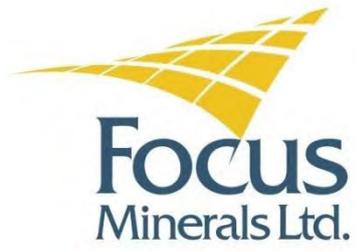


M15/645, M15/646, M15/958, M15/1788, G15/007 and
P15/5717

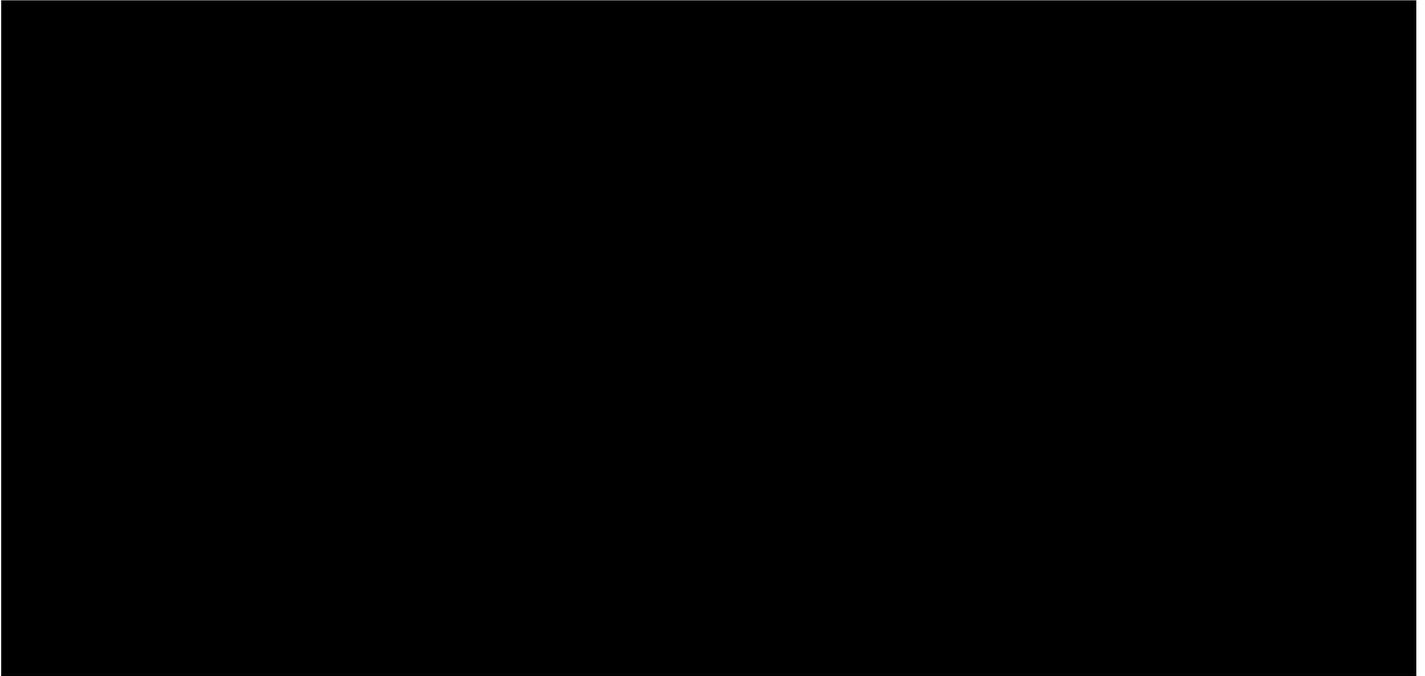
FOCUS OPERATIONS PTY. LTD.

PRELIMINARY SITE INVESTIGATION

July 2012



FOCUS OPERATIONS PTY. LTD.
THREE MILE HILL
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APPENDIX

APPENDIX 1: Site Summary Forms

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1 Introduction and Background

Focus Minerals Limited (Focus Minerals) owns and operates the Coolgardie Gold Project (CGP). The CGP is located approximately 40 kilometres west of Kalgoorlie, 550 kilometres east of Perth and approximately five kilometres south-east of Coolgardie township within the Shire of Coolgardie, Western Australia.

The CGP has an extensive history of mining which dates back to the late 1800's. As a consequence, there is a multitude of historical disturbance present throughout the CGP, including features such as old shafts, batteries, ponds, tailings and heap leach facilities.

As part of their mine closure planning, Focus Minerals has commenced a process of identifying and investigating potentially contaminated sites. This report focusses on the sites identified to date as potentially contaminated. These include a number of historical tailings facilities and associated batteries located in five areas known locally as Lady Loch, Perseverance, Bayleys, Redemption and Dreadnought (Figure 1).

This Preliminary Site Investigation report has been prepared to provide an initial evaluation of the four potentially contaminated sites identified to date and to allow for the development of further investigations and management plans as part of Focus Minerals mine closure planning process.

2 Scope of Works

Focus Minerals has undertaken a Preliminary Site Investigation (PSI) within the CGP. The investigation was undertaken in general accordance with the Department of Environment and Conservation (DEC) Contaminated Sites Management Series. The scope of work is described below.

2.1 Site Identification Process

A high-level identification process was undertaken to identify potentially contaminated historical mine workings. This included a review of aerial photography, knowledge of the surrounding area and other anecdotal evidence. Site summary forms are provided in Appendix 1.

2.2 Site Inspections

Those sites identified as potentially contaminated were visually inspected to further assess the potential for historical contamination as well as to identify potential risks to the surrounding environment, human health and ecological receptors.

2.3 Soil Sampling and Analysis Program

Upon inspecting each individual site, a limited soil sampling and analysis program was undertaken to confirm the presence of contamination and gain an understanding of the vertical and horizontal extent of contamination within the soil profile.

2.4 Reporting

This PSI report has been prepared in general accordance with DEC guidelines to provide the following information:

- Known details on the nature, extent and concentrations of contamination at each of the five sites.
- Recommended investigation levels.

- Information on the sensitivity of the receiving environment.
- Details on the potential for contamination to impact on human health, the environment and ecological receptors.
- Hydrological and hydrogeological understanding.
- Recommendations and need for further works.

3 Environmental Setting

The following provides a generalised summary of the surrounding environment for all four sites.

3.1 Regional and Local Setting

The Coolgardie Gold Project is located in the Eastern Goldfield region of Western Australia, within the Eastern Goldfields IBRA subregion on the Yilgarn Craton (Terrestrial Ecosystems 2009). The area comprises granite rocky outcrops, low greenstone hills, laterite uplands and broad plains. Salt lakes also occur through the bioregion, although none exist in proximity to the Coolgardie Gold Project. Regional land tenure comprises mining and pastoral leases, Aboriginal land as well as a number of national parks and reserves.

Locally, the Coolgardie Gold Project is situated adjacent to the Coolgardie township. Mining is the predominant surrounding land use. In recent years, tourism has become a significant part of the Coolgardie township.

3.2 Climate

The Coolgardie region has a semi-arid Mediterranean climate, with hot summers and mild wet winters. The nearest comprehensive climatic data available for the Coolgardie Gold Project is recorded at Coolgardie (BOM Station No. 012018). Rainfall records for Coolgardie are available from 1901 onwards (Table 1). The station records show an annual average rainfall of 270.4 millimetres, with marginally higher rates of rainfall being delivered between January and August. Maximum temperatures average 33 degrees Celsius in January and 16 degrees in July. During October to May, a high pressure sub-tropical ridge delivers prevailing east to south-easterly winds, producing wind gusts of up to 140 kilometres per hour. Cyclone activity to the north-west can produce severe thunderstorms over the summer months, however threatening cyclonic climatic conditions are rarely produced near Coolgardie (BOM 2011).

Table 1: Summary of Climatic Data at Coolgardie (BOM 2011)

| Statistic | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|-----------------------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|-------|--------|
| Mean rainfall (mm) | 23.3 | 27.8 | 25.3 | 22.3 | 29.1 | 29.6 | 24.6 | 24.3 | 13.9 | 16.3 | 16.9 | 16.9 | 270.4 |
| Rainfall days | 2.6 | 2.9 | 3.3 | 3.7 | 5.5 | 6.8 | 6.9 | 5.7 | 3.6 | 3.1 | 3.0 | 2.6 | 49.7 |
| Highest rainfall (mm) | 194.4 | 237.0 | 219.4 | 105.5 | 115.4 | 165.0 | 75.3 | 93.8 | 92.6 | 90.0 | 77.8 | 101.2 | 633.2 |
| Mean max. temperature | 33.3 | 32.3 | 29.4 | 24.9 | 20.3 | 16.9 | 16.1 | 18.1 | 22.0 | 25.1 | 29.3 | 32.3 | 25.0 |
| Mean min. temperature | 17.0 | 16.8 | 15.1 | 12.0 | 8.6 | 6.5 | 5.2 | 5.9 | 7.9 | 10.2 | 13.4 | 15.8 | 11.2 |

The closest Bureau of Meteorology data station to the CGP project area that measures wind speeds is Kalgoorlie-Boulder Airport (BOM Station No. 012038). At this site, average 3 pm wind speeds range from 13.7 to 17.8 kilometres per hour with August to November exhibiting the highest wind speeds. The average 9 am wind speeds range from 11.8 to 17.1 kilometres per hour and are lowest in the months May to July. Within the Kalgoorlie-Boulder region, wind direction is very seasonal with predominantly southeasterly winds during summer and northeasterly winds in winter (BOM 2011).

3.3 Regional Geology

The Coolgardie goldfields are situated on the western side of the Archaean Menzies-Norseman Greenstone belt. The basement rocks of the region are a mixture of granite, gneiss and greenstone. The most common features found in the northwestern half of the region and in the north east are even-grained porphyritic granitic rocks which are intruded by quartz veins and dolerite dykes. In the south-west are the largest areas of migmatite and gneiss.

Greenstone belts are concentrated between Norseman and Kalgoorlie and are common along the southwestern margin and south of Lake Barlee. The belts are comprised of a mixture of metamorphosed mafic to ultra-mafic volcanic rocks such as basalt, amphibolite, dolerite and gabbro, as well as felsic volcanic rocks and metasedimentary rocks including cherts and banded iron formations.

In the south east Mesoproterozoic rocks of the Albany-Fraser Orogen are found, which include the gneiss of the Biranup Complex and the granite of the Nornalup Complex which is weakly to strongly deformed. The Albany-Fraser Orogen is overlaid by a veneer of Eocene sediments which belong to the Balladonia Shelf of the Eucla Basin. North east of Norseman there is an outcrop of Mesoproterozoic arenaceous and argillaceous metasedimentary sandstone and shale belong to the Woodline Formation.

The bedrock is extensively weathered and laterised, with much of it obscured by Quaternary deposits of alluvial, colluvial and Aeolian origin (DAF 2006).

3.4 Topography and Soils

The main landforms within the Coolgardie Gold Project are undulating plains and uplands (with some sandplains and salt lakes) on granitic rocks of the Yilgarn Craton. The soils in this zone consist of calcareous loamy earths, yellow sandy and loamy earths, red loamy earths, red deep sands and salt lake soils (DAF 2006).

3.5 Surface Water

The hydrology of the Eastern Goldfields region is dominated by ephemeral creek lines, salt lakes (Coffey Natural Systems 2007) and hyper saline groundwater and elevations in the area range from 400 metres to 450 metres above sea level (Geoscience Pty Ltd 2007).

3.6 Groundwater

A groundwater monitoring bore is installed approximately 600 metres to the south of the Redemption historical TSF which is located approximately 1.6 kilometres north-east from the Coolgardie town border. Water quality monitoring results are presented in Table 2.

Table 2: Redemption Groundwater Quality

| Analyte (dissolved) | Concentration (mg/L) | Analyte (dissolved) | Concentration (mg/L) |
|---------------------|----------------------|---------------------|----------------------|
| Arsenic | 0.12 | Antimony | <0.001 |
| Calcium | 17 | Selenium | <0.001 |
| Cadmium | <0.002 | Zinc | 0.01 |
| Chromium | <0.01 | Cyanide (total) | 0.02 |
| Copper | 0.02 | Cyanide (WAD) | <0.01 |
| Iron | 0.46 | Sulphate | 30 |
| Mercury | <0.00002 | TDS | 1000 |
| Nickel | 0.01 | | |

All of the above concentrations are well below ANZECC 2000 Livestock Drinking Water Guidelines.

3.7 Vegetation

The Coolgardie Gold Project is located within the Coolgardie Botanical District of the south-western Interzone, which is dominated by Eucalypt woodlands. On calcareous soils these woodlands become more open and a saltbush blue understory appears. The sand plains contain scrub heath and Allocasuarina thickets (Coffey Natural Systems 2007).

4. Site History

The Coolgardie area has a long history of mining, dating back to 1892. Anecdotal evidence including the shape of the landforms and the remnants of construction materials suggests that the sites under investigation were gold processing plants and/or tailings disposal facilities which were in operation between the late 1800's and mid 1900's. During this period, mercury was commonly utilised in the gold recovery process. Lack of appropriate bunding combined with spillages and poor environmental management practices had the potential to result in contamination of soil within the footprint of historical gold plants. Significant concentrations of mercury would have reported to the tailings stream and then to the tailings storage facilities.

Additional elements of concern are typically associated with the ores being processed. Gold mineralisation in the Coolgardie area is often associated with minerals such as arsenopyrite (FeAsS) and sphalerite ((Zn,Fe)S) and to a lesser extent chalcopyrite (CuFeS₂) and galena (PbS). Therefore, arsenic, zinc, copper and lead were initially identified as potential contaminants to be included in the analysis program.

5. Potentially Contaminated Sites

The Coolgardie Gold Project includes nearly over 100 tenements within 10 kilometres of the town of Coolgardie. A field inspection of these tenements, conducted by an Environmental Scientist from Focus Minerals highlighted the following potential historical contaminated sites:

- Perseverance (heap leach and processing plant)
- Lady Loch (tailings storage facility and stamp battery)
- Dreadnought (tailings storage facility, processing plant site and sumps)
- Redemption (tailings storage facility)
- Bayleys (Bayleys tailings storage facilities)

The locations of these sites are shown in Figure 1 and discussed below.

5.1 Perseverance

5.1.1 Location

The Perseverance demolished plant site and TSF is located on mining tenement M15/646 which is approximately 3.5 kilometres south of Coolgardie town (see Figure 2). The Lady Loch historical tailings dam is located north-east of the Tindals underground mine. Perseverance demolished plant site and tailings are located on the both sites of the Tindals access road.

5.1.2 Site Details

Site details for Perseverance are summarised in Table 3.

Table 3: Perseverance Identification Summary

| Identification | Details |
|--|---|
| Name of Site | Perseverance Plant, Tailings and Heap Leach Pad |
| Coordinates (MGA 94 Zone 51, centre point) | 325760E 6571152N |
| Tenements | M15/646 |
| Local Government Authority | Shire of Coolgardie |
| Tenement Holder | Focus Minerals Limited |
| Former Land Use | Mineral Development |
| Current Land Use | Mineral Development |
| Proposed Land Use | Mineral Development |

5.1.3 Site Inspection

The demolished plant site and tailings occupy approximately 0.6 hectares of land, whereas the tails area occupies approximately 0.3 hectares. However, following inspection, the total area impacted is approximately 2.08 hectares.

The heap leach pad was constructed with a plastic liner to reduce contamination of the underlying soils. The liner is still visible, however it has largely perished due to ultraviolet damage and other environmental factors.



Photo 1 Demolished plant site - Perseverance



Photo 2 Scattered tailings - Perseverance



Photo 3 Heap Leach and Impacted surrounding area – Perseverance



Photo 4 Stockpiled soil – Perseverance

Potentially contaminated areas at Perseverance are summarised in Table 4.

Table 4: Summary of Potentially Contaminated Areas at Perseverance

| Historical Land Use | Area (ha) |
|-------------------------------|-------------|
| Demolished plant and tailings | 0.6 |
| Heap leach | 0.3 |
| Surrounding area | 1.18 |
| TOTAL | 2.08 |

5.2. Lady Loch

5.2.1. Location

The Lady Loch historical TSF is located on mining tenement M15/646 which is approximately 3.5 kilometres south of Coolgardie town (see Figure 3). The Lady Loch historical tailings dam is located north-east of the Tindals underground mine.

5.2.2. Site Description

Site details for Lady Loch are summarised in Table 5.

Table 5: Lady Loch Identification Summary

| Identification | Details |
|--|---|
| Name of Site | Lady Loch Tailings Facility and Stamp Battery |
| Coordinates (MGA 94 Zone 51, centre point) | 327347E 6571151N |
| Tenements | M15/646 |
| Local Government Authority | Shire of Coolgardie |
| Tenement Holder | Focus Minerals Limited |
| Former Land Use | Mineral Development |
| Current Land Use | Mineral Development |
| Proposed Land Use | Mineral Development |

5.2.3 Site Inspection

Lady Loch tailings occupy approximately 1.05 hectares of land and approximately 0.8 hectares of the surrounding land has been impacted over the years due to erosional processes. During the site investigation a number of historical mine shafts and some brick pads were found. There is no historical documentation about the site, but due to the presence of tailings material, it is considered likely that the area was a historical plant site or battery.



