AP site, including TfNSW as site owner and John Holland Rail as contractor managing the AP site. In addition, the Action Plan details mitigation measures such as the use of PPE, dust suppression etc.

Measures described in the Action Plan for managing exposure to contamination on the AP site include the following:

- The creation of an exclusion zone around the rail formation and the footprint of the former OLC and the application of a polymer sealant over the lead impacted area;
- Contaminated sediments downstream of the rail culverts within the AP site boundary will be removed and the area validated by sampling;
- Installation of sediment controls and an inspection regime has been planned after rain of >10 mm;
- Provisions for any excavations within the contaminated areas of the site; and

- Controls for the existing stockpile.

The effectiveness of the Action Plan will be monitored through sampling and analysis of surface water and dust.

Measures described in the Action Plan for managing exposure to contamination off the AP site include the following:

- Removal of rainwater and sediment from tanks when specified trigger levels are exceeded. Tanks will be refilled with clean water and a letter will be provided stating that the water is suitable for use.
- Removal of dust from inside properties when specified trigger levels are exceeded, if the property is within 500 m of the rail corridor site.
- Further investigations of soil, sediment and surface water will occur where concentrations of lead are above applicable guidelines and/or a risk assessment concludes an unacceptable risk to be present to human health or the environment.

Other details provided in the Action Plan include stockpile management and material tracking.

3.3 Audit Opinion/Requested Actions

The Auditor is satisfied that the objectives described in the Action Plan are adequate for mitigating exposure to lead from the site and that the measures described in the Action Plan are adequate for meeting the objectives.

Please note that this interim advice does not constitute a Site Audit Statement or a Site Audit Report but is provided to assist in the assessment and management of contamination issues at the site in regard to requirements of the site audit. The information provided herein should not be considered pre-emptive of the final audit conclusions, but rather represent the findings of the audit based on a preliminary review of available site information. Furthermore, the interim advice should not be regarded as approval of any proposed investigations or remedial activities, as any such approval is beyond the scope of an independent auditor.

Should you require clarification, please contact the undersigned on 02 8245 0300 or by email alau@jbsg.com.au.

Yours sincerely:

DRAFT

Andrew Lau
NSW EPA Accredited Site Auditor
Accreditation Number 0503
JBS&G Australia Pty Ltd

Attachments (1) Limitations
(2) Site Plans
(3) Documentation Reviewed

Attachment 1 – Limitations

This audit was conducted with a reasonable level of scrutiny, care and diligence on behalf of the client for the purposes outlined in s.47 (1) of the *Contaminated Land Management Act 1997*. The data used to support the conclusions reached in this audit were obtained by other consultants and the limitations which apply to the consultant's report(s) apply equally to this audit report.

Every reasonable effort has been made to identify and obtain all relevant data, reports and other information that provide evidence about the condition of the site, and those that were held by the client and the client's consultants, or that were readily available. No liability can be accepted for unreported omissions, alterations or errors in the data collected and presented by other consultants. Accordingly, the data and information presented by others are taken and interpreted in good faith.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements. Limited sampling and laboratory analyses were undertaken as part of the investigations reviewed, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this audit are based on the information obtained at the time of the investigations.