Photo 5 Lady Loch tailings facility



Photo 6 Impacted area of surrounding land – Lady Loch area



Photo 7 Plant or battery site – Lady Loch

Potentially contaminated areas at Lady Loch are summarised in Table 6.

Table 6: Summary of Potentially Contaminated Areas at Lady Loch

| Historical Land Use | Area (ha) |
|-------------------------------|-------------|
| Tailings facility | 1.05 |
| Surrounding contaminated land | 0.8 |
| TOTAL | 1.85 |

5.3 Dreadnought

5.3.1 Location

The location of the Dreadnought historical TSF and mill site is located on mining tenement M15/958, which is approximately five kilometres south of Coolgardie town (see Figure 4).

5.3.2 Site Description

Site details for Dreadnought are summarised in Table 7.

Table 7: Dreadnought Identification Summary

| Identification | Details |
|--|---|
| Name of Site | Dreadnought Tailings Facility and Associated Infrastructure |
| Coordinates (MGA 94 Zone 51, centre point) | 325262E 6569105N |
| Tenements | M15/958 |
| Local Government Authority | Shire of Coolgardie |
| Tenement Holder | Focus Minerals Limited |
| Former Land Use | Mineral Development |
| Current Land Use | Mineral Development |
| Proposed Land Use | Mineral Development |

5.3.3 Site Inspection

Investigation of the Dreadnought historic tailings facility shows that there was a mill site occupying approximately 1.6 hectares of land. This included the main milling and processing area which has since been removed and rehabilitated, although some concrete pads remain in place. There are three sumps occupying 0.8 hectares of land on the eastern side of the TSF which were probably used for tailings storage.

North-west of the mill site is a water dam which was lined and has a small amount of suspected mine waste material in it. Presumably the process water was being recycled and stored in the water dam. The water dam has not been rehabilitated. The outside wall of one sump had been covered with soil at some stage which has now washed away in places. The remaining two sumps do not appear to have been covered. The tailings facility itself occupies 1.5 hectares of land. The surface to the south-east of the TSF appears to contain tailings material which was most likely deposited by wind and rainfall over a period of time. This area covers approximately 1.3 hectares of land.

Potentially contaminated areas at Dreadnought are summarised in Table 8.

Table 8: Summary of Potential Contaminated Areas at Dreadnought

| Historical Land Use | Area (ha) |
|---------------------|------------|
| Mill | 1.6 |
| Sumps | 0.8 |
| TSF | 1.5 |
| Surrounding Area | 1.3 |
| TOTAL | 5.2 |



Photo 8 Dreadnought historical tailings facility



Photo 9 Historical plant site



Photo 10

Tailing material piled by the road and water dam walls are built with tails





Photo 11 Water course and holes



Photo 12 Historical Sump

5.4. Bayleys

5.4.1. Location

The Bayleys Reward deposit is located immediately north-east of the Coolgardie townsite, 550 kilometres east of Perth and 40 kilometres south-west of Kalgoorlie in Western Australia. The Bayleys historic tails facility is situated on tenements M15/645, M15/1788 and G15/007, which are located approximately two kilometres north-east of Coolgardie township.

5.4.2 Site Description

Site details for Bayleys are summarised in Table 9.

Table 9: Bayleys Identification Summary

| Identification | Details |
|--|----------------------------|
| Name of Site | Bayleys Tailings Facility |
| Coordinates (MGA 94 Zone 51, centre point) | 326503E 6575360N |
| Tenements | M15/645, M15/1788, G15/007 |
| Local Government Authority | Shire of Coolgardie |
| Tenement Holder | Focus Minerals Limited |
| Former Land Use | Mineral Development |
| Current Land Use | Mineral Development |
| Proposed Land Use | Crown Land |

5.4.3. Site Inspection

The Bayleys area was used as a stamp battery and subsequently used to deposit tails. The Bayleys tails facility occupies an area of 3.9 hectares. Approximately 5.8 hectares of land adjacent to the facility (primarily to the east) was also identified as potentially contaminated due to sedimentation processes.



Photo 13 Bayleys historical tails facility



Photo 14 Bayleys tails stockpiled material



Photo 15 Bayleys frame and battery remains



Photo 16 Bayleys impacted area

Potentially contaminated areas at Bayleys are summarised in Table 10.

Table 10: Summary of Potential Contaminated Areas at Bayleys

| Historical Land Use | Area (ha) |
|---------------------|-----------|
| Bayleys Tails | 3.9 |

| | |
|------------------|------------|
| Surrounding Area | 5.8 |
| TOTAL | 9.7 |

5.5 Redemption

5.5.1. Location

The Redemption historical tails area is located south-east of Bayleys on tenements M15/1788 and P15/5717.

5.5.2 Site Description

Site details for Redemption are summarised in Table 11.

Table 11: Redemption Identification Summary

| Identification | Details |
|--|------------------------------|
| Name of Site | Redemption Tailings Facility |
| Coordinates (MGA 94 Zone 51, centre point) | 326849E 6574976N |
| Tenements | M15/1788, P15/5717 |
| Local Government Authority | Shire of Coolgardie |
| Tenement Holder | Focus Minerals Limited |
| Former Land Use | Mineral Development |
| Current Land Use | Mineral Development |
| Proposed Land Use | Crown Land |

5.5.3. Site Inspection

There is limited information available for the Redemption area, however the tails facility, scattered tails around the historical tails dam and some old workings still remain. The total area of the facility is 0.32 hectares.



Photo 17 Redemption tails stockpiled material



Photo 18 Redemption impacted area

Potentially contaminated areas at Redemption are summarised in Table 12.

Table 12: Summary of Potential Contaminated Areas at Redemption

| Historical Land Use | Area (Hectares) |
|---------------------|-----------------|
|---------------------|-----------------|

| | |
|------------------|-----------------|
| Heap leach | 0.32 |
| Surrounding area | unknown |
| TOTAL | >0.32 |

6. Limited Sampling and Analysis Program

6.1. Implementation

A soil sampling program was implemented to determine whether contamination was present in materials contained within the historical facilities at each site. This program also examined the vertical and lateral extents of any contamination. It was undertaken in accordance with the following guidelines:

- Development of Sampling and Analysis Programs (DEC 2001).
- AS 4482.1-2005 Australian Standard – Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil – Part 1: Non-volatile and Semi-volatile compounds.
- AS/NZS 5667.1-1998 Australian/New Zealand Standard - Guidance on the Design of Sampling Programs, Sampling Techniques and Preservation and Handling.
- AS 1726-1993 Australian Standard – Geotechnical Site Investigations.

6.2. Health and Safety

Prior to commencing fieldwork, a Health, Safety and Environmental Analysis Plan was prepared and discussed with all relevant field personnel. The plan addressed health, safety and environmental issues relevant to the site and proposed tasks.

Specific aims of this process were to ensure:

- That the sampling and drilling personnel fully understand health and safety aspects of the site,
- That personnel were fully trained in accordance with Focus Minerals Health and Safety Management Plan,
- All personnel wore appropriate PPE during drilling and sampling.

6.3. Sampling Plan

A soil sampling plan was developed to assess the presence and extent of any contamination at each of the suspected sites. Sample locations for the majority of historical TSFs were based on a grid pattern. For the remaining areas, judgemental sampling was applied. This approach relied on a combination of factors including visual inspection of the site, available background knowledge, vegetation and hydrology.

Laterally, samples were collected as follows:

- Perseverance and Ladyloch – tails and underlying natural ground.
- Redemption, Dreadnought and Bayleys – surface, subsurface and underlying natural ground.

The sampling programme was supervised by an Environmental Scientist from Focus Minerals and took place between October 2011 and April 2012. Sample locations at each of the sites are summarised in Table 13 and shown on Figure 2, Figure 3, Figure 4 and Figure 5.

Table 13: Sample Locations

| Site | Area (ha) | No. of Sample Sites |
|---|-----------|---------------------|
| Perseverance historical tails surrounding area | 1.78 | 15 |
| Perseverance historical plant | 0.60 | 11 |
| Lady Loch historical tails | 1.05 | 17 |
| Lady Loch surrounding area | 0.80 | 2 |
| Dreadnought historical TSF and surrounding area | 2.8 | 9 |
| Dreadnought mill site | 1.6 | 2 |
| Dreadnought sumps | 0.8 | 4 |
| Bayleys historical site and surrounding area | 9.7 | 11 |

6.4. Sampling Methodology

Sampling procedures were undertaken in accordance with AS 4482.1-1997 for non-volatile compounds in soil and AS/NZS 5667.1-1998 Guidance on the Design of Sampling Programs, Sampling Techniques and Preservation and Handling.

Prior to sample collection, the positions of sampling points were marked on the ground and reviewed with the drill rig operator to ensure safe access and operation of the equipment.

With the exception of the Bayleys site, all samples were collected using a reverse circulation drill rig. Drilling was chosen in lieu of test-pitting as it provides a greater range of sampling depths and it is expected that early refusal would have been met had sampling been undertaken using an average sized excavator or backhoe (12 – 20 tonnes). Due to logistical issues, it was not possible to use the drill rig at Bayleys historical tails facility. Instead, at this site, an excavator was used to dig a trench at each sample location.

The drill bit was thoroughly washed down and rinsed prior to commencing sampling and between each sampling location. Generally, samples were collected every vertical metre up to a maximum depth of seven metres below existing ground levels.

Samples were collected in pre-washed 250 millilitre glass sample containers provided by the laboratory. Each container was appropriately labelled including sample identification, date, project and sample depth. Sample depths were recorded relative to existing ground levels only. Field assessment of sample lithologies by an Environmental Scientist determined which samples would be submitted for analysis. The remainder were stored on site in case they were required for further analysis. Samples to be analysed were immediately wrapped in protective covers and placed within an insulated container for storage and transportation to the laboratory. A Chain of Custody Form accompanied the samples from the site to the laboratory.

All un-sampled core material was carefully placed around the borehole to allow inspection of the soil profile and identify any visually or olfactory signs of contamination.

6.5. Sample Details

Table 14 outlines the number of samples collected at each historical site. At Lady Loch and Perseverance, field assessment of sample lithologies by an Environmental Scientist reduced the number of samples submitted for analysis.

The drill hole depth varied across each site, depending on the depth of stockpiled material. Generally, three samples were submitted for analysis from each drill hole, representing the following zones:

- The top (typically 0 – 2 metres).
- The middle of the drill hole.
- Material below the facility.

Table 14: Sample Frequency Data

| Site | Sample Sites | Sample Depths (metres) | Samples Collected | Samples Submitted for Analysis |
|--------------|--------------|------------------------|-------------------|--------------------------------|
| Lady Loch | 19 | 0 - 4 | 30 | 24 |
| Perseverance | 26 | 0 - 3 | 34 | 31 |
| Dreadnought | 15 | 0 - 6 | 35 | 35 |
| Bayleys | 11 | 0 - 5 | 26 | 26 |

6.6. Soil Assessment Criteria

For environmental evaluation, the concentrations of target compounds in soil are compared against the Ecological Investigation Levels (EIL) as defined within the DEC Assessment Levels for Soil, Sediment and Water guidelines (DEC 2010). These levels represent conservation criteria for protection of ecological values and are the first tier of assessment criteria. The DEC provide health based investigation levels for various land uses, which are generally less stringent than environmental criteria. However, as there is no proposed change in land use for the site, the results have been compared to the EIL only. The applicable criteria are presented with the tabulated laboratory analysis results in Table 15.

6.7. Laboratory Program

Soil samples collected as part of the investigations were submitted to SGS Laboratories in Welshpool, WA, which is accredited with the National Association of Testing Authorities (NATA). Samples were analysed for the following contaminants considered relevant to the history of mining activities at each site:

- pH
- Moisture
- Arsenic
- Weak Acid Dissociable (WAD) Cyanide
- Mercury
- Cadmium
- Chromium
- Conductivity
- Copper
- Cobalt
- Lead
- Nickel
- Zinc
- Gold
- Manganese
- Boron
- Selenium
- Antimony
- Beryllium
- Silver
- Sulphur¹
- Acid Neutralisation Capacity (ANC)¹
- Net Acid Generation (NAG)¹

Copies of the laboratory reports are provided in Appendix 2.

¹ Lady Loch and Perseverance Samples

7. Quality Assurance Procedures

7.1. Procedures and Methodologies

The sampling and analysis program was undertaken in accordance with industry and government guidelines including:

- Department of Environment and Conservation Contaminated Management Series, in particular:
 - Development of Sampling and Analysis Programs (2001).
- Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Compounds (AS 4482.1-1997) (Standards Australia 1997).
- Guidance on the Design of Sampling Programs, Sampling Techniques and Preservation and Handling (AS/NZS 5667.1-1998) (Standards Australia and Standards New Zealand 1998).
- Geotechnical Site Investigations (AS 1726-1993) (Standards Australia 1993).

These standards and guidelines provide detailed guidance for collecting sufficient and reliable information for the assessment of a site potentially contaminated or contaminated as a result of historic mining activities.

7.2. Laboratory Quality Control

The laboratory selected is accredited with the National Association of Testing Authorities (NATA) for the required analyses and, as such, undertake a number of quality control measures. These include reagent blanks, matrix spikes, internal standards and surrogate spikes. Surrogate spikes are used to assess the efficiency of the extraction process and matrix spikes are used to assess the suitability of the analyses method for the relevant soil matrix.

7.3. Quality Assurance Summary

The only item which did not comply with guidelines listed in 7.1 was the collection of field duplicates. No field duplicates were collected during the work program. Despite this, sample collection, handling and analysis techniques were of an acceptable quality and reported results are considered sufficiently reliable upon which to draw significant conclusions regarding the likely contamination status at each site.

8. Results

Laboratory results for Perseverance, Lady Loch, Dreadnought and Bayleys are presented in Table 15.

Table 15: Analytical Results

| Sample ID | Analyte (mg/kg) | | | | | | | | | | | | | | | | | |
|--------------|-----------------|-----------|------------|------|-------|----------|------------|-----------|------------|------|-----------|------------|------|------|------------|----------|-----|-----------------|
| | pH* | As | Pb | Au | Ag | Cd | Cu | Ni | Zn | Be | Co | Mn | Sb | Se | Cr | Hg | B | CN ⁻ |
| EIL | | 20 | 600 | - | - | 3 | 100 | 60 | 200 | - | 50 | 500 | - | - | 400 | 1 | - | 10 |
| Perseverance | | | | | | | | | | | | | | | | | | |
| PRT1-1 | 7.8 | 143 | 110 | 366 | 0.45 | 0.82 | 147 | 29.6 | 201 | 0.06 | 11.2 | 343 | 0.34 | 0.8 | 80 | 5.8 | <20 | 0.2 |
| PRT1-3 | 7.6 | 39.8 | 37.2 | 136 | 0.19 | 0.37 | 73 | 47.5 | 108 | 0.15 | 27.9 | 735 | 0.16 | 0.9 | 130 | 2.6 | 60 | 0.5 |
| PRT2-2 | 7.6 | 62.6 | 55.3 | 750 | 0.49 | 0.97 | 129 | 15.4 | 174 | 0.04 | 8.5 | 367 | 0.29 | 0.7 | 30 | 8.9 | <20 | 0.6 |
| PRT2-3 | 7.7 | 34.7 | 35.3 | 460 | 0.39 | 0.60 | 96 | 34.4 | 134 | 0.09 | 15.0 | 589 | 0.21 | 0.7 | 100 | 6.1 | 60 | 0.5 |
| PRT3-1 | 7.5 | 403 | 78.3 | 1150 | 3.5 | 1.32 | 531 | 88.1 | 169 | 0.13 | 21.0 | 342 | 0.40 | 1.0 | 250 | 2.6 | 50 | 0.4 |
| PRT3-3 | 8.0 | 27.2 | 29.9 | 590 | 0.44 | 0.41 | 134 | 22.3 | 128 | 0.11 | 8.6 | 319 | 0.13 | 0.5 | 70 | 3.9 | 30 | <0.1 |
| PRT4-1 | 9.2 | 30.9 | 43.6 | 192 | 0.40 | 0.42 | 98 | 82.4 | 131 | 0.07 | 8.8 | 291 | 0.19 | <0.5 | 140 | 2 | 20 | 0.4 |
| PRT4-3 | 8.6 | 12.1 | 19.0 | 233 | 0.37 | 0.30 | 70 | 64.2 | 92 | 0.15 | 21.6 | 979 | 0.11 | 0.6 | 160 | 3 | 40 | <0.1 |
| PRT6-1 | 8.0 | 73.3 | 144 | 930 | 0.78 | 1.70 | 231 | 20. | 461 | 0.05 | 13.9 | 378 | 0.19 | 1.0 | 40 | 7 | 40 | 1.1 |
| PRT8 | 9.1 | 4.4 | 9.0 | 650 | 0.16 | 0.26 | 77 | 29.3 | 93 | 0.09 | 10.7 | 619 | 0.09 | <0.5 | 90 | 1.1 | <20 | <0.1 |
| PRT-12 | 8.2 | 29.0 | 115.0 | 1660 | 0.49 | 0.29 | 254 | 43.9 | 221 | 0.06 | 5.1 | 87.6 | 0.19 | 2.7 | 153 | 1.1 | 20 | <0.1 |
| PRT-13 | 8.4 | 22.7 | 26.8 | 421 | 0.31 | 0.34 | 119 | 65.2 | 148 | 0.12 | 16.8 | 468.0 | 0.15 | 1.5 | 381 | 0.5 | 20 | <0.1 |
| PRT-14 | 7.7 | 30.3 | 94.5 | 1420 | 0.75 | 0.33 | 237 | 33.3 | 199 | 0.06 | 6.0 | 140.0 | 0.20 | 3.0 | 109 | 0.2 | 0 | <0.1 |
| PRT-15 | 8.3 | 13.2 | 26.4 | 324 | 0.24 | 0.18 | 97 | 88.3 | 111 | 0.26 | 40.6 | 1080.0 | 0.13 | 1.4 | 290 | 0.5 | 110 | <0.1 |
| PRT-16 | 8.7 | 31.7 | 54.7 | 382 | 0.33 | 0.35 | 141 | 103.0 | 236 | 0.13 | 21.6 | 611.0 | 0.14 | 1.3 | 197 | 0.5 | 0 | <0.1 |
| PRT-17 | 8.2 | 5.6 | 2.9 | 19 | <0.02 | 0.05 | 61 | 54.7 | 58 | 0.16 | 15.7 | 424.0 | 0.10 | 0.6 | 255 | 0 | 90 | <0.1 |
| PRT-18 | 7.8 | 2.7 | 14.0 | 81 | 0.03 | 1.63 | 60 | 100.0 | 552 | 0.30 | 37.3 | 1930.0 | 0.06 | 0.7 | 151 | 0.2 | 30 | <0.1 |
| PRT-19 | 9.0 | 5.5 | 3.4 | 35 | <0.02 | 0.05 | 52 | 79.3 | 71 | 0.20 | 33.7 | 534.0 | 0.05 | 0.8 | 211 | 0 | 80 | <0.1 |
| PRT-20 | 8.7 | 5.1 | 20.9 | 44 | <0.02 | 0.15 | 49 | 60.2 | 77 | 0.16 | 24.7 | 1080.0 | 0.12 | <0.5 | 121 | 0.3 | 30 | <0.1 |
| PRT-21 | 8.0 | 95.4 | 106.0 | 1020 | 0.63 | 1.13 | 243 | 34.0 | 344 | 0.08 | 18.0 | 517.0 | 0.26 | 1.0 | 461 | 9.7 | 0 | <0.1 |
| PRT-22 | 8.1 | 211.0 | 106.0 | 900 | 0.83 | 1.47 | 232 | 33.7 | 818 | 0.07 | 17.4 | 511.0 | 0.55 | 1.1 | 58 | 10.7 | 0 | 0.2 |
| PRT-23 | 9.2 | 87.2 | 109.0 | 1420 | 0.95 | 1.03 | 289 | 51.7 | 336 | 0.16 | 20.4 | 675.0 | 0.28 | 1.5 | 267 | 10.1 | 0 | <0.1 |

| Sample ID | Analyte (mg/kg) | | | | | | | | | | | | | | | | | |
|-----------|-----------------|-------|-------|------|-------|------|-----|-------|------|------|------|--------|------|------|-----|------|-----|-----------------|
| | pH* | As | Pb | Au | Ag | Cd | Cu | Ni | Zn | Be | Co | Mn | Sb | Se | Cr | Hg | B | CN ⁻ |
| EIL | | 20 | 600 | - | - | 3 | 100 | 60 | 200 | - | 50 | 500 | - | - | 400 | 1 | - | 10 |
| PRT-24 | 8.2 | 117.0 | 33.2 | 890 | 0.53 | 0.65 | 153 | 26.0 | 168 | 0.09 | 20.2 | 715.0 | 0.32 | 0.7 | 30 | 11 | 20 | <0.1 |
| PRT-25 | 9.0 | 28.4 | 33.2 | 440 | 0.31 | 0.43 | 100 | 101.0 | 137 | 0.19 | 30.6 | 1240.0 | 0.12 | 0.5 | 374 | 0.8 | 0 | <0.1 |
| PRT-26 | 8.8 | 35.3 | 72.9 | 1790 | 0.79 | 1.08 | 105 | 31.3 | 556 | 0.17 | 19.8 | 414.0 | 0.09 | 0.6 | 80 | 2.8 | 40 | <0.1 |
| PRT-6.2 | 8.8 | 19.2 | 30.8 | 760 | 0.27 | 0.47 | 112 | 98.1 | 178 | 0.23 | 36.9 | 1130.0 | 0.09 | 0.8 | 251 | 2.5 | 50 | <0.1 |
| PRT-7 | 9.0 | 83.9 | 118.0 | 1930 | 0.75 | 0.88 | 169 | 32.8 | 297 | 0.08 | 16.5 | 588.0 | 0.25 | 0.6 | 51 | 4.1 | 0 | <0.1 |
| PRT-9 | 9.3 | 48.8 | 79.0 | 1010 | 0.53 | 0.73 | 166 | 88.6 | 208 | 0.09 | 16.8 | 430.0 | 0.22 | 0.8 | 511 | 3.1 | 0 | <0.1 |
| PRT-10 | 8.9 | 57.2 | 89.9 | 1050 | 0.56 | 1.02 | 186 | 54.5 | 278 | 0.11 | 20.0 | 729.0 | 0.17 | 0.6 | 94 | 4.8 | 20 | <0.1 |
| PRT-5 | 9.2 | 18.1 | 3790 | 286 | 0.33 | 0.31 | 91 | 61.2 | 117 | 0.12 | 23.1 | 1120.0 | 0.45 | <0.5 | 240 | 8.4 | 50 | <0.1 |
| PRT-11 | 8.4 | 138.0 | 303.0 | 3670 | 1.42 | 3.79 | 307 | 28.8 | 3550 | 0.05 | 18.7 | 517.0 | 0.38 | 0.8 | 41 | 27.8 | 0 | 0.1 |
| Lady Loch | | | | | | | | | | | | | | | | | | |
| LLT-1 | 9.1 | 23.8 | 6.8 | 98 | <0.02 | 0.07 | 57 | 171.0 | 60 | 0.23 | 56.7 | 764.0 | 0.08 | 0.8 | 378 | 0.2 | 160 | <0.1 |
| LLT-2 | 9.3 | 35.2 | 42.2 | 234 | 0.06 | 0.20 | 82 | 52.5 | 74 | 0.06 | 13.9 | 346.0 | 0.10 | <0.5 | 138 | 2.6 | 0 | 0.1 |
| LLT3-1 | 9.0 | 154 | 110 | 720 | 0.23 | 0.39 | 81 | 75.4 | 131 | 0.09 | 14.3 | 355 | 0.45 | 0.5 | 240 | 5.6 | <20 | 0.1 |
| LLT3-3 | 9.0 | 44.2 | 35.0 | 700 | 0.15 | 0.21 | 56 | 49.1 | 70 | 0.06 | 14.3 | 363 | 0.17 | <0.5 | 170 | 3.1 | 20 | <0.1 |
| LLT3-4 | 9.0 | 25.6 | 23.1 | 267 | 0.21 | 0.14 | 54 | 65.8 | 75 | 0.10 | 28.6 | 436 | 0.15 | 0.8 | 290 | 1.6 | 90 | <0.1 |
| LLT4-1 | 9.4 | 23.8 | 30.9 | 376 | 0.11 | 0.26 | 56 | 30.5 | 77 | 0.04 | 9.3 | 293 | 0.12 | <0.5 | 130 | 1.5 | <20 | <0.1 |
| LLT-4.3 | 8.3 | 8.4 | 17.3 | 373 | 0.16 | 0.73 | 36 | 73.7 | 864 | 0.09 | 20.0 | 605.0 | 0.11 | <0.5 | 242 | 2 | 0 | 0.1 |
| LLT5-1 | 9.6 | 27.4 | 285.6 | 290 | 0.09 | 0.23 | 67 | 38.1 | 63 | 0.06 | 12.6 | 386 | 0.15 | <0.5 | 150 | 0.9 | <20 | <0.1 |
| LLT5-2 | 9.3 | 13.0 | 15.8 | 262 | 0.06 | 0.14 | 43 | 50.7 | 46 | 0.10 | 17.0 | 626 | 0.13 | <0.5 | 170 | 0.6 | 30 | <0.1 |
| LLT8-1 | 9.8 | 18.4 | 27.0 | 468 | 0.15 | 0.20 | 57 | 46.0 | 55 | 0.08 | 18.1 | 811 | 0.16 | <0.5 | 150 | 0.9 | <20 | 1.0 |
| LLT-8.2 | 9.7 | 14.2 | 15.1 | 74 | <0.02 | 0.07 | 54 | 41.3 | 116 | 0.30 | 16.5 | 675.0 | 0.37 | 0.5 | 89 | 0.1 | 0 | <0.1 |
| LLT7-1 | 9.8 | 30.1 | 31.7 | 290 | 0.13 | 0.22 | 66 | 35.7 | 59 | 0.05 | 11.6 | 300 | 0.14 | <0.5 | 130 | 1.7 | 30 | <0.1 |
| LLT6-2 | 9.1 | 32.7 | 32.1 | 284 | 0.10 | 0.21 | 73 | 40.1 | 61 | 0.05 | 11.9 | 294 | 0.16 | <0.5 | 170 | 2.3 | 30 | <0.1 |

| Sample ID | Analyte (mg/kg) | | | | | | | | | | | | | | | | | |
|-------------|-----------------|------|------|------|-------|------|-----|-------|-----|-------|------|--------|------|------|-----|------|-----|-----------------|
| | pH* | As | Pb | Au | Ag | Cd | Cu | Ni | Zn | Be | Co | Mn | Sb | Se | Cr | Hg | B | CN ⁻ |
| EIL | | 20 | 600 | - | - | 3 | 100 | 60 | 200 | - | 50 | 500 | - | - | 400 | 1 | - | 10 |
| LLT6-4 | 8.8 | 20.1 | 8.6 | 94 | 0.04 | 0.04 | 18 | 9.1 | 20 | <0.02 | 2.7 | 68.0 | 0.05 | 39.5 | 220 | 2.7 | 50 | <0.1 |
| LLM-2 | 8.0 | 22.9 | 21.6 | 600 | 0.13 | 0.19 | 60 | 24.9 | 52 | 0.05 | 9.4 | 319.0 | 0.11 | <0.5 | 62 | 0.7 | 0 | <0.1 |
| LLT-9 | 9.1 | 33.7 | 29.0 | 493 | 0.08 | 0.25 | 102 | 56.7 | 77 | 0.07 | 13.4 | 360.0 | 0.13 | <0.5 | 287 | 1 | 0 | <0.1 |
| LLT-10 | 8.5 | 55.1 | 93.3 | 970 | 0.15 | 0.45 | 70 | 168.0 | 93 | 0.10 | 18.1 | 423.0 | 0.18 | <0.5 | 301 | 4.3 | 0 | 0.2 |
| LLT-11 | 8.8 | 42.2 | 71.4 | 423 | 0.09 | 0.24 | 56 | 142.0 | 83 | 0.08 | 20.1 | 349.0 | 0.14 | <0.5 | 532 | 1.4 | 0 | <0.1 |
| LLT-12 | 8.1 | 51.6 | 20.9 | 1030 | 0.21 | 0.16 | 75 | 129.0 | 83 | 0.20 | 36.0 | 806.0 | 0.20 | 0.9 | 384 | 1.9 | 30 | 0.2 |
| LLT-13 | 9.2 | 23.2 | 25.4 | 495 | 0.12 | 0.18 | 63 | 61.8 | 55 | 0.10 | 17.4 | 508.0 | 0.14 | <0.5 | 476 | 0.7 | 0 | <0.1 |
| LLT-14 | 8.8 | 5.9 | 9.0 | 65 | <0.02 | 0.08 | 37 | 81.3 | 46 | 0.15 | 26.3 | 1010.0 | 0.10 | <0.5 | 173 | 0.1 | 0 | <0.1 |
| LLT-15 | 8.8 | 6.5 | 9.7 | 30 | 0.02 | 0.13 | 34 | 121.0 | 63 | 0.19 | 41.2 | 1880.0 | 0.10 | <0.5 | 461 | 0.1 | 0 | <0.1 |
| LLT-16 | 8.7 | 44.2 | 45.8 | 445 | 0.15 | 0.24 | 105 | 65.0 | 82 | 0.08 | 21.8 | 506.0 | 0.16 | 0.7 | 154 | 0.8 | 0 | 0.1 |
| LLT-17 | 9.8 | 31.7 | 66.1 | 5090 | 2.53 | 3.00 | 67 | 42.8 | 112 | 0.57 | 8.2 | 355.0 | 0.16 | 0.8 | 122 | 15.7 | 190 | <0.1 |
| Dreadnought | | | | | | | | | | | | | | | | | | |
| DTD1-1 | 8.6 | 96 | 75.2 | 72 | 0.2 | 0.71 | 57 | 146 | 140 | 0.45 | 21 | 338 | 0.17 | 0.6 | 700 | 0.26 | <20 | 0.3 |
| DTD1-3 | 5.6 | 56 | 25.7 | 110 | 0.2 | 0.84 | 49 | 108 | 151 | 0.44 | 24.5 | 484 | 0.09 | 0.7 | 290 | 0.09 | <20 | 0.1 |
| DTD1-6 | 9.4 | 19 | 11.3 | 64 | 0.1 | 0.37 | 36 | 62.1 | 47 | 0.17 | 29.1 | 261 | 0.04 | <0.5 | 580 | 0.04 | 20 | <0.1 |
| DTD2-1 | 8.8 | 120 | 61.9 | 93 | 0.2 | 0.62 | 51 | 67.6 | 116 | 0.47 | 15.7 | 303 | 0.19 | 0.8 | 150 | 0.22 | <20 | 0.2 |
| DTD2-4 | 8.5 | 57 | 30 | 70 | 0.2 | 1.46 | 55 | 59.1 | 226 | 0.31 | 17.4 | 618 | 0.15 | 0.7 | 460 | 0.21 | <20 | <0.1 |
| DTD2-6 | 9.4 | 41 | 24.4 | 63 | 0.2 | 1.07 | 52 | 73.1 | 129 | 0.26 | 21.3 | 376 | 0.03 | <0.5 | 270 | 0.14 | <20 | <0.1 |
| DTD3-1 | 9.1 | 380 | 18.8 | 130 | 0.2 | 0.45 | 46 | 39.7 | 66 | 0.47 | 28.2 | 257 | 0.21 | 1 | 350 | 0.19 | <20 | 0.4 |
| DTD3-3 | 9.1 | 270 | 17.5 | 150 | 0.2 | 0.41 | 48 | 281 | 64 | 0.9 | 40.6 | 260 | 0.1 | 0.9 | 660 | 0.29 | 50 | 0.7 |
| DTD3-6 | 8.7 | 50 | 5.7 | 21 | 0.1 | 0.23 | 38 | 38.5 | 30 | 0.03 | 17.1 | 136 | 0.08 | <0.5 | 510 | 0.06 | <20 | <0.1 |
| DTD4-1 | 9.1 | 120 | 34.9 | 260 | 0.3 | 0.94 | 72 | 61.4 | 190 | 0.46 | 28.6 | 623 | 0.14 | 0.7 | 250 | 0.74 | <20 | 0.3 |
| DTD4-4 | 8.9 | 79 | 28.4 | 100 | 0.2 | 0.94 | 56 | 178 | 174 | 0.4 | 26.9 | 397 | 0.15 | 0.8 | 660 | 0.22 | <20 | 0.1 |
| DTD4-6 | 9.5 | 35 | 16.2 | 57 | 0.4 | 0.87 | 46 | 176 | 119 | 0.23 | 34.6 | 297 | 0.1 | 0.6 | 720 | 0.29 | <20 | <0.1 |