Attachment 2 – Site Plans

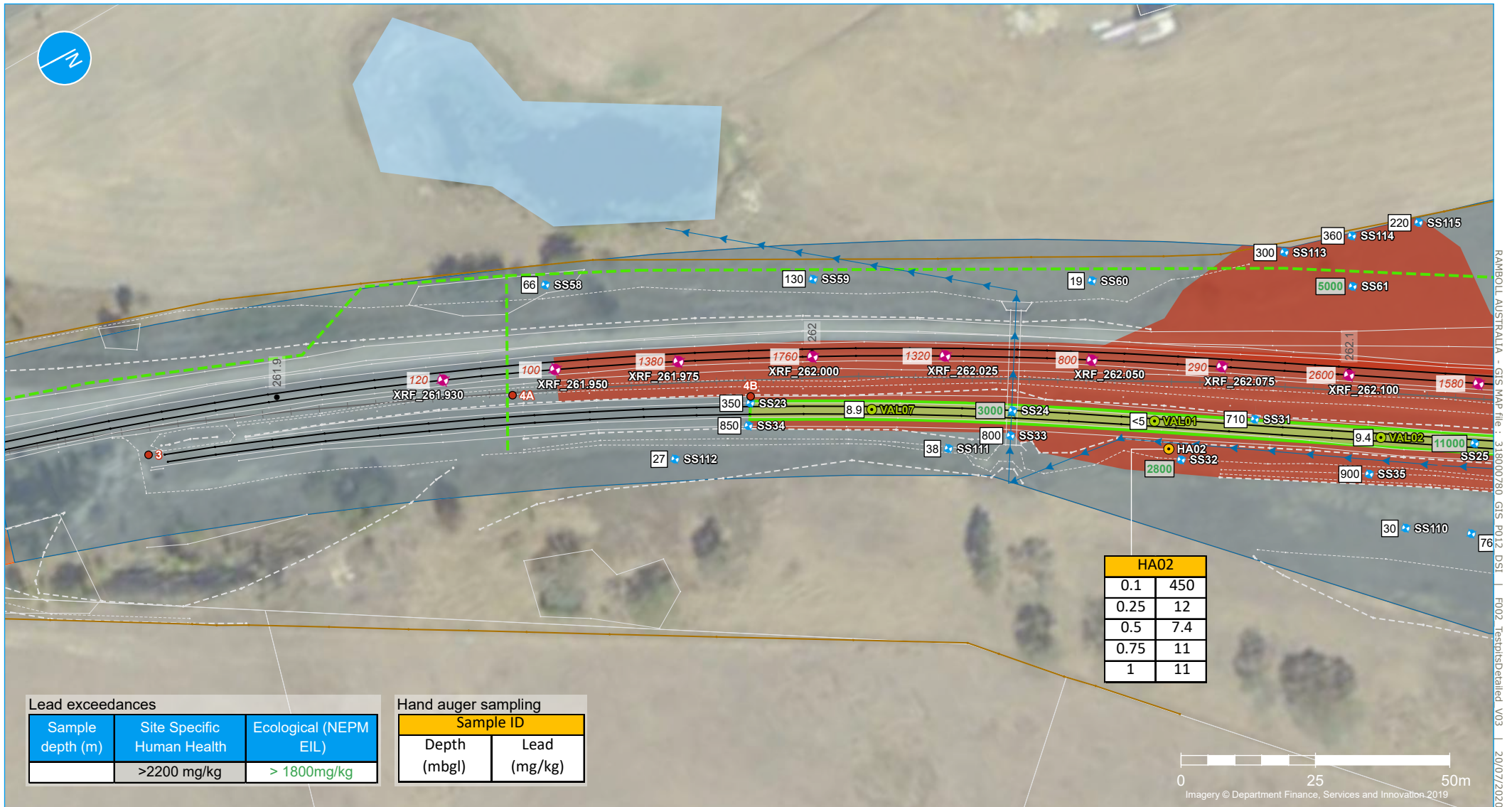


- Legend**
- Site boundary
 - Rail corridor
 - Rail corridor fence

A4
1:10,000

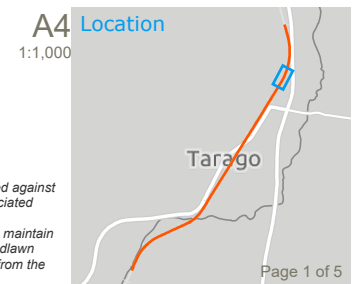


Figure 1 | Locality Plan



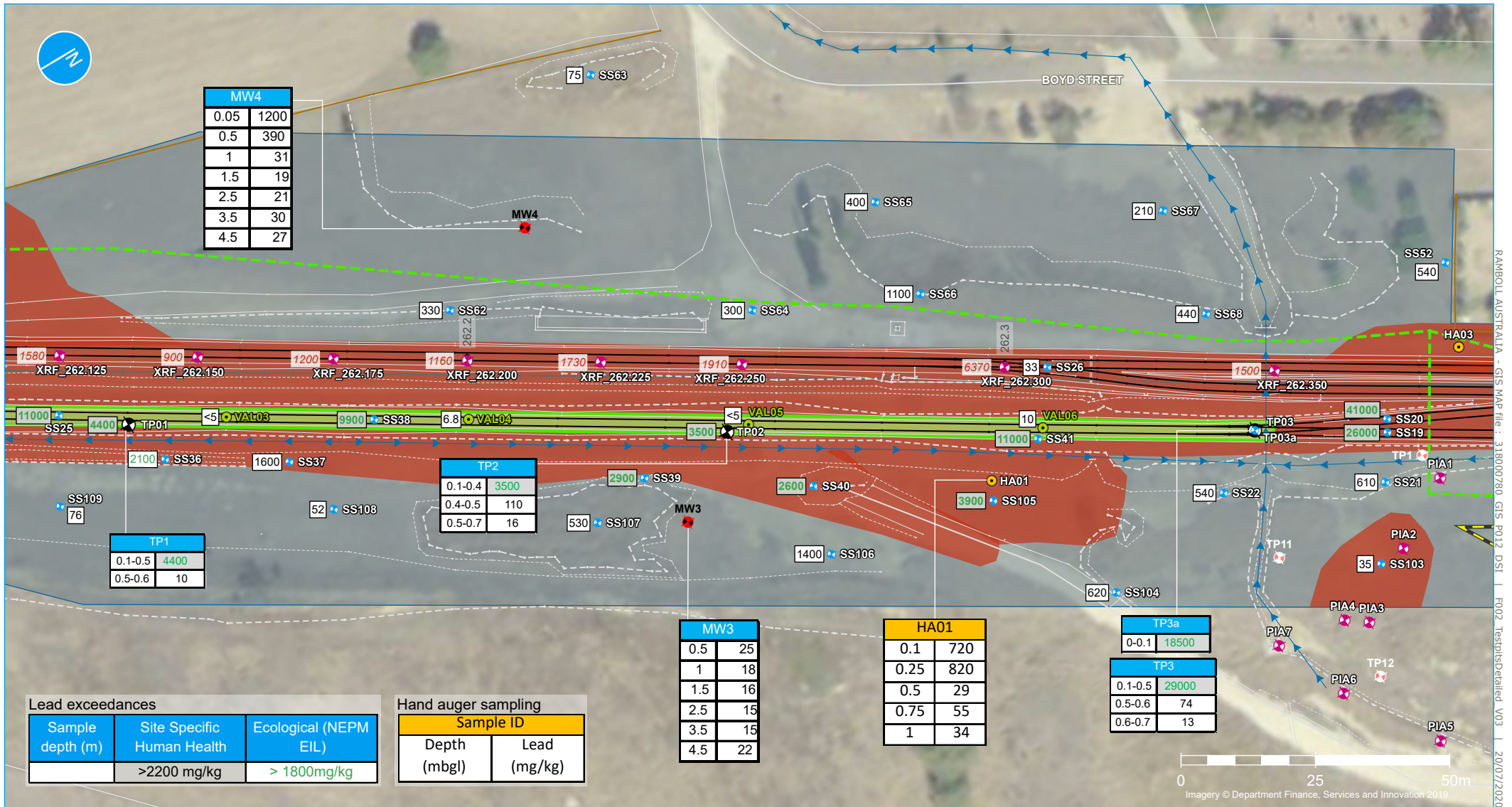
Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)
- Survey lines
- Rail track
- Top of bank
- Bottom of bank
- Other elements
- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Previous sampling location (McMahon)
- Shallow soil (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)
- Lead impacted area
- Area of excavation during loop extension (no further excavation proposed)



Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

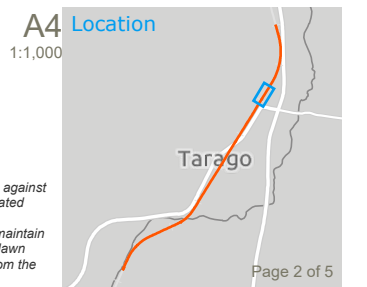
Figure 2a | Site Plan



Legend

- Site boundary
 - Rail corridor fence
 - 0.1km chainage point
 - Signal trench (approximate)
 - Surface water flow (indicative)
 - Survey lines
 - Rail track
 - Top of bank
 - Bottom of bank
 - Other elements
 - ◆ X-Ray fluorescence sampling (Ramboll 2019, 2020)
 - ◆ Shallow soil (Ramboll 2019)
 - ⊕ Test pit (Ramboll 2019)
 - Hand auger (Ramboll 2019)
 - ◆ 1200 Lead concentration for XRF sample (mg/kg)
 - Validation sample (Ramboll 2019)
 - ◆ Groundwater monitoring location
 - ◆ Test pit (loadout complex)
 - Lead impacted area
 - Area of excavation during loop extension (no further excavation proposed)
 - Former loadout road (approximate)
- Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

Figure 2b | Site Plan



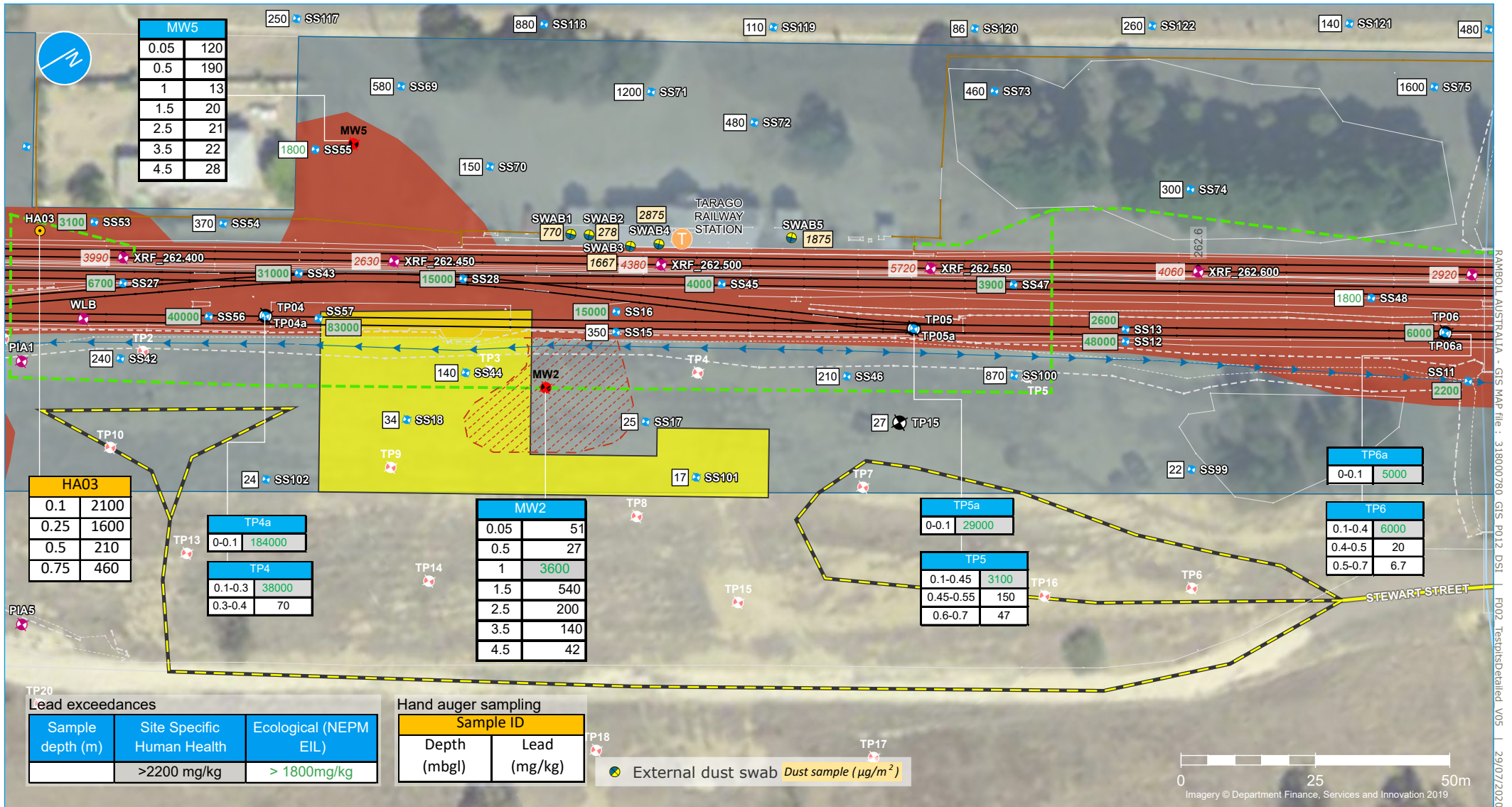
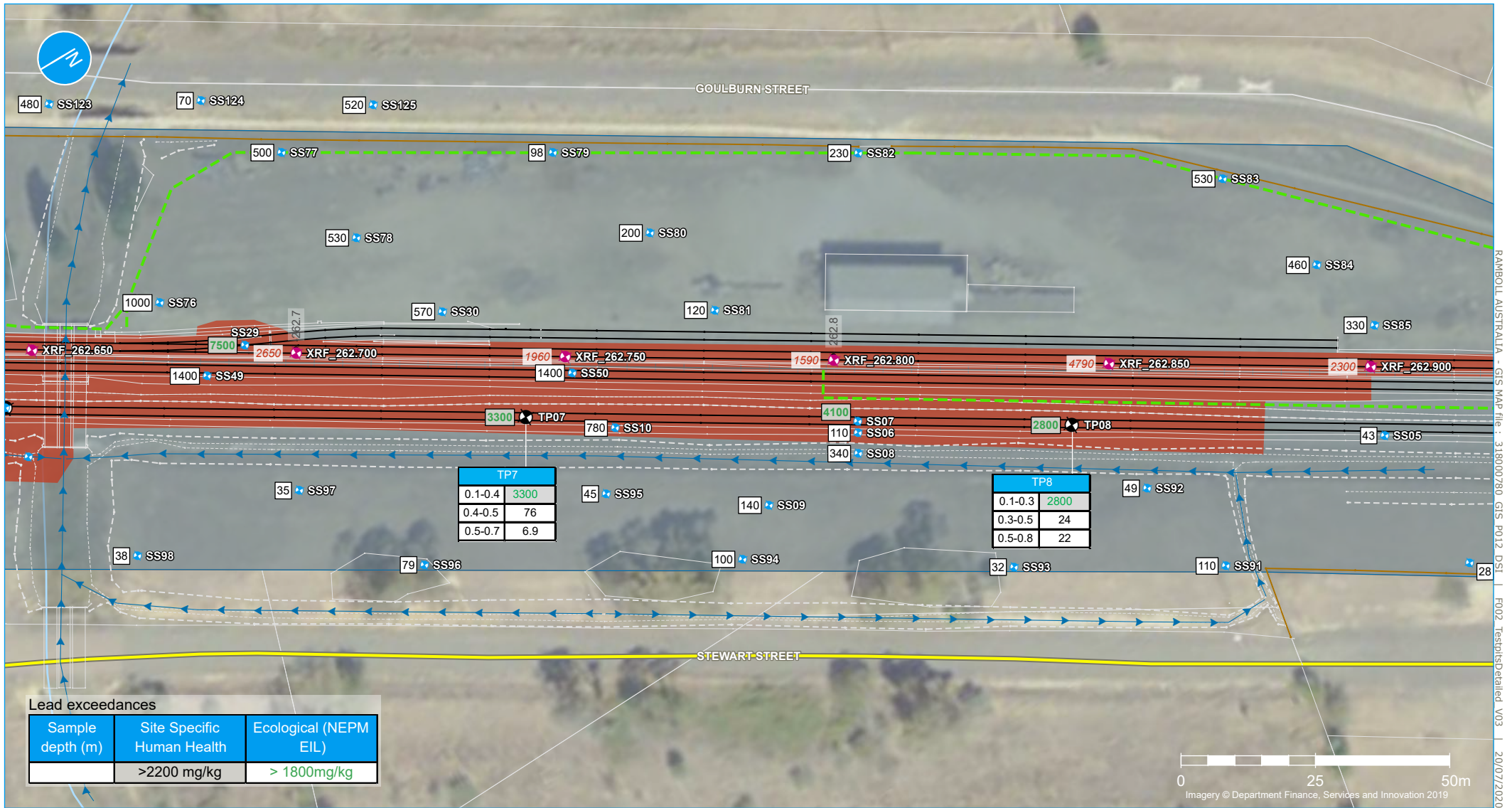