| Sample ID | Analyte (mg/kg) | | | | | | | | | | | | | | | | | |
|-----------|-----------------|------|------|------|------|------|-----|------|-----|------|------|------|------|------|------|------|-----|-----------------|
| | pH* | As | Pb | Au | Ag | Cd | Cu | Ni | Zn | Be | Co | Mn | Sb | Se | Cr | Hg | B | CN ⁻ |
| EIL | | 20 | 600 | - | - | 3 | 100 | 60 | 200 | - | 50 | 500 | - | - | 400 | 1 | - | 10 |
| DTD5-1 | 9.3 | 640 | 4.5 | 160 | 0.2 | 0.22 | 60 | 23.3 | 40 | 0.28 | 33.8 | 394 | 0.37 | 1.1 | 240 | 0.11 | <20 | 0.6 |
| DTD5-3 | 9.1 | 240 | 22 | 150 | 0.1 | 0.26 | 38 | 146 | 65 | 0.4 | 27.8 | 276 | 0.17 | 0.6 | 330 | 0.11 | 20 | 0.6 |
| DTD5-7 | 9.4 | 120 | 26.8 | 120 | 0.2 | 1.01 | 51 | 164 | 174 | 0.46 | 26.6 | 406 | 0.15 | 0.7 | 520 | 0.2 | >20 | <0.1 |
| DTD6-1 | 9.7 | 570 | 8.9 | 240 | 0.2 | 0.14 | 35 | 21.2 | 28 | 0.2 | 31.7 | 354 | 0.25 | 1.1 | 80 | 0.06 | <20 | <0.1 |
| DTD6-4 | 8.9 | 120 | 57.6 | 330 | 0.4 | 1.55 | 123 | 75.7 | 375 | 0.37 | 21 | 517 | 0.17 | 0.8 | 390 | 1.34 | <20 | 0.3 |
| DTD6-5 | 8.9 | 630 | 10.2 | 160 | 0.2 | 0.21 | 40 | 73.8 | 36 | 0.57 | 37.2 | 251 | 0.23 | 1.1 | 250 | 0.16 | <20 | <0.1 |
| DTD7-1 | 8.7 | 39 | 16.8 | 140 | 0.2 | 0.51 | 51 | 99.9 | 101 | 0.49 | 39.8 | 456 | 0.16 | 0.7 | 680 | 0.35 | 50 | 0.4 |
| DTD7-3 | 8.7 | 140 | 25.4 | 120 | 0.3 | 0.58 | 71 | 136 | 100 | 0.25 | 28.4 | 539 | 0.26 | 0.37 | 490 | 0.21 | <20 | 0.4 |
| DTD7-7 | 10.0 | 56 | 8.9 | 32 | 0.1 | 0.18 | 42 | 74.3 | 27 | 0.1 | 40.3 | 206 | 0.15 | <0.5 | 610 | 0.09 | <20 | 0.2 |
| DTD8-1 | 9.2 | 550 | 10.8 | 190 | 0.2 | 0.2 | 42 | 77.8 | 34 | 0.44 | 31.8 | 251 | 0.24 | 1 | 260 | 0.18 | <20 | 0.3 |
| DTD8-4 | 9.3 | 110 | 27.6 | 140 | 0.2 | 0.37 | 57 | 153 | 95 | 0.28 | 27.6 | 374 | 0.22 | 0.7 | 640 | 0.13 | <20 | 0.3 |
| DTD8-6 | 9.4 | 59 | 23.4 | 230 | 0.4 | 0.25 | 46 | 42.6 | 58 | 0.7 | 47.5 | 770 | 0.1 | 1 | 220 | 0.35 | <20 | 0.5 |
| DTD9-1 | 9.2 | 420 | 14.2 | 120 | 0.3 | 0.25 | 46 | 64.8 | 39 | 0.49 | 33.4 | 252 | 0.32 | 1 | 350 | 0.29 | 30 | <0.1 |
| DTD9-3 | 9.3 | 100 | 319 | 93 | 0.4 | 0.41 | 68 | 469 | 80 | 1.19 | 52.1 | 267 | 0.23 | 1 | 790 | 0.29 | 30 | 1.0 |
| DTD9-6 | 9.5 | 95 | 16.7 | 74 | 0.1 | 0.25 | 37 | 264 | 50 | 0.2 | 53.9 | 155 | 0.22 | 0.8 | 1360 | 0.12 | 40 | <0.1 |
| DTD10 | 9.1 | 810 | 24.2 | 740 | 0.2 | 0.41 | 41 | 45.6 | 52 | 0.41 | 27.1 | 299 | 0.42 | 1.2 | 120 | 0.26 | <20 | 0.3 |
| DTD11 | 9.0 | 110 | 51.3 | 6600 | 0.7 | 0.47 | 46 | 216 | 82 | 0.48 | 29.6 | 273 | 0.24 | 0.7 | 680 | 49.3 | 30 | 0.3 |
| DTD12 | 9.7 | 81 | 27.5 | 340 | 0.4 | 1.12 | 75 | 77.3 | 145 | 0.53 | 41.8 | 831 | 0.31 | 0.7 | 330 | 0.63 | 30 | 0.1 |
| DTD13 | 8.4 | 29 | 34 | 600 | 0.4 | 0.85 | 65 | 51.7 | 135 | 0.86 | 56.8 | 820 | 0.13 | 1 | 460 | 2.53 | 30 | 0.6 |
| DMS1-1 | 8.5 | 79 | 26.2 | 1300 | 0.6 | 0.86 | 56 | 117 | 117 | 0.36 | 32.4 | 386 | 0.6 | 0.6 | 630 | 0.64 | <20 | 1.5 |
| DMS1-3 | 8.3 | 15 | 3.9 | 170 | 0.1 | 0.14 | 27 | 67.7 | 18 | 0.02 | 26.7 | 82.3 | 0.08 | <0.5 | 1030 | 0.31 | 40 | 0.2 |
| DMS2-1 | 9.2 | 29 | 7.9 | 260 | 0.1 | 0.37 | 31 | 35.3 | 40 | 0.21 | 15.6 | 191 | 0.12 | 0.5 | 340 | 0.14 | 40 | <0.1 |
| DMS2-3 | 9.2 | 6 | 0.9 | 21 | <0.1 | 0.08 | 26 | 33.2 | 12 | 0.11 | 24.5 | 251 | 0.1 | <0.5 | 350 | 0.08 | <20 | 0.1 |
| Bayleys | | | | | | | | | | | | | | | | | | |
| B1-1 | - | 2200 | 110 | <5.0 | 0.7 | 1.6 | 280 | 360 | 340 | - | - | - | - | - | 720 | 0.65 | - | 1.4 |
| B1-2 | - | 4200 | 110 | <5.0 | 0.9 | 1.6 | 270 | 360 | 410 | - | - | - | - | - | 710 | 0.95 | - | 0.7 |

| Sample ID | Analyte (mg/kg) | | | | | | | | | | | | | | | | | |
|-----------|-----------------|------|-----|------|------|-------|-----|------|-----|----|----|-----|----|----|------|-------|---|------|
| | pH* | As | Pb | Au | Ag | Cd | Cu | Ni | Zn | Be | Co | Mn | Sb | Se | Cr | Hg | B | CN* |
| EIL | | 20 | 600 | - | - | 3 | 100 | 60 | 200 | - | 50 | 500 | - | - | 400 | 1 | - | 10 |
| B1-3 | - | 290 | 13 | <5.0 | <0.2 | 0.27 | 71 | 760 | 82 | - | - | - | - | - | 2200 | 0.09 | - | <0.5 |
| B2-1 | - | 400 | 7.5 | <5.0 | <0.2 | 0.28 | 56 | 600 | 64 | - | - | - | - | - | 1200 | 0.06 | - | 2.1 |
| B2-2 | - | 23 | 1.8 | <5.0 | <0.2 | 0.12 | 51 | 710 | 53 | - | - | - | - | - | 2200 | 0.03 | - | <0.5 |
| B2-3 | - | 26 | 1.7 | <5.0 | <0.2 | 0.12 | 43 | 880 | 50 | - | - | - | - | - | 2100 | <0.02 | - | <0.5 |
| B3-1 | - | 1300 | 140 | <5.0 | 1.7 | 2.1 | 680 | 360 | 300 | - | - | - | - | - | 780 | 0.78 | - | 2.0 |
| B3-2 | - | 74 | 4.4 | <5.0 | <0.2 | 0.22 | 78 | 780 | 56 | - | - | - | - | - | 1900 | 0.05 | - | <0.5 |
| B3-3 | - | 15 | 2.8 | <5.0 | <0.2 | <0.05 | 64 | 840 | 46 | - | - | - | - | - | 1700 | <0.02 | - | <0.5 |
| B4-1 | - | 12 | 3.8 | <5.0 | <0.2 | 0.09 | 48 | 1700 | 54 | - | - | - | - | - | 2600 | <0.02 | - | <0.5 |
| B5-5 | - | 22 | 5.0 | <5.0 | <0.2 | 0.24 | 130 | 970 | 51 | - | - | - | - | - | 1700 | 0.04 | - | <0.5 |
| B6-1 | - | 310 | 170 | <5.0 | 1.0 | 2.0 | 640 | 650 | 190 | - | - | - | - | - | 1200 | 0.35 | - | 0.6 |
| B6-2 | - | 17 | 6.9 | <5.0 | <0.2 | 0.08 | 53 | 1100 | 57 | - | - | - | - | - | 1700 | <0.02 | - | <0.5 |
| B6-3 | - | 11 | 3.5 | <5.0 | <0.2 | 0.06 | 36 | 1400 | 54 | - | - | - | - | - | 1900 | <0.02 | - | <0.5 |
| B7-1 | - | 820 | 26 | <5.0 | <0.2 | 0.35 | 72 | 670 | 140 | - | - | - | - | - | 1300 | 0.21 | - | <0.5 |
| B7-2 | - | 44 | 5.3 | <5.0 | <0.2 | 0.06 | 39 | 770 | 55 | - | - | - | - | - | 1500 | 0.03 | - | <0.5 |
| B7-3 | - | 15 | 2.2 | <5.0 | <0.2 | <0.05 | 15 | 1200 | 59 | - | - | - | - | - | 2100 | <0.02 | - | <0.5 |
| B8-1 | - | 1000 | 150 | <5.0 | 1.2 | 2.1 | 650 | 490 | 190 | - | - | - | - | - | 1100 | 0.55 | - | 2.0 |
| B8-2 | - | 40 | 7.3 | <5.0 | <0.2 | 0.06 | 49 | 740 | 55 | - | - | - | - | - | 1400 | 0.05 | - | <0.5 |
| B9 | - | 1100 | 110 | <5.0 | 0.6 | 0.78 | 260 | 450 | 180 | - | - | - | - | - | 930 | 0.49 | - | 1.0 |
| B10-1 | - | 3400 | 120 | <5.0 | 0.2 | 0.67 | 130 | 300 | 580 | - | - | - | - | - | 530 | 4.7 | - | <0.5 |
| B10-2 | - | 70 | 3.7 | <5.0 | <0.2 | <0.05 | 49 | 1200 | 74 | - | - | - | - | - | 2000 | 0.10 | - | <0.5 |
| B10-3 | - | 52 | 2.6 | <5.0 | <0.2 | <0.05 | 52 | 1200 | 55 | - | - | - | - | - | 2100 | 0.06 | - | <0.5 |
| B11-1 | - | 970 | 55 | <5.0 | 0.5 | 0.63 | 220 | 530 | 130 | - | - | - | - | - | 1000 | 0.16 | - | <0.5 |
| B11-2 | - | 52 | 5.5 | <5.0 | <0.2 | <0.05 | 50 | 840 | 56 | - | - | - | - | - | 1500 | 0.03 | - | <0.5 |
| P1 | - | 930 | 160 | <5.0 | 2.0 | 2.6 | 900 | 400 | 230 | - | - | - | - | - | 910 | 0.94 | - | 2.7 |

| Sample ID | Analyte (mg/kg) | | | | | | | | | | | | | | | | | |
|------------|-----------------|------|------|-----|------|------|-----|------|-----|------|------|------|------|------|------|------|-----|------|
| | pH* | As | Pb | Au | Ag | Cd | Cu | Ni | Zn | Be | Co | Mn | Sb | Se | Cr | Hg | B | CN* |
| EIL | | 20 | 600 | - | - | 3 | 100 | 60 | 200 | - | 50 | 500 | - | - | 400 | 1 | - | 10 |
| Redemption | | | | | | | | | | | | | | | | | | |
| RTD1-1 | 8.1 | 2660 | 218 | 324 | 0.58 | 1.63 | 148 | 51.8 | 301 | 0.07 | 14.7 | 308 | 0.66 | 1.1 | 153 | 4.5 | <20 | 0.3 |
| RTD1-2 | 7.8 | 2290 | 161 | 337 | 0.34 | 2.38 | 155 | 153 | 562 | 0.11 | 46.8 | 554 | 1.69 | 2.2 | 2810 | 3.7 | 20 | 0.6 |
| RTD1-3 | 8.3 | 2870 | 190 | 438 | 0.45 | 1.74 | 122 | 116 | 520 | 0.11 | 22.5 | 394 | 1.42 | 1.3 | 800 | 5.7 | 30 | 0.5 |
| RTD2-1 | 7.9 | 4890 | 193 | <1 | 0.99 | 2.06 | 167 | 83.1 | 578 | 0.08 | 18.8 | 475 | 1.00 | 1.4 | 249 | 9.3 | <20 | 0.3 |
| RTD2-2 | 6.3 | 6290 | 223 | <1 | 0.80 | 1.60 | 151 | 86.4 | 354 | 0.06 | 13.6 | 351 | 1.21 | 1.4 | 425 | 11.6 | <20 | 0.8 |
| RTD2-3 | 8.4 | 2570 | 111 | 442 | 0.54 | 0.93 | 113 | 467 | 272 | 0.05 | 40.0 | 385 | 0.65 | 0.8 | 1580 | 5.2 | 20 | 0.4 |
| RTD3-1 | 8.2 | 3790 | 187 | 285 | 0.64 | 1.32 | 139 | 114 | 300 | 0.07 | 17.8 | 510 | 2.05 | 1.4 | 744 | 5.6 | <20 | 1.1 |
| RTD3-2 | 8.3 | 550 | 27.8 | <1 | 1.12 | 0.25 | 12 | 14.3 | 33 | 0.04 | 3.1 | 64.4 | 0.53 | 282 | 296 | 5.3 | <20 | 0.8 |
| RTD3-3 | 7.6 | 417 | 26.2 | 90 | 0.21 | 0.21 | 35 | 795 | 82 | 0.06 | 63.5 | 597 | 0.40 | <0.5 | 1750 | 1.2 | 30 | 0.1 |
| RTD4-1 | 7.1 | 6540 | 224 | 430 | 0.44 | 1.66 | 134 | 91.4 | 346 | 0.05 | 17.5 | 331 | 1.41 | 1.7 | 247 | 3.9 | <20 | <0.1 |
| RTD4-2 | 7.1 | 5010 | 233 | 352 | 0.36 | 1.23 | 144 | 77.9 | 327 | 0.06 | 15.0 | 405 | 0.99 | 1.3 | 261 | 4.4 | <20 | 0.5 |
| RTD4-3 | 7.4 | 4030 | 179 | 197 | 0.36 | 1.09 | 132 | 126 | 323 | 0.11 | 18.9 | 349 | 1.45 | 1.2 | 1010 | 4.6 | <20 | 0.5 |
| RTD5-1 | 7.5 | 7710 | 180 | <1 | 0.66 | 1.64 | 146 | 66.9 | 337 | 0.04 | 19.3 | 349 | 1.34 | 1.5 | 173 | 7.3 | <20 | 0.3 |
| RTD5-2 | 7.5 | 5400 | 224 | 447 | 0.62 | 1.89 | 137 | 66.8 | 497 | 0.05 | 14.6 | 341 | 1.12 | 1.3 | 223 | 7.8 | <20 | 0.6 |
| RTD5-4 | 7.7 | 1650 | 96.7 | 392 | 0.49 | 0.85 | 105 | 367 | 256 | 0.08 | 35.1 | 379 | 0.89 | 0.8 | 1330 | 3.9 | 20 | 0.9 |
| RTD6-1 | 8.0 | 1130 | 126 | <1 | 0.49 | 1.03 | 170 | 91.5 | 379 | 0.08 | 17.6 | 450 | 0.70 | 0.7 | 307 | 4.5 | <20 | 0.6 |
| RTD6-2 | 7.9 | 1720 | 154 | 288 | 0.31 | 1.13 | 115 | 87.9 | 339 | 0.06 | 13.1 | 381 | 0.82 | 0.9 | 349 | 4.8 | <20 | 0.6 |
| RTD6-4 | 7.8 | 1270 | 90.2 | 132 | 0.26 | 0.84 | 112 | 174 | 268 | 0.14 | 24.4 | 553 | 1.08 | 1.8 | 1730 | 2.8 | 60 | 0.7 |
| RTD7-1 | 7.9 | 5890 | 298 | 217 | 1.05 | 2.47 | 183 | 107 | 607 | 0.09 | 22.9 | 416 | 2.03 | 1.6 | 390 | 8 | <20 | 0.5 |
| RTD7-2 | 8.0 | 3900 | 263 | <1 | 0.71 | 1.99 | 157 | 77.2 | 528 | 0.07 | 19.3 | 433 | 1.06 | 1.4 | 320 | 8 | <20 | 0.4 |
| RTD7-3 | 8.0 | 1770 | 133 | 473 | 0.50 | 1.17 | 115 | 298 | 320 | 0.15 | 35.8 | 565 | 1.42 | 1.1 | 1620 | 4 | 30 | 0.4 |
| RTD8-1 | 8.0 | 6380 | 401 | 284 | 0.67 | 2.39 | 187 | 88.7 | 596 | 0.06 | 19.5 | 346 | 1.49 | 1.8 | 286 | 4.9 | <20 | 0.3 |
| RTD8-2 | 8.7 | 6660 | 362 | 229 | 0.60 | 2.30 | 163 | 78.5 | 532 | 0.06 | 15.6 | 350 | 1.33 | 1.7 | 231 | 6.5 | <20 | 0.3 |
| RTD8-3 | 8.8 | 981 | 66.4 | 117 | 0.16 | 0.47 | 85 | 691 | 158 | 0.05 | 52.8 | 368 | 0.75 | <0.5 | 1990 | 1.2 | 30 | 0.3 |
| RTD9-1 | 8.8 | 1530 | 120 | 252 | 0.28 | 0.68 | 122 | 82.5 | 216 | 0.09 | 18.9 | 461 | 0.85 | 0.9 | 246 | 1.7 | <20 | 0.2 |

| Sample ID | Analyte (mg/kg) | | | | | | | | | | | | | | | | | |
|------------|-----------------|-----------|------------|-----|------|----------|------------|-----------|------------|------|-----------|------------|------|------|------------|----------|-----|-----------------|
| | pH* | As | Pb | Au | Ag | Cd | Cu | Ni | Zn | Be | Co | Mn | Sb | Se | Cr | Hg | B | CN ⁻ |
| EIL | | 20 | 600 | - | - | 3 | 100 | 60 | 200 | - | 50 | 500 | - | - | 400 | 1 | - | 10 |
| RTD9-2 | 9.0 | 1560 | 132 | 277 | 0.39 | 0.62 | 130 | 79.0 | 205 | 0.10 | 18.6 | 499 | 0.92 | 1.0 | 251 | 3.1 | <20 | 0.3 |
| RTD9-3 | 9.2 | 568 | 37.2 | 78 | 0.15 | 0.21 | 61 | 442 | 96 | 0.07 | 36.8 | 361 | 0.69 | <0.5 | 1600 | 1 | 40 | 0.1 |

*Unit of measurement pH units.

EIL exceedance

9. Discussion

Elevated concentrations of arsenic and mercury were observed at all sites and are most likely due to historical mining activities. Elevated concentrations of copper, nickel, zinc, manganese and chromium were also present. The following sections provide a detailed discussion of results for each area.

9.1. Perseverance

Arsenic (up to 403 mg/kg) and mercury (up to 27.8 mg/kg) concentrations at the Perseverance TSF and mill site consistently exceeded EILs, confirming that this site is to be considered contaminated. Elevated concentrations of copper (up to 531 mg/kg), nickel (up to 103 mg/kg), zinc (up to 3550 mg/kg) and manganese (up to 1930 mg/kg) were also present. In addition, results in Table 15 indicated the following:

- Samples collected outside and to the west of the TSF footprint (PRT-19 and PRT-20) did not contain elevated concentrations of mercury or arsenic. The only elements to exceed EIL's in this area were nickel and manganese (60.2 to 79.3 and 534 to 1080 mg/kg respectively). It is possible that these concentrations are a reflection of natural background concentrations, rather than the result of past mining activities and that the lateral extent of contamination remains within the boundary presented in Figure 2. Additional (background) sampling in this area would be required to confirm this assessment.
- With the exception of PRT25, located along the eastern edge of the plant and mill site, all samples near the outer extremities of the mill footprint contained concentrations of mercury well above the 1 mg/kg EIL. This suggests contamination may extend beyond the plant footprint.
- Arsenic concentration decreased with depth. Despite this observation, arsenic concentrations at two of the deeper sampling locations in the TSF footprint (PRT1 and PRT2 at 2 – 3 metres BGL) still exceeded the EIL.
- No relationship between mercury concentration and depth was evident with values up to 3.9 mg/kg measured at a depth of three metres.
- Sample PRT-5, located in the southern portion of the mill area, had an unusually high concentration of lead (3790 mg/kg). No other exceedances of the 600 mg/kg EIL for this analyte were observed at Perseverance.
- One sample (PRT9) located in the central section of the mill site had a slightly elevated concentration of chromium (511 mg/kg). No other exceedances of the 400 mg/kg EIL for this analyte were observed at Perseverance.
- One sample (PRT11) located towards the southern end of the mill site contained an elevated cadmium concentration (3.79 mg/kg). No other exceedances of the 3 mg/kg EIL for this analyte were observed at Perseverance.

Overall, elevated concentrations of arsenic and mercury at the Perseverance TSF and mill site indicate that these areas are contaminated from historical mining activities. The lateral extent of contamination associated with the TSF appears to be limited to within the area highlighted in Figure 2. However, the lateral extent of contamination associated with the mill could not be defined in this study. Contamination was present at both sites to a depth of 3 metres. Assessment of the presence and extent of contamination beyond this depth was beyond the scope of this report.

9.2. Lady Loch

Arsenic and mercury concentrations (up to 154 and 15.7 mg/kg respectively) were variable across the TSF, but generally elevated above EILs. Contamination was evident along the southern and eastern borders of the investigation area and in sample LLT17 (15.7 mg/kg mercury), located outside and to the south of the TSF footprint. LLT17 also contained cadmium and arsenic concentrations exceeding the EIL (3.0 and 31.7 mg/kg respectively). Concentrations of copper, nickel, manganese and to a lesser extent chromium, were also elevated above EILs at a number of locations across the TSF. This data confirms the presence of contamination within the Lady Loch TSF and indicates the lateral extent of this contamination is likely to go beyond the investigation area highlighted in Figure 3.

Arsenic concentrations in the TSF decreased with depth but remained above EILs up to four metres below ground level at a number of locations across the TSF. No relationship between mercury concentration and depth was evident with values up to 2.7 mg/kg measured four metres below ground level. This data confirms the presence of contamination at the Lady Loch TSF to a depth of four metres. Assessment of the vertical extent of contamination below this depth is beyond the scope of this report.

The one sample collected from the Lady Loch stamp battery (LLM-2) contained an elevated arsenic concentration (22.9 mg/kg), confirming that this area is also to be considered as contaminated by historical mining activities. All other elements were below EILs.

9.3. Dreadnought

9.3.1. Historical Tailings Area

Assessment of analytical data for this site indicated the following:

- Arsenic concentrations were at or above EILs across the TSF footprint (up to 810 mg/kg).
- Arsenic concentrations in the TSF decreased with depth but remained above EILs to a depth of seven metres BGL.
- In contrast to Perseverance and Lady Loch sites, the Dreadnought TSF area contained low concentrations of mercury. The EIL for this element was only exceeded at three locations (range of 1.34 – 49.3 mg/kg).
- Chromium concentrations were above EILs for 18 of the 27 samples collected across this site. The concentration tended to increase with depth with the highest value of 1360 mg/kg observed at a depth of six metres at the south eastern section of the TSF.
- Elevated concentrations of nickel (up to 469 mg/kg) were observed across the TSF site. There was no clear relationship between this analyte and sample depth.
- Elevated concentrations of copper (up to 123 mg/kg), zinc (up to 375 mg/kg), manganese (up to 770 mg/kg) and cobalt (up to 56.8 mg/kg) were also observed at locations across the TSF.
- The pH for most samples was highly alkaline, in the range 8.5 to 10.0. However, one sample (DTD1-3) recorded a pH of 5.6. The validity of this laboratory result is questionable, given that pH values above, below and around this location were consistently above 8.5.

There is no background data available for soils in the Dreadnought area to allow comparison between these test results and background concentrations of arsenic, chromium, nickel, copper, zinc and manganese. However, given the high concentrations of arsenic observed, the presence of this

contaminant is most likely attributed to mining activities and the site should be considered as contaminated.

9.3.2. Mill Site

Four samples collected from two sample locations (at 0 – 1 metre and 2 – 3 metres) around the mill site indicated the following:

- Arsenic concentrations in the shallower samples exceeded the EIL at both locations (79 and 29 mg/kg at DMS1 and DMS2 respectively). However, the deeper samples were below EIL.
- Nickel and chromium concentrations in the DMS1 samples both exceeded EILs (up to 67.7 and 1030 mg/kg respectively).

Again, in the absence of background data for soils in the Dreadnought area, elevated concentrations of arsenic in the mill area indicate that the first metre of material in this location could be considered contaminated.

Nickel and chromium concentrations at DMS01 were above EIL at a depth of 2 – 3 metres. While these concentrations are likely due to natural background concentrations, collection and analysis of background samples is required to confirm this assessment.

9.3.3. Historical Sumps

Results of analysis of four samples collected from four locations around the historical sump area indicated the following:

- Concentrations of mercury at sample locations inside the defined sump area (DTD10 and DTD12) were below EILs. However, concentrations in samples located outside and to the north of the footprint were well above the EIL (49.3 mg/kg and 2.53 mg/kg for DTD11 and DTD13 respectively).
- All samples exceeded EIL concentrations for arsenic (in the range 81 to 810 mg/kg).
- With the exception of the southern-most sample in this area (DTD10), a combination of exceedances for nickel, cobalt and manganese were noted at all sample locations.

This data indicates that on the basis of arsenic assays, the historical sump area is considered to be contaminated. Elevated arsenic and mercury concentrations observed in the samples to the north of the defined sump area demonstrate this contamination extends beyond the footprint of the sumps.

9.4. Bayleys

9.4.1. Bayleys Tailings

Twenty six samples collected from 12 sample locations (at 0 – 5 metres) around the tails area indicated the following:

- Arsenic concentrations within the TSF footprint at the surface (0 – 1 metre) were consistently above the EIL of 20 mg/kg (in the range 22 to 3400 mg/kg). Elevated concentrations (up to 970 mg/kg) of this contaminant also extended to the southern and eastern areas adjacent to the facility. However, the concentration at B4 (to the north of the facility and outside the footprint) was below the EIL at 12 mg/kg.
- Arsenic concentrations in the tails area decreased with depth but remained above the EIL to a depth of five metres BGL.

- All samples had elevated concentrations of chromium and nickel (up to 2600 and 1700 mg/kg respectively). It is not clear whether these concentrations are indicative of natural background levels.
- Some enrichment in copper and zinc was observed at sites across the TSF footprint. Generally these concentrations decreased with depth, indicating limited mobility of such metals.
- One sample (B10-1) displayed a mercury concentration of 4.7 mg/kg which is well above the EIL of one mg/kg. Slightly elevated concentrations of mercury were observed at five other sample locations across the TSF (including B1, B3, B8, B9 and P1). Mercury concentrations at these sites were below the EIL, but elevated, in the range 0.49 to 0.95 mg/kg.

This data indicates that on the basis of arsenic assays, the tails area is contaminated to a depth of at least five metres. Very high concentrations of arsenic along the perimeter of the TSF also suggest this contamination may extend beyond this structure, particularly to the south and east.

9.4.2. Redemption Historical Tailings

Twenty seven samples collected from nine sites indicated the following:

- Arsenic and mercury concentrations were consistently above the EILs of 20 and one mg/kg respectively. Concentrations ranged from 417 – 7710 mg/kg for arsenic and 1 – 11.6 mg/kg for mercury.
- Concentrations of copper, nickel and zinc exceeded their respective EILs at the majority of sites with maximum concentrations reaching 187, 691 and 607 mg/kg respectively.
- Exceedences of chromium at every sampling site with exceedences within the range of 42 – 2810 mg/kg.
- There were some exceedences of the cobalt and manganese EILs.

The very high concentrations of arsenic and mercury across the TSF suggest that contamination may extend beyond this structure.

10. Conclusions and Recommendations

Summary of Contamination Status

As summarised in Table 16, all sites assessed in this investigation can be considered to be contaminated, primarily by arsenic and mercury. At a number of sites this contamination is likely to extend both laterally and vertically beyond the footprint of the historic facility. Elevated concentrations of several other elements, including copper, nickel, zinc, manganese, cobalt and chromium were also present. It is beyond the scope of this assessment to determine whether these concentrations can be attributed to natural background concentrations or mining activities.

Table 16: Summary of Contamination Status

| Site | Contamination Status | Primary Contaminants | Vertical extent | Surrounding Areas |
|---|----------------------|----------------------|-----------------|-------------------|
| Perseverance historical tails surrounding area | contaminated | arsenic, mercury | ≥3 metres | unlikely |
| Perseverance historical plant | contaminated | arsenic, mercury | ≥3 metres | likely |
| Lady Loch historical tails | contaminated | arsenic, mercury | ≥4 metres | likely |
| Lady Loch surrounding area | contaminated | arsenic | Unknown | Unknown |
| Dreadnought historical TSF and surrounding area | contaminated | arsenic | ≥7 metres | likely |
| Dreadnought mill site | contaminated | arsenic | <1 metre | unlikely |
| Dreadnought sumps | contaminated | arsenic, mercury | Unknown | likely |
| Bayleys and Redemption historical site and surrounding area | contaminated | arsenic, mercury | ≥5 metres | likely |

Recommendations

Based on the findings of this preliminary site investigation, the following recommendations have been made:

- Given that there are no immediate sensitive receptors to any of the sites, it is unlikely that the contamination poses any significant risk to the environment or to human health based on the current land use. Further investigations are recommended in order to fully delineate the vertical and lateral extent of contamination for each site.
- Further investigations should include proposed management strategies for each site. Management strategies are likely to comprise a combination of encapsulation and/or removal of materials to an appropriate location (there may be some opportunity to process the historic tails through the Three Mile Hill processing plant).
- Collection and analysis of a set of background samples for each site. The footprint of each facility under investigation has been clearly defined as contaminated, based on arsenic and mercury concentrations. However, in the surrounding area for most facilities, EILs were only exceeded for elements such as copper, nickel, cobalt, manganese, zinc and chromium. With the exception of zinc, most of these elements are often naturally elevated in ultramafic sequences such as those present at Coolgardie. Therefore, if further assessment of the lateral extent of contamination is required, collection of background samples will be necessary.

References

Contaminated Sites Management Series Assessment Levels for soil, sediment and water version 3, (2003)
- Department of Environment and Conservation, Western Australia

Contaminated Sites Management Series Development of Sampling and Analysis Programs, (2001)-
Department of Environmental Protection, Western Australia

Contaminated Sites Management Series Report of Known or Suspected Contaminated Sites, (2006) -
Department of Environment and Conservation, Western Australia

Landfill waste classification and waste definitions. (2005) - Department of Environment and
Conservation, Western Australia

Development of Sampling and analysis programs, December 2001 - Department of Environment and
Conservation, Western Australia

Mine Closure Plan Perseverance Lode Tindals Operation, Three Mile Hill, (2007). Coffey Natural Systems
Pty Ltd, Western Australia

Assessment Levels for Soil, Sediment and Water. (2010) - Department of Environment and Conservation,
Western Australia.

APPENDIX 1: Site Summary Forms



Site Summary Form – Contaminated Site Assessment

For completion by the person(s) submitting a report(s) to be assessed by the Department of Environment and Conservation (DEC) as per the information requirements of the DEC *Reporting on Site Assessments (2001)* guideline. Completing this form enables DEC to maintain accurate records for the site.

Please note: A completed site summary form must accompany each report submitted to DEC for assessment. Each box must be filled out appropriately. Please do not write “refer to report” in any section. Copies of all relevant/current Certificates of Title must accompany this form.

Site location details:

Site name (e.g. where site may be known by a common/ business name)

Lot no. **House no.** **Street**

Suburb **State** **Postcode**

Crown Reserve (if applicable)

Certificate(s) of Title (or equivalent)

Where the subject site comprises of multiple certificates of title, please list all certificates:.....

Where substances have migrated beyond the cadastral boundaries of the subject site, please provide the addresses, relevant Certificates of Title documentation and owners details for all offsite properties impacted (includes soil and/or groundwater), as an attachment to this form.

Is a hard copy of Certificate of Title and associated sketch for all listed sites attached? (Y/N)

WAPC reference no. (where applicable)

Current Owner/Occupier details:

Site owner (Name and address)

Site owner company ACN/ABN

Site occupier (name and address)

Site occupier company ACN/ABN

Site status (at time of reporting):

Proposed land use (e.g. high density residential/child care facility)

Identified substances and relevant media (e.g. benzene in soil and groundwater, xylene in soil only)

| | | | | | | | |
|---------------------------------|--------------------------------|-------------------------------------|--------------------------------|---|--------------------------------|--|--------------------------------|
| Asbestos (Y/N) | <input type="text" value="N"/> | Health Risk Assessment (Y/N) | <input type="text" value="N"/> | Community health concerns identified (Y/N) | <input type="text" value="N"/> | Radiological issues (Y/N) | <input type="text" value="N"/> |
| Air quality issues (Y/N) | <input type="text" value="N"/> | Past/present landfill (Y/N) | <input type="text" value="N"/> | Potential human exposure to identified substances > DEC’s Health Investigation Levels or equivalent (Y/N) | <input type="text" value="N"/> | Other human health issues (Y/N) | <input type="text" value="N"/> |

Specify other health issues.....

Where 'yes' is recorded for at least one of the above categories, please submit two copies of the report(s) (relevant documentation) to DEC for referral to the Department of Health (or Radiological Council, in the case of radiological issues)

Are site activities licensed under the *Environmental Protection Act 1986*? (Y/N)

Where laboratory analysis has been undertaken, is the laboratory NATA accredited for all analytes and analytical methodologies used? (Y/N) (If not, why not?)

Community Consultation: (as per the DEC's *Community Consultation (December 2006)* guideline)

Community consultation program commenced/proposed (Y/N)

Are consultation program details (e.g. community consultation plan) provided in attached report (Y/N)

History of Investigation:

Have previous site investigations been undertaken? (Y/N - if yes, please provide details below)

Report title, date and author:

Declaration:

The information contained in this site summary form is a true representation of the information contained in the attached report(s)/document(s).

Full name (print)

Position held

Signature Date

Please ensure that a hardcopy of the current Certificate(s) of Title and associated sketch accompanies the site summary form. DEC cannot proceed with the assessment of the report if this information is not provided.

DEC Registrar Only

Registrar name: Signature:

CoT verified (Y/N) Owner details verified (Y/N) Complete form (Y/N)

Awaiting Classification (Y/N)

Awaiting Re-Classification (Y/N)

Incomplete Form (Y/N)

LWQB Assessment Officer:

Comments/Actions:

Date of data entry:



Site Summary Form – Contaminated Site Assessment

For completion by the person(s) submitting a report(s) to be assessed by the Department of Environment and Conservation (DEC) as per the information requirements of the DEC *Reporting on Site Assessments (2001)* guideline. Completing this form enables DEC to maintain accurate records for the site.