Figure 2c | Site Plan

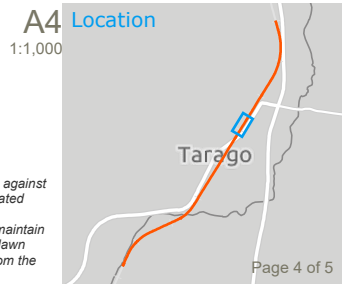
Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.





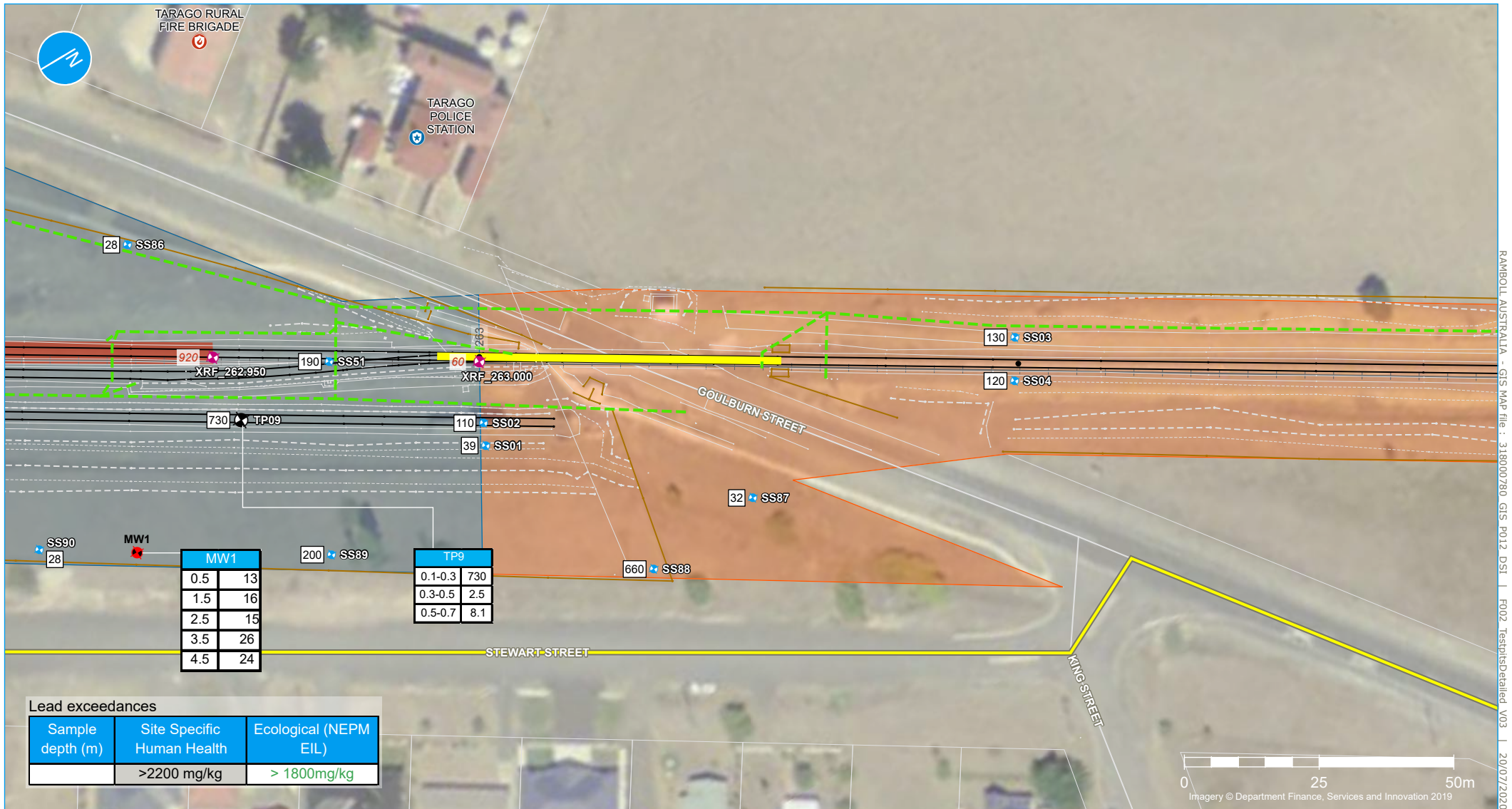
Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)
- Survey lines
- Rail track
- Top of bank
- Bottom of bank
- Other elements
- ◆ X-Ray fluorescence sampling (Ramboll 2019, 2020)
- ◆ Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Lead impacted area
- Haul route



Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

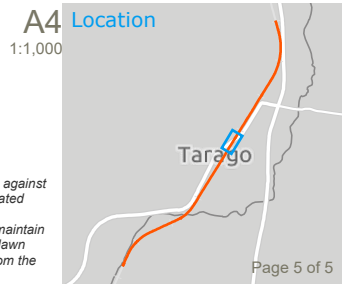
Figure 2d | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F002_TestpitsDetailed_V03 | 20/07/2020

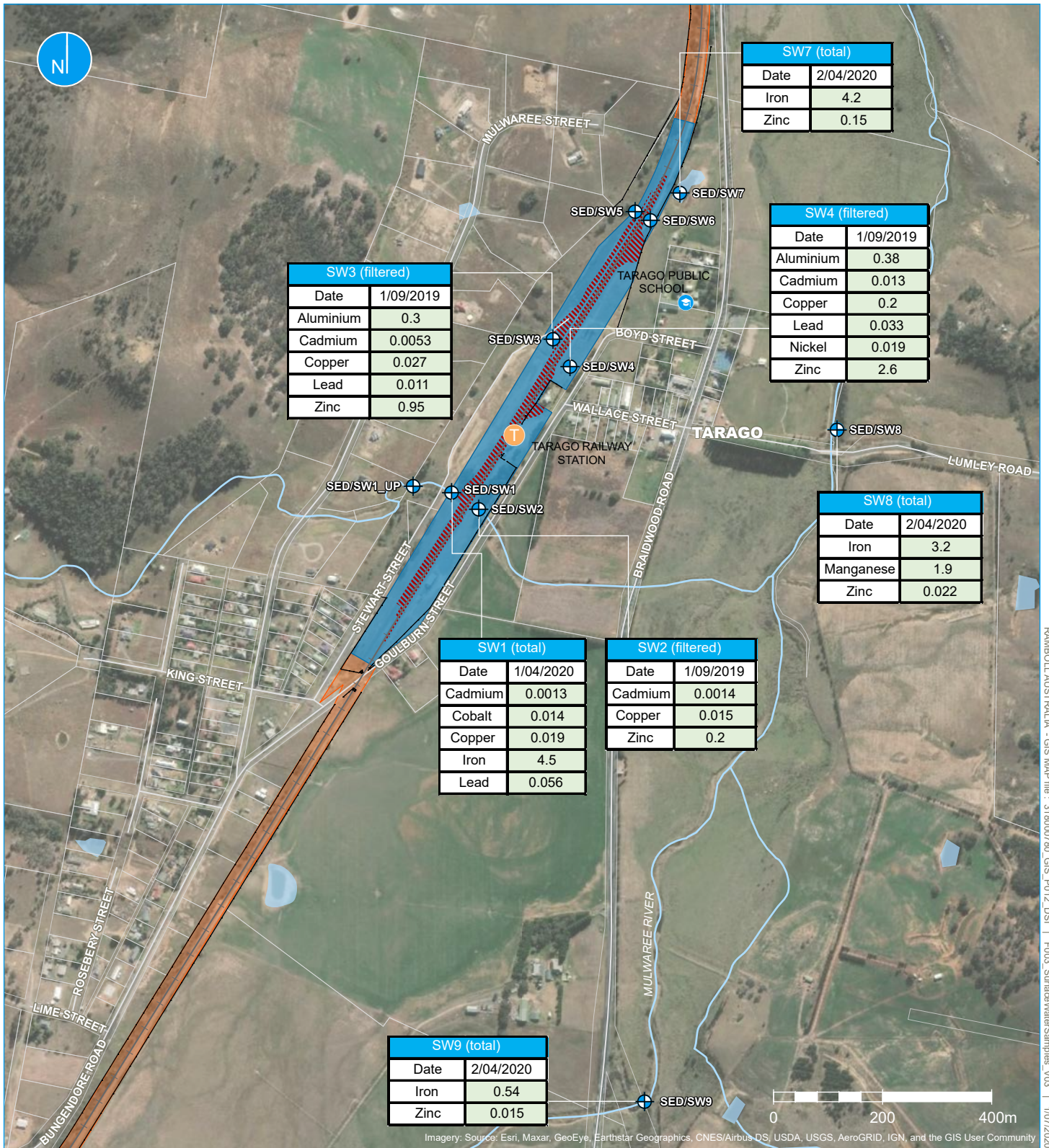
Legend

- Site boundary
- Rail corridor fence
- Rail track
- Top of bank
- Bottom of bank
- Other elements
- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location
- Lead impacted area
- Haul route
- 0.1km chainage point
- Goulburn Street level crossing
- Signal trench (approximate)
- Surface water flow (indicative)



*Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.*

Figure 2e | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F003_SurfaceWaterSamples_V03 | 1/07/2020

Legend

- Surface water and sediment sampling locations (co-located)
- Rail corridor
- Rail corridor fence
- Area of lead exceedance (within rail corridor)

Exceedances (surface water)

Contaminant (mg/L)	> ANZG 2018 Freshwater Ecosystems
Aluminium	0.055
Cadmium	0.0002
Cobalt	0.09
Copper	0.0014
Iron	0.3
Lead	0.0034
Manganese	1.9
Nickel	0.011
Zinc	0.008

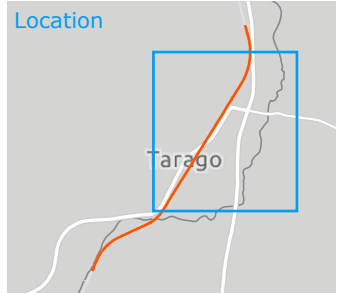


Figure 3 | Surface water and sediment sampling locations

Attachment 3 – Documents Reviewed

- Declaration of significantly contaminated land No 20201103, Area Number 3455, 25 March 2020 ('the declaration').
- Voluntary Management Proposal ('the VMP') (Notice Number 20201711), 25 May 2020
- *Tarago Rail Corridor and Tarago Area, Detailed Site Investigation*, Ramboll, July 2020
- *Tarago Lead Management Action Plan*, Ramboll, 31 July 2020