Please note: A completed site summary form must accompany each report submitted to DEC for assessment. Each box must be filled out appropriately. Please do not write “refer to report” in any section. Copies of all relevant/current Certificates of Title must accompany this form.

Site location details:

Site name (e.g. where site may be known by a common/ business name)

Lot no. **House no.** **Street**

Suburb **State** **Postcode**

Crown Reserve (if applicable)

Certificate(s) of Title (or equivalent)

Where the subject site comprises of multiple certificates of title, please list all certificates:.....

Where substances have migrated beyond the cadastral boundaries of the subject site, please provide the addresses, relevant Certificates of Title documentation and owners details for all offsite properties impacted (includes soil and/or groundwater), as an attachment to this form.

Is a hard copy of Certificate of Title and associated sketch for all listed sites attached? (Y/N)

WAPC reference no. (where applicable)

Current Owner/Occupier details:

Site owner (Name and address)

Site owner company ACN/ABN

Site occupier (name and address)

Site occupier company ACN/ABN

Site status (at time of reporting):

Proposed land use (e.g. high density residential/child care facility)

Identified substances and relevant media (e.g. benzene in soil and groundwater, xylene in soil only)

| | | | | | | | |
|---------------------------------|--------------------------------|-------------------------------------|--------------------------------|---|--------------------------------|--|--------------------------------|
| Asbestos (Y/N) | <input type="text" value="N"/> | Health Risk Assessment (Y/N) | <input type="text" value="N"/> | Community health concerns identified (Y/N) | <input type="text" value="N"/> | Radiological issues (Y/N) | <input type="text" value="N"/> |
| Air quality issues (Y/N) | <input type="text" value="N"/> | Past/present landfill (Y/N) | <input type="text" value="N"/> | Potential human exposure to identified substances > DEC’s Health Investigation Levels or equivalent (Y/N) | <input type="text" value="N"/> | Other human health issues (Y/N) | <input type="text" value="N"/> |

Specify other health issues.....

Where 'yes' is recorded for at least one of the above categories, please submit two copies of the report(s) (relevant documentation) to DEC for referral to the Department of Health (or Radiological Council, in the case of radiological issues)

Are site activities licensed under the *Environmental Protection Act 1986*? (Y/N)

Where laboratory analysis has been undertaken, is the laboratory NATA accredited for all analytes and analytical methodologies used? (Y/N) (If not, why not?)

Community Consultation: (as per the DEC's *Community Consultation (December 2006)* guideline)

Community consultation program commenced/proposed (Y/N)

Are consultation program details (e.g. community consultation plan) provided in attached report (Y/N)

History of Investigation:

Have previous site investigations been undertaken? (Y/N - if yes, please provide details below)

Report title, date and author:

Declaration:

The information contained in this site summary form is a true representation of the information contained in the attached report(s)/document(s).

Full name (print)

Position held

Signature Date

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DEC Registrar Only

Registrar name: Signature:

CoT verified (Y/N) Owner details verified (Y/N) Complete form (Y/N)

Awaiting Classification (Y/N)

Awaiting Re-Classification (Y/N)

Incomplete Form (Y/N)

LWQB Assessment Officer:

Comments/Actions:

Date of data entry:



Site Summary Form – Contaminated Site Assessment

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Site location details:

Site name (e.g. where site may be known by a common/ business name)

Lot no. **House no.** **Street**

Suburb **State** **Postcode**

Crown Reserve (if applicable)

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Proposed land use (e.g. high density residential/child care facility)

Identified substances and relevant media (e.g. benzene in soil and groundwater, xylene in soil only)

| | | | | | | | |
|---------------------------------|--------------------------------|-------------------------------------|--------------------------------|---|--------------------------------|--|--------------------------------|
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Awaiting Classification (Y/N)

Awaiting Re-Classification (Y/N)

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Position held

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DEC Registrar Only

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Awaiting Classification (Y/N)

Awaiting Re-Classification (Y/N)

Incomplete Form (Y/N)

LWQB Assessment Officer:

Comments/Actions:

Date of data entry:

APPENDIX 2: Analytical Reports



ChemCentre
Land Resources
Amended Report



Accreditation No. 8

Purchase Order: 8701

ChemCentre Reference: 10A0526

Focus Operations Pty Ltd
PMB 3
COOLGARDIE WA 6429

Attention: Liana Dunstone

Report on: 26 samples received on 08/06/2011

| <u>LAB ID</u> | <u>Material</u> | <u>Client ID and Description</u> |
|---------------|-----------------|----------------------------------|
| 10A0526 / 001 | soil | B1 01 |
| 10A0526 / 002 | soil | B1 02 |
| 10A0526 / 003 | soil | B1 03 |
| 10A0526 / 004 | soil | B2 01 |
| 10A0526 / 005 | soil | B2 02 |
| 10A0526 / 006 | soil | B2 03 |
| 10A0526 / 007 | soil | B3 01 |
| 10A0526 / 008 | soil | B3 02 |
| 10A0526 / 009 | soil | B3 03 |
| 10A0526 / 010 | soil | B4 01 |
| 10A0526 / 011 | soil | B5 05 |
| 10A0526 / 012 | soil | B6 01 |
| 10A0526 / 013 | soil | B6 02 |
| 10A0526 / 014 | soil | B6 03 |
| 10A0526 / 015 | soil | B7 01 |
| 10A0526 / 016 | soil | B7 02 |
| 10A0526 / 017 | soil | B7 03 |
| 10A0526 / 018 | soil | B8 01 |
| 10A0526 / 019 | soil | B8 02 |
| 10A0526 / 020 | soil | B9 |
| 10A0526 / 021 | soil | B10 01 |
| 10A0526 / 022 | soil | B10 02 |
| 10A0526 / 023 | soil | B10 03 |
| 10A0526 / 024 | soil | B11 01 |
| 10A0526 / 025 | soil | B11 02 |
| 10A0526 / 026 | soil | P 1 |

| LAB ID | 001 | 002 | 003 | 004 |
|-----------|-------|-------|-------|-------|
| Client ID | B1 01 | B1 02 | B1 03 | B2 01 |

| Sampled Analyte | Method | Unit | 001 | 002 | 003 | 004 |
|-----------------|------------|-------|------|------|------|------|
| Arsenic | iMET1SAICP | mg/kg | 2200 | 4200 | 290 | 400 |
| Cadmium | iMET1SAICP | mg/kg | 1.6 | 1.6 | 0.27 | 0.28 |
| Chromium | iMET1SAICP | mg/kg | 720 | 710 | 2200 | 1200 |
| Copper | iMET1SAICP | mg/kg | 280 | 270 | 71 | 56 |
| Cyanide, WAD | iCNW1SSAA | mg/kg | 1.4 | 0.7 | <0.5 | 2.1 |
| Gold | iMET1SAICP | mg/kg | <5.0 | <5.0 | <5.0 | <5.0 |
| Lead | iMET1SAICP | mg/kg | 110 | 110 | 13 | 7.5 |
| Mercury, total | iHG1STVGA | mg/kg | 0.65 | 0.95 | 0.09 | 0.06 |
| Moisture | (40C) | %ar | 1.9 | 1.2 | 1.4 | 2.6 |
| Nickel | iMET1SAICP | mg/kg | 360 | 360 | 760 | 600 |

| | | | | |
|------------------|-------|-------|-------|-------|
| LAB ID | 001 | 002 | 003 | 004 |
| Client ID | B1 01 | B1 02 | B1 03 | B2 01 |

Sampled

| Analyte | Method | Unit | | | | |
|---------|------------|-------|-----|-----|------|------|
| Silver | iMET1SAICP | mg/kg | 0.7 | 0.9 | <0.2 | <0.2 |
| Zinc | iMET1SAICP | mg/kg | 340 | 410 | 82 | 64 |

| | | | | |
|------------------|-------|-------|-------|-------|
| LAB ID | 005 | 006 | 007 | 008 |
| Client ID | B2 02 | B2 03 | B3 01 | B3 02 |

Sampled

| Analyte | Method | Unit | | | | |
|----------------|------------|-------|------|-------|------|------|
| Arsenic | iMET1SAICP | mg/kg | 23 | 26 | 1300 | 74 |
| Cadmium | iMET1SAICP | mg/kg | 0.12 | 0.12 | 2.1 | 0.22 |
| Chromium | iMET1SAICP | mg/kg | 2200 | 2100 | 780 | 1900 |
| Copper | iMET1SAICP | mg/kg | 51 | 43 | 680 | 78 |
| Cyanide, WAD | iCNW1SSAA | mg/kg | <0.5 | <0.5 | 2.0 | <0.5 |
| Gold | iMET1SAICP | mg/kg | <5.0 | <5.0 | <5.0 | <5.0 |
| Lead | iMET1SAICP | mg/kg | 1.8 | 1.7 | 140 | 4.4 |
| Mercury, total | iHG1STVGA | mg/kg | 0.03 | <0.02 | 0.78 | 0.05 |
| Moisture | (40C) | %ar | 1.9 | 2.4 | 1.1 | 3.7 |
| Nickel | iMET1SAICP | mg/kg | 710 | 880 | 360 | 780 |
| Silver | iMET1SAICP | mg/kg | <0.2 | <0.2 | 1.7 | <0.2 |
| Zinc | iMET1SAICP | mg/kg | 53 | 50 | 300 | 56 |

| | | | | |
|------------------|-------|-------|-------|-------|
| LAB ID | 009 | 010 | 011 | 012 |
| Client ID | B3 03 | B4 01 | B5 05 | B6 01 |

Sampled

| Analyte | Method | Unit | | | | |
|----------------|------------|-------|-------|-------|------|------|
| Arsenic | iMET1SAICP | mg/kg | 15 | 12 | 22 | 310 |
| Cadmium | iMET1SAICP | mg/kg | <0.05 | 0.09 | 0.24 | 2.0 |
| Chromium | iMET1SAICP | mg/kg | 1700 | 2600 | 1700 | 1200 |
| Copper | iMET1SAICP | mg/kg | 64 | 48 | 130 | 640 |
| Cyanide, WAD | iCNW1SSAA | mg/kg | <0.5 | <0.5 | <0.5 | 0.6 |
| Gold | iMET1SAICP | mg/kg | <5.0 | <5.0 | <5.0 | <5.0 |
| Lead | iMET1SAICP | mg/kg | 2.8 | 3.8 | 5.0 | 170 |
| Mercury, total | iHG1STVGA | mg/kg | <0.02 | <0.02 | 0.04 | 0.35 |
| Moisture | (40C) | %ar | 2.1 | 4.0 | 3.3 | 1.4 |
| Nickel | iMET1SAICP | mg/kg | 840 | 1700 | 970 | 650 |
| Silver | iMET1SAICP | mg/kg | <0.2 | <0.2 | <0.2 | 1.0 |
| Zinc | iMET1SAICP | mg/kg | 46 | 54 | 51 | 190 |

| | | | | |
|------------------|-------|-------|-------|-------|
| LAB ID | 013 | 014 | 015 | 016 |
| Client ID | B6 02 | B6 03 | B7 01 | B7 02 |

Sampled

| Analyte | Method | Unit | | | | |
|----------|------------|-------|------|------|------|------|
| Arsenic | iMET1SAICP | mg/kg | 17 | 11 | 820 | 44 |
| Cadmium | iMET1SAICP | mg/kg | 0.08 | 0.06 | 0.35 | 0.06 |
| Chromium | iMET1SAICP | mg/kg | 1700 | 1900 | 1300 | 1500 |
| Copper | iMET1SAICP | mg/kg | 53 | 36 | 72 | 39 |

| | | | | |
|------------------|-------|-------|-------|-------|
| LAB ID | 013 | 014 | 015 | 016 |
| Client ID | B6 02 | B6 03 | B7 01 | B7 02 |

Sampled

| Analyte | Method | Unit | | | | |
|----------------|------------|-------|-------|-------|------|------|
| Cyanide, WAD | iCNW1SSAA | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Gold | iMET1SAICP | mg/kg | <5.0 | <5.0 | <5.0 | <5.0 |
| Lead | iMET1SAICP | mg/kg | 6.9 | 3.5 | 26 | 5.3 |
| Mercury, total | iHG1STVGA | mg/kg | <0.02 | <0.02 | 0.21 | 0.03 |
| Moisture | (40C) | %ar | 4.0 | 5.9 | 3.2 | 4.4 |
| Nickel | iMET1SAICP | mg/kg | 1100 | 1400 | 670 | 770 |
| Silver | iMET1SAICP | mg/kg | <0.2 | <0.2 | <0.2 | <0.2 |
| Zinc | iMET1SAICP | mg/kg | 57 | 54 | 140 | 55 |

| | | | | |
|------------------|-------|-------|-------|-----|
| LAB ID | 017 | 018 | 019 | 020 |
| Client ID | B7 03 | B8 01 | B8 02 | B9 |

Sampled

| Analyte | Method | Unit | | | | |
|----------------|------------|-------|-------|------|------|------|
| Arsenic | iMET1SAICP | mg/kg | 15 | 1000 | 40 | 1100 |
| Cadmium | iMET1SAICP | mg/kg | <0.05 | 2.1 | 0.06 | 0.78 |
| Chromium | iMET1SAICP | mg/kg | 2100 | 1100 | 1400 | 930 |
| Copper | iMET1SAICP | mg/kg | 15 | 650 | 49 | 260 |
| Cyanide, WAD | iCNW1SSAA | mg/kg | <0.5 | 2.0 | <0.5 | 1.0 |
| Gold | iMET1SAICP | mg/kg | <5.0 | <5.0 | <5.0 | <5.0 |
| Lead | iMET1SAICP | mg/kg | 2.2 | 150 | 7.3 | 110 |
| Mercury, total | iHG1STVGA | mg/kg | <0.02 | 0.55 | 0.05 | 0.49 |
| Moisture | (40C) | %ar | 4.4 | 0.9 | 4.7 | 0.8 |
| Nickel | iMET1SAICP | mg/kg | 1200 | 490 | 740 | 450 |
| Silver | iMET1SAICP | mg/kg | <0.2 | 1.2 | <0.2 | 0.6 |
| Zinc | iMET1SAICP | mg/kg | 59 | 190 | 55 | 180 |

| | | | | |
|------------------|--------|--------|--------|--------|
| LAB ID | 021 | 022 | 023 | 024 |
| Client ID | B10 01 | B10 02 | B10 03 | B11 01 |

Sampled

| Analyte | Method | Unit | | | | |
|----------------|------------|-------|------|-------|-------|------|
| Arsenic | iMET1SAICP | mg/kg | 3400 | 70 | 52 | 970 |
| Cadmium | iMET1SAICP | mg/kg | 0.67 | <0.05 | <0.05 | 0.63 |
| Chromium | iMET1SAICP | mg/kg | 530 | 2000 | 2100 | 1000 |
| Copper | iMET1SAICP | mg/kg | 130 | 49 | 52 | 220 |
| Cyanide, WAD | iCNW1SSAA | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Gold | iMET1SAICP | mg/kg | <5.0 | <5.0 | <5.0 | <5.0 |
| Lead | iMET1SAICP | mg/kg | 120 | 3.7 | 2.6 | 55 |
| Mercury, total | iHG1STVGA | mg/kg | 4.7 | 0.10 | 0.06 | 0.16 |
| Moisture | (40C) | %ar | 1.0 | 2.4 | 2.6 | 1.2 |
| Nickel | iMET1SAICP | mg/kg | 300 | 1200 | 1200 | 530 |
| Silver | iMET1SAICP | mg/kg | 0.2 | <0.2 | <0.2 | 0.5 |
| Zinc | iMET1SAICP | mg/kg | 580 | 74 | 55 | 130 |

| | | |
|------------------|--------|-----|
| LAB ID | 025 | 026 |
| Client ID | B11 02 | P 1 |

Sampled

| Analyte | Method | Unit | | |
|----------------|------------|-------|-------|------|
| Arsenic | iMET1SAICP | mg/kg | 52 | 930 |
| Cadmium | iMET1SAICP | mg/kg | <0.05 | 2.6 |
| Chromium | iMET1SAICP | mg/kg | 1500 | 910 |
| Copper | iMET1SAICP | mg/kg | 50 | 900 |
| Cyanide, WAD | iCNW1SSAA | mg/kg | <0.5 | 2.7 |
| Gold | iMET1SAICP | mg/kg | <5.0 | <5.0 |
| Lead | iMET1SAICP | mg/kg | 5.5 | 160 |
| Mercury, total | iHG1STVGA | mg/kg | 0.03 | 0.94 |
| Moisture | (40C) | %ar | 3.8 | 0.9 |
| Nickel | iMET1SAICP | mg/kg | 840 | 400 |
| Silver | iMET1SAICP | mg/kg | <0.2 | 2.0 |
| Zinc | iMET1SAICP | mg/kg | 56 | 230 |

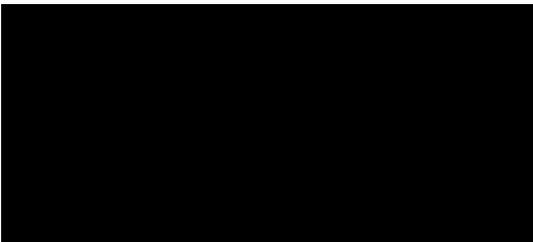
| Method | Method Description |
|------------|---|
| (40C) | Moisture calculated from % mass lost on drying at 40 deg C. |
| iCNW1SSAA | Weak acid dissociable (WAD) cyanide (as received) in solids microdistillation and colourimetry. |
| iHG1STVGA | Mercury in soils as received, digestion USEPA 3051 analysis by CVAAS. |
| iMET1SAICP | Acid digestable metals as received by digestion and ICPAES (USEPA 3051A modification). |

Please note that this is an amended report that contains information that is different from the original report. The original report must be destroyed and replaced with this corrected version.

This is an amended report as the gold results reported in the original were incorrect due to undetected interferences in the analysis of the digest solutions by ICPAES. Attached is QC report for the gold analysis.

Results apply only to the samples as received.

This report may only be reproduced in full. Unless otherwise advised, the samples in this job will be disposed of after a holding period of 30 days from the report date shown below.



CLIENT DETAILS

Contact [REDACTED]
Focus Operations
Client Address PMB 3
Coolgardie
WA 6429

LABORATORY DETAILS

Manager [REDACTED]
Laboratory Address SGS Newburn Environmental
10 Reid Rd
Newburn WA 6105

[REDACTED]

Project **Historical Contaminated Site Assessment**
Order Number **10764**
Samples 35

[REDACTED]

SGS Reference PE062274 R0
Report Number 0000031048
Date Reported 23 Nov 2011
Date Received 03 Nov 2011

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

Total Metals and Metalloids were subcontracted to SGS Perth Minerals, 10 Reid Rd Newburn WA, NATA Accreditation Number 1936, report # WM 136851.

| Parameter | Units | LOR | PE062274.001 Sample Number Sample Matrix Sample Date Sample Name | PE062274.002 Tails Tails 28/10/11 9:15 DTD 01.3 | PE062274.003 Tails & Ground Tails & Ground 28/10/11 9:20 DTD 01.6 | PE062274.004 Tails Tails 28/10/11 9:30 DTD 02.1 | PE062274.005 Tails Tails 28/10/11 9:45 DTD 02.4 |
|-----------|-------|-----|--|---|---|---|---|
|-----------|-------|-----|--|---|---|---|---|

Moisture Content Method: AN234

| | | | | | | | |
|------------|---|-----|------|------|------|------|------|
| % Moisture | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|------|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|---------|---|-----|-----|-----|-----|-----|
| pH | No unit | - | 8.6 | 5.6 | 9.4 | 8.8 | 8.5 |
|----|---------|---|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|--------------|-------|---|------|------|------|------|------|
| Conductivity | µS/cm | 1 | 1700 | 1700 | 1000 | 1400 | 1300 |
|--------------|-------|---|------|------|------|------|------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|------|-----|-----|------|-----|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 1300 | 370 | 460 | 1000 | 650 |
|-----------------------------------|-------|---|------|-----|-----|------|-----|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|
| Water Soluble Fluoride* | mg/kg | 0.5 | 1.7 | 0.7 | 2.9 | 1.5 | 1.4 |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|---|----|---|---|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 2 | <1 | 7 | 6 | <1 |
|---|-------|---|---|----|---|---|----|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|-----|-----|------|-----|------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.3 | 0.1 | <0.1 | 0.2 | <0.1 |
|--------------------------------|-------|-----|-----|-----|------|-----|------|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|----------------|-----|------|------|------|------|------|------|
| Arsenic, As* | ppm | 0.5 | 96 | 56 | 19 | 120 | 57 |
| Lead, Pb* | ppm | 0.2 | 75.2 | 25.7 | 11.3 | 61.9 | 30 |
| Silver, Ag* | ppm | 0.02 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 |
| Cadmium, Cd* | ppm | 0.02 | 0.71 | 0.84 | 0.37 | 0.62 | 1.46 |
| Copper, Cu* | ppm | 1 | 57 | 49 | 36 | 51 | 55 |
| Nickel, Ni* | ppm | 0.5 | 146 | 108 | 62.1 | 67.6 | 59.1 |
| Zinc, Zn* | ppm | 1 | 140 | 151 | 47 | 116 | 226 |
| Beryllium, Be* | ppm | 0.02 | 0.45 | 0.44 | 0.17 | 0.47 | 0.31 |
| Cobalt, Co* | ppm | 0.2 | 21 | 24.5 | 29.1 | 15.7 | 17.4 |
| Manganese, Mn* | ppm | 0.5 | 338 | 484 | 261 | 303 | 618 |
| Antimony, Sb* | ppm | 0.02 | 0.17 | 0.09 | 0.04 | 0.19 | 0.15 |
| Selenium, Se* | ppm | 0.5 | 0.6 | 0.7 | <0.5 | 0.8 | 0.7 |
| Mercury, Hg* | ppm | 0.02 | 0.26 | 0.09 | 0.04 | 0.22 | 0.21 |

Gold by Aqua Regia Digest ICP Method: ARE133

| | | | | | | | |
|-------|-----|---|----|-----|----|----|----|
| Gold* | ppb | 1 | 72 | 110 | 64 | 93 | 70 |
|-------|-----|---|----|-----|----|----|----|

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|----|-----|-----|-----|-----|-----|
| Chromium, Cr* | ppm | 10 | 700 | 290 | 580 | 150 | 460 |
|---------------|-----|----|-----|-----|-----|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|-----|----|-----|-----|
| Boron, B* | ppm | 20 | <20 | <20 | 20 | <20 | <20 |
|-----------|-----|----|-----|-----|----|-----|-----|

| | Sample Number | PE062274.006 | PE062274.007 | PE062274.008 | PE062274.009 | PE062274.010 |
|--|---------------|----------------|---------------|---------------|----------------|----------------|
| | Sample Matrix | Tails & Ground | Tails | Tails | Tails & Ground | Tails |
| | Sample Date | 28/10/11 9:50 | 28/10/11 9:53 | 28/10/11 9:57 | 28/10/11 10:05 | 28/10/11 10:20 |
| | Sample Name | DTD 02.6 | DTD 03.1 | DTD 03.3 | DTD 03.6 | DTD 04.1 |

Parameter Units LOR

Moisture Content Method: AN234

| % Moisture | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|------|
| | | | | | | | |

pH in soil (1:5) Method: AN101

| pH | No unit | - | 9.4 | 9.1 | 9.1 | 8.7 | 9.1 |
|----|---------|---|-----|-----|-----|-----|-----|
| | | | | | | | |

Conductivity and TDS by Calculation - Soil Method: AN106

| Conductivity | µS/cm | 1 | 880 | 1500 | 2100 | 970 | 2400 |
|--------------|-------|---|-----|------|------|-----|------|
| | | | | | | | |

Chloride (water extractable) Method: AN274

| Chloride (water extractable 1:5)* | mg/kg | 5 | 690 | 1400 | 2100 | 820 | 2400 |
|-----------------------------------|-------|---|-----|------|------|-----|------|
| | | | | | | | |

Water Soluble Fluoride in Soil Method: AN141

| Water Soluble Fluoride* | mg/kg | 0.5 | 2.4 | 3.6 | 3.2 | 0.7 | 5.9 |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|
| | | | | | | | |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | <1 | 1 | 13 | 9 | 1 |
|---|-------|---|----|---|----|---|---|
| | | | | | | | |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | <0.1 | 0.4 | 0.7 | <0.1 | 0.3 |
|--------------------------------|-------|-----|------|-----|-----|------|-----|
| | | | | | | | |

Rare Earth Metals in soil by ICPMS Method: IMS12S

| Element | ppm | LOR | Sample 1 | Sample 2 | Sample 3 | Sample 4 | Sample 5 |
|----------------|-----|------|----------|----------|----------|----------|----------|
| Arsenic, As* | | 0.5 | 41 | 380 | 270 | 50 | 120 |
| Lead, Pb* | | 0.2 | 24.4 | 18.8 | 17.5 | 5.7 | 34.9 |
| Silver, Ag* | | 0.02 | 0.2 | 0.2 | 0.2 | 0.1 | 0.3 |
| Cadmium, Cd* | | 0.02 | 1.07 | 0.45 | 0.41 | 0.23 | 0.94 |
| Copper, Cu* | | 1 | 52 | 46 | 48 | 38 | 72 |
| Nickel, Ni* | | 0.5 | 73.1 | 39.7 | 281 | 38.5 | 61.4 |
| Zinc, Zn* | | 1 | 129 | 66 | 64 | 30 | 190 |
| Beryllium, Be* | | 0.02 | 0.26 | 0.47 | 0.9 | 0.03 | 0.46 |
| Cobalt, Co* | | 0.2 | 21.3 | 28.2 | 40.6 | 17.1 | 28.6 |
| Manganese, Mn* | | 0.5 | 376 | 257 | 280 | 136 | 623 |
| Antimony, Sb* | | 0.02 | 0.03 | 0.21 | 0.1 | 0.08 | 0.14 |
| Selenium, Se* | | 0.5 | <0.5 | 1 | 0.9 | <0.5 | 0.7 |
| Mercury, Hg* | | 0.02 | 0.14 | 0.19 | 0.29 | 0.06 | 0.74 |

Gold by Aqua Regia Digest ICP Method: ARE133

| Gold* | ppb | 1 | 63 | 130 | 150 | 21 | 260 |
|-------|-----|---|----|-----|-----|----|-----|
| | | | | | | | |

ICPAES after Aqua Regia Digest Method: ICP12S

| Chromium, Cr* | ppm | 10 | 270 | 350 | 660 | 510 | 250 |
|---------------|-----|----|-----|-----|-----|-----|-----|
| | | | | | | | |

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| Boron, B* | ppm | 20 | <20 | <20 | 50 | <20 | <20 |
|-----------|-----|----|-----|-----|----|-----|-----|
| | | | | | | | |

| | Sample Number | PE062274.011 | PE062274.012 | PE062274.013 | PE062274.014 | PE062274.015 |
|---------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Sample Matrix | Tails | Tails | Tails & Ground | Tails | Tails | Tails & Ground |
| Sample Date | 28/10/11 10:25 | 28/10/11 10:30 | 28/10/11 10:30 | 28/10/11 10:35 | 28/10/11 10:37 | 28/10/11 10:40 |
| Sample Name | DTD 04.4 | DTD 04.6 | DTD 05.1 | DTD 05.3 | DTD 05.7 | |

| Parameter | Units | LOR | | | | |
|-----------|-------|-----|--|--|--|--|
|-----------|-------|-----|--|--|--|--|

Moisture Content Method: AN234

| | | | | | | | |
|------------|---|-----|------|------|------|------|------|
| % Moisture | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|------|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|---------|---|------------|------------|------------|------------|------------|
| pH | No unit | - | 8.9 | 9.5 | 9.3 | 9.1 | 9.4 |
|----|---------|---|------------|------------|------------|------------|------------|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|--------------|-------|---|-------------|-------------|------------|-------------|-------------|
| Conductivity | µS/cm | 1 | 2100 | 1000 | 930 | 1700 | 1200 |
|--------------|-------|---|-------------|-------------|------------|-------------|-------------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|-------------|------------|------------|-------------|-------------|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 1700 | 850 | 990 | 1500 | 1200 |
|-----------------------------------|-------|---|-------------|------------|------------|-------------|-------------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|------------|------------|------------|------------|------------|
| Water Soluble Fluoride* | mg/kg | 0.5 | 1.9 | 4.5 | 3.0 | 2.0 | 2.0 |
|-------------------------|-------|-----|------------|------------|------------|------------|------------|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----------|-----------|----------|----------|----------|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 7 | 18 | 1 | 7 | 2 |
|---|-------|---|----------|-----------|----------|----------|----------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|------------|------|------------|------------|------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.1 | <0.1 | 0.6 | 0.6 | <0.1 |
|--------------------------------|-------|-----|------------|------|------------|------------|------|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|----------------|-----|------|-------------|-------------|-------------|-------------|-------------|
| Arsenic, As* | ppm | 0.5 | 79 | 35 | 640 | 240 | 120 |
| Lead, Pb* | ppm | 0.2 | 28.4 | 16.2 | 4.5 | 22 | 26.8 |
| Silver, Ag* | ppm | 0.02 | 0.2 | 0.4 | 0.2 | 0.1 | 0.2 |
| Cadmium, Cd* | ppm | 0.02 | 0.94 | 0.87 | 0.22 | 0.26 | 1.01 |
| Copper, Cu* | ppm | 1 | 56 | 46 | 60 | 38 | 51 |
| Nickel, Ni* | ppm | 0.5 | 178 | 176 | 23.3 | 146 | 164 |
| Zinc, Zn* | ppm | 1 | 174 | 119 | 40 | 65 | 174 |
| Beryllium, Be* | ppm | 0.02 | 0.4 | 0.23 | 0.28 | 0.4 | 0.46 |
| Cobalt, Co* | ppm | 0.2 | 26.9 | 34.6 | 33.8 | 27.8 | 26.6 |
| Manganese, Mn* | ppm | 0.5 | 397 | 297 | 394 | 276 | 406 |
| Antimony, Sb* | ppm | 0.02 | 0.15 | 0.1 | 0.37 | 0.17 | 0.15 |
| Selenium, Se* | ppm | 0.5 | 0.8 | 0.6 | 1.1 | 0.6 | 0.7 |
| Mercury, Hg* | ppm | 0.02 | 0.22 | 0.29 | 0.11 | 0.11 | 0.2 |

Gold by Aqua Regia Digest ICP Method: ARE133

| | | | | | | | |
|-------|-----|---|------------|-----------|------------|------------|------------|
| Gold* | ppb | 1 | 100 | 57 | 160 | 150 | 120 |
|-------|-----|---|------------|-----------|------------|------------|------------|

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|----|------------|------------|------------|------------|------------|
| Chromium, Cr* | ppm | 10 | 660 | 720 | 240 | 330 | 520 |
|---------------|-----|----|------------|------------|------------|------------|------------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|-----|-----|-----------|-----|
| Boron, B* | ppm | 20 | <20 | <20 | <20 | 20 | <20 |
|-----------|-----|----|-----|-----|-----|-----------|-----|

| | Sample Number | PE062274.016 | PE062274.017 | PE062274.018 | PE062274.019 | PE062274.020 |
|---------------|----------------|----------------|----------------|----------------|----------------|--------------|
| Sample Matrix | Tails | Tails | Tails | Ground | Tails | Tails |
| Sample Date | 28/10/11 10:42 | 28/10/11 10:46 | 28/10/11 10:50 | 28/10/11 11:15 | 28/10/11 11:20 | |
| Sample Name | DTD 06.1 | DTD 06.4 | DTD 06.5 | DTD 07.1 | DTD 07.3 | |

Parameter Units LOR

Moisture Content Method: AN234

| | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|------|
| % Moisture | | | | | | | |

pH in soil (1:5) Method: AN101

| | No unit | - | 9.7 | 8.9 | 8.9 | 8.7 | 8.7 |
|----|---------|---|-----|-----|-----|-----|-----|
| pH | | | | | | | |

Conductivity and TDS by Calculation - Soil Method: AN106

| | µS/cm | 1 | 100 | 1100 | 1300 | 2300 | 2200 |
|--------------|-------|---|-----|------|------|------|------|
| Conductivity | | | | | | | |

Chloride (water extractable) Method: AN274

| | mg/kg | 5 | 15 | 640 | 790 | 1700 | 1500 |
|-----------------------------------|-------|---|----|-----|-----|------|------|
| Chloride (water extractable 1:5)* | | | | | | | |

Water Soluble Fluoride in Soil Method: AN141

| | mg/kg | 0.5 | 2.0 | 2.0 | 2.6 | 2.1 | 1.9 |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|
| Water Soluble Fluoride* | | | | | | | |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | mg/kg | 1 | <1 | 12 | 14 | 28 | 13 |
|---|-------|---|----|----|----|----|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | | | | | | | |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | mg/kg | 0.1 | <0.1 | 0.3 | <0.1 | 0.4 | 0.4 |
|--------------------------------|-------|-----|------|-----|------|-----|-----|
| Weak Acid Dissociable Cyanide* | | | | | | | |

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | ppm | 0.5 | 570 | 120 | 630 | 39 | 140 |
|----------------|-----|------|------|------|------|------|------|
| Arsenic, As* | | | | | | | |
| Lead, Pb* | | 0.2 | 8.9 | 57.6 | 10.2 | 16.8 | 25.4 |
| Silver, Ag* | | 0.02 | 0.2 | 0.4 | 0.2 | 0.2 | 0.3 |
| Cadmium, Cd* | | 0.02 | 0.14 | 1.55 | 0.21 | 0.51 | 0.58 |
| Copper, Cu* | | 1 | 35 | 123 | 40 | 51 | 71 |
| Nickel, Ni* | | 0.5 | 21.2 | 75.7 | 73.8 | 99.9 | 136 |
| Zinc, Zn* | | 1 | 28 | 375 | 36 | 101 | 100 |
| Beryllium, Be* | | 0.02 | 0.2 | 0.37 | 0.57 | 0.49 | 0.25 |
| Cobalt, Co* | | 0.2 | 31.7 | 21 | 37.2 | 39.8 | 28.4 |
| Manganese, Mn* | | 0.5 | 354 | 517 | 251 | 456 | 539 |
| Antimony, Sb* | | 0.02 | 0.25 | 0.17 | 0.23 | 0.16 | 0.26 |
| Selenium, Se* | | 0.5 | 1.1 | 0.8 | 1.1 | 0.7 | 0.7 |
| Mercury, Hg* | | 0.02 | 0.06 | 1.34 | 0.16 | 0.35 | 0.21 |

Gold by Aqua Regia Digest ICP Method: ARE133

| | ppb | 1 | 240 | 330 | 160 | 140 | 120 |
|-------|-----|---|-----|-----|-----|-----|-----|
| Gold* | | | | | | | |

ICPAES after Aqua Regia Digest Method: ICP12S

| | ppm | 10 | 80 | 390 | 250 | 680 | 490 |
|---------------|-----|----|----|-----|-----|-----|-----|
| Chromium, Cr* | | | | | | | |

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | ppm | 20 | <20 | <20 | <20 | 50 | <20 |
|-----------|-----|----|-----|-----|-----|----|-----|
| Boron, B* | | | | | | | |

| | Sample Number | PE062274.021 | PE062274.022 | PE062274.023 | PE062274.024 | PE062274.025 |
|--|---------------|----------------|----------------|----------------|----------------|----------------|
| | Sample Matrix | Fresh Rock | Tails | Tails | Tails | Tails |
| | Sample Date | 28/10/11 11:27 | 28/10/11 11:30 | 28/10/11 11:32 | 28/10/11 11:35 | 28/10/11 11:37 |
| | Sample Name | DTD 07.7 | DTD 08.1 | DTD 08.4 | DTD 08.6 | DTD 09.1 |

Parameter Units LOR

Moisture Content Method: AN234

| | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|------|
| % Moisture | | | | | | | |

pH in soil (1:5) Method: AN101

| | No unit | - | 10.0 | 9.2 | 9.3 | 9.4 | 9.2 |
|----|---------|---|------|-----|-----|-----|-----|
| pH | | | | | | | |

Conductivity and TDS by Calculation - Soil Method: AN106

| | µS/cm | 1 | 1100 | 780 | 1400 | 1300 | 640 |
|--------------|-------|---|------|-----|------|------|-----|
| Conductivity | | | | | | | |

Chloride (water extractable) Method: AN274

| | mg/kg | 5 | 430 | 540 | 1300 | 1300 | 420 |
|-----------------------------------|-------|---|-----|-----|------|------|-----|
| Chloride (water extractable 1:5)* | | | | | | | |

Water Soluble Fluoride in Soil Method: AN141

| | mg/kg | 0.5 | 1.1 | 3.3 | 1.6 | 2.9 | 6.3 |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|
| Water Soluble Fluoride* | | | | | | | |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | mg/kg | 1 | 5 | 3 | 2 | 4 | 16 |
|---|-------|---|---|---|---|---|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | | | | | | | |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | mg/kg | 0.1 | 0.2 | 0.3 | 0.3 | 0.5 | <0.1 |
|--------------------------------|-------|-----|-----|-----|-----|-----|------|
| Weak Acid Dissociable Cyanide* | | | | | | | |

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | ppm | 0.5 | 56 | 550 | 110 | 59 | 420 |
|----------------|-----|------|------|------|------|------|------|
| Arsenic, As* | | | | | | | |
| Lead, Pb* | | 0.2 | 8.9 | 10.8 | 27.6 | 23.4 | 14.2 |
| Silver, Ag* | | 0.02 | 0.1 | 0.2 | 0.2 | 0.4 | 0.3 |
| Cadmium, Cd* | | 0.02 | 0.18 | 0.2 | 0.37 | 0.25 | 0.25 |
| Copper, Cu* | | 1 | 42 | 42 | 57 | 46 | 46 |
| Nickel, Ni* | | 0.5 | 74.3 | 77.8 | 153 | 42.6 | 64.8 |
| Zinc, Zn* | | 1 | 27 | 34 | 95 | 58 | 39 |
| Beryllium, Be* | | 0.02 | 0.1 | 0.44 | 0.28 | 0.7 | 0.49 |
| Cobalt, Co* | | 0.2 | 40.3 | 31.8 | 27.6 | 47.5 | 33.4 |
| Manganese, Mn* | | 0.5 | 206 | 251 | 374 | 770 | 252 |
| Antimony, Sb* | | 0.02 | 0.15 | 0.24 | 0.22 | 0.1 | 0.32 |
| Selenium, Se* | | 0.5 | <0.5 | 1 | 0.7 | 1 | 1 |
| Mercury, Hg* | | 0.02 | 0.09 | 0.18 | 0.13 | 0.35 | 0.29 |

Gold by Aqua Regia Digest ICP Method: ARE133

| | ppb | 1 | 32 | 190 | 140 | 230 | 120 |
|-------|-----|---|----|-----|-----|-----|-----|
| Gold* | | | | | | | |

ICPAES after Aqua Regia Digest Method: ICP12S

| | ppm | 10 | 610 | 260 | 640 | 220 | 350 |
|---------------|-----|----|-----|-----|-----|-----|-----|
| Chromium, Cr* | | | | | | | |

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | ppm | 20 | <20 | <20 | <20 | <20 | 30 |
|-----------|-----|----|-----|-----|-----|-----|----|
| Boron, B* | | | | | | | |

| | Sample Number | PE062274.026 | PE062274.027 | PE062274.028 | PE062274.029 | PE062274.030 |
|---------------|----------------|--------------|----------------|----------------|----------------|----------------|
| Sample Matrix | Tails | | Ground | Contamination | Contamination | Contamination |
| Sample Date | 28/10/11 12:03 | | 28/10/11 12:05 | 28/10/11 12:10 | 28/10/11 12:15 | 28/10/11 12:20 |
| Sample Name | DTD 09.3 | | DTD 09.6 | DTD 10 | DTD 11 | DTD 12 |

| Parameter | Units | LOR | | | | |
|-----------|-------|-----|--|--|--|--|
|-----------|-------|-----|--|--|--|--|

Moisture Content Method: AN234

| | | | | | | | |
|------------|---|-----|------|------|------|------|------|
| % Moisture | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|------|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|---------|---|------------|------------|------------|------------|------------|
| pH | No unit | - | 9.3 | 9.5 | 9.1 | 9.0 | 9.7 |
|----|---------|---|------------|------------|------------|------------|------------|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|--------------|-------|---|-------------|-------------|------------|-------------|------------|
| Conductivity | µS/cm | 1 | 1300 | 1300 | 250 | 1700 | 320 |
|--------------|-------|---|-------------|-------------|------------|-------------|------------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|------------|------------|-----------|-------------|------------|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 800 | 910 | 28 | 1400 | 150 |
|-----------------------------------|-------|---|------------|------------|-----------|-------------|------------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|------------|------------|------------|------------|------------|
| Water Soluble Fluoride* | mg/kg | 0.5 | 3.2 | 7.8 | 2.2 | 1.2 | 4.3 |
|-------------------------|-------|-----|------------|------------|------------|------------|------------|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----------|-----------|----------|-----------|----------|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 3 | 29 | 2 | 12 | 8 |
|---|-------|---|----------|-----------|----------|-----------|----------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|------------|------|------------|------------|------------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 1.0 | <0.1 | 0.3 | 0.3 | 0.1 |
|--------------------------------|-------|-----|------------|------|------------|------------|------------|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|----------------|-----|------|-------------|-------------|-------------|-------------|-------------|
| Arsenic, As* | ppm | 0.5 | 100 | 95 | 810 | 110 | 81 |
| Lead, Pb* | ppm | 0.2 | 319 | 16.7 | 24.2 | 51.3 | 27.5 |
| Silver, Ag* | ppm | 0.02 | 0.4 | 0.1 | 0.2 | 0.7 | 0.4 |
| Cadmium, Cd* | ppm | 0.02 | 0.41 | 0.25 | 0.41 | 0.47 | 1.12 |
| Copper, Cu* | ppm | 1 | 68 | 37 | 41 | 46 | 75 |
| Nickel, Ni* | ppm | 0.5 | 469 | 264 | 45.6 | 216 | 77.3 |
| Zinc, Zn* | ppm | 1 | 80 | 50 | 52 | 82 | 145 |
| Beryllium, Be* | ppm | 0.02 | 1.19 | 0.2 | 0.41 | 0.48 | 0.53 |
| Cobalt, Co* | ppm | 0.2 | 52.1 | 53.9 | 27.1 | 29.6 | 41.8 |
| Manganese, Mn* | ppm | 0.5 | 267 | 155 | 299 | 273 | 831 |
| Antimony, Sb* | ppm | 0.02 | 0.23 | 0.22 | 0.42 | 0.24 | 0.31 |
| Selenium, Se* | ppm | 0.5 | 1 | 0.8 | 1.2 | 0.7 | 0.7 |
| Mercury, Hg* | ppm | 0.02 | 0.29 | 0.12 | 0.26 | 49.3 | 0.63 |

Gold by Aqua Regia Digest ICP Method: ARE133

| | | | | | | | |
|-------|-----|---|-----------|-----------|------------|-------------|------------|
| Gold* | ppb | 1 | 93 | 74 | 740 | 6600 | 340 |
|-------|-----|---|-----------|-----------|------------|-------------|------------|

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|----|------------|-------------|------------|------------|------------|
| Chromium, Cr* | ppm | 10 | 790 | 1360 | 120 | 680 | 330 |
|---------------|-----|----|------------|-------------|------------|------------|------------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----------|-----------|-----|-----------|-----------|
| Boron, B* | ppm | 20 | 30 | 40 | <20 | 30 | 30 |
|-----------|-----|----|-----------|-----------|-----|-----------|-----------|

| | Sample Number | PE062274.031 | PE062274.032 | PE062274.033 | PE062274.034 | PE062274.035 |
|--|---------------|----------------|----------------|----------------|----------------|----------------|
| | Sample Matrix | Contamination | Soil | Transitional | Soil | Transitional |
| | Sample Date | 28/10/11 12:23 | 28/10/11 12:26 | Material | 28/10/11 12:35 | Material |
| | Sample Name | DTD 13 | DMS 01.1 | 28/10/11 12:30 | DMS 02.1 | 28/10/11 12:40 |
| | | | | DMS 01.3 | | DMS 02.3 |

Parameter Units LOR

Moisture Content Method: AN234

| | | | | | | |
|------------|---|-----|------|------|------|------|
| % Moisture | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|---------|---|-----|-----|-----|-----|-----|
| pH | No unit | - | 8.4 | 8.5 | 8.3 | 9.2 | 9.2 |
|----|---------|---|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|--------------|-------|---|---|------|------|------|------|
| Conductivity | µS/cm | 1 | 4 | 1800 | 1800 | 1200 | 1000 |
|--------------|-------|---|---|------|------|------|------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|------|------|------|------|-----|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 2400 | 1500 | 1500 | 1200 | 870 |
|-----------------------------------|-------|---|------|------|------|------|-----|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|-----|-----|------|-----|-----|
| Water Soluble Fluoride* | mg/kg | 0.5 | 1.3 | 1.8 | <0.5 | 0.9 | 1.2 |
|-------------------------|-------|-----|-----|-----|------|-----|-----|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|----|---|---|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 20 | 61 | 8 | 3 | <1 |
|---|-------|---|----|----|---|---|----|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|-----|-----|-----|------|-----|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.6 | 1.5 | 0.2 | <0.1 | 0.1 |
|--------------------------------|-------|-----|-----|-----|-----|------|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|----------------|-----|------|------|------|------|------|-------|
| Arsenic, As* | ppm | 0.5 | 29 | 79 | 15 | 29 | 6 |
| Lead, Pb* | ppm | 0.2 | 34 | 26.2 | 3.9 | 7.9 | 0.9 |
| Silver, Ag* | ppm | 0.02 | 0.4 | 0.6 | 0.1 | 0.1 | <0.01 |
| Cadmium, Cd* | ppm | 0.02 | 0.85 | 0.86 | 0.14 | 0.37 | 0.08 |
| Copper, Cu* | ppm | 1 | 65 | 56 | 27 | 31 | 26 |
| Nickel, Ni* | ppm | 0.5 | 51.7 | 117 | 67.7 | 38.3 | 33.2 |
| Zinc, Zn* | ppm | 1 | 135 | 117 | 18 | 40 | 12 |
| Beryllium, Be* | ppm | 0.02 | 0.86 | 0.36 | 0.02 | 0.21 | 0.11 |
| Cobalt, Co* | ppm | 0.2 | 56.8 | 32.4 | 26.7 | 15.6 | 24.5 |
| Manganese, Mn* | ppm | 0.5 | 820 | 386 | 82.3 | 191 | 251 |
| Antimony, Sb* | ppm | 0.02 | 0.13 | 0.6 | 0.08 | 0.12 | 0.1 |
| Selenium, Se* | ppm | 0.5 | 1 | 0.6 | <0.5 | 0.5 | <0.5 |
| Mercury, Hg* | ppm | 0.02 | 2.53 | 0.64 | 0.31 | 0.14 | 0.08 |

Gold by Aqua Regia Digest ICP Method: ARE133

| | | | | | | | |
|-------|-----|---|-----|------|-----|-----|----|
| Gold* | ppb | 1 | 600 | 1300 | 170 | 260 | 21 |
|-------|-----|---|-----|------|-----|-----|----|

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|----|-----|-----|------|-----|-----|
| Chromium, Cr* | ppm | 10 | 460 | 630 | 1030 | 340 | 350 |
|---------------|-----|----|-----|-----|------|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|----|-----|----|----|-----|
| Boron, B* | ppm | 20 | 30 | <20 | 40 | 40 | <20 |
|-----------|-----|----|----|-----|----|----|-----|

MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Chloride (water extractable) Method: ME-(AU)-[ENV]AN274

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD |
|-----------------------------------|--------------|-------|-----|----|----------|
| Chloride (water extractable 1:5)* | LB031081 | mg/kg | 5 | <5 | 0 - 1% |

Conductivity and TDS by Calculation - Soil Method: ME-(AU)-[ENV]AN106

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|--------------|--------------|-------|-----|----|----------|---------------|
| Conductivity | LB030362 | µS/cm | 1 | <1 | 1 - 2% | 100% |

Moisture Content Method: ME-(AU)-[ENV]AN234

| Parameter | QC Reference | Units | LOR | DUP %RPD |
|------------|--------------|-------|-----|----------|
| % Moisture | LB030332 | % | 0.5 | 0% |

pH in soil (1:5) Method: ME-(AU)-[ENV]AN101

| Parameter | QC Reference | Units | LOR | DUP %RPD | LCS %Recovery |
|-----------|--------------|---------|-----|----------|---------------|
| pH | LB030360 | No unit | - | 0 - 2% | 100% |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: ME-(AU)-[ENV]AN258

| Parameter | QC Reference | Units | LOR | MB |
|---|--------------|-------|-----|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | LB030896 | mg/kg | 1 | <1 |

Water Soluble Fluoride in Soil Method: ME-(AU)-[ENV]AN141

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|-------------------------|--------------|-------|-----|------|----------|---------------|
| Water Soluble Fluoride* | LB030807 | mg/kg | 0.5 | <0.5 | 3 - 19% | NA |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN077/AN287

| Parameter | QC Reference | Units | LOR | DUP %RPD |
|--------------------------------|--------------|-------|-----|----------|
| Weak Acid Dissociable Cyanide* | LB030337 | mg/kg | 0.1 | 78% |

| METHOD | METHODOLOGY SUMMARY |
|--------|--|
| AN002 | Into a glass bottle or plastic jar weigh 20g of air-dried or as received sample, and add 100mL distilled water. If suspensions are prepared on different sample weights, ensure that the 1:5 soil to water ratio is maintained. |
| AN101 | pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+. |
| AN106 | Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as $\mu\text{mhos/cm}$ or $\mu\text{S/cm @ 25}^\circ\text{C}$. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2520 B. |
| AN141 | Determination of Fluoride by ISE: A fluoride ion selective electrode and reference electrode combination, in the presence of a pH/complexation buffer, is used to determine the fluoride concentration on the soil water extract. The electrode millivolt response is measured logarithmically against fluoride concentration. Reference APHA F- C. |
| AN234 | The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water. |
| AN258 | Nitrate and Nitrite by FIA:: In an acidic medium, nitrate is reduced quantitatively to nitrite by cadmium metal. This nitrite plus any original nitrite is determined as an intense red-pink azo dye at 540 nm following diazotisation with sulphanilamide and subsequent coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. Without the cadmium reduction only the original nitrite is determined. Reference APHA 4500-NO3- F. |
| AN274 | Chloride by Aquakem DA following 1:5 or 1:2 DI water extraction: Chloride reacts with mercuric thiocyanate forming a mercuric chloride complex. In the presence of ferric iron, highly coloured ferric thiocyanate is formed which is proportional to the chloride concentration. Results reported on dry sample basis. Reference APHA 4500Cl- |

FOOTNOTES

| | | | |
|-----|---|-----|--|
| IS | Insufficient sample for analysis. | QFH | QC result is above the upper tolerance |
| LNR | Sample listed, but not received. | QFL | QC result is below the lower tolerance |
| * | This analysis is not covered by the scope of accreditation. | - | The sample was not analysed for this analyte |
| ^ | Performed by outside laboratory. | NVL | Not Validated |
| LOR | Limit of Reporting | | |
| ↑↓ | Raised or Lowered Limit of Reporting | | |

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf>

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Order Number (Not specified)
Samples 20

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SGS Reference PE064484B R0
Report Number 0000036253
Date Reported 07 Mar 2012
Date Received 06 Mar 2012

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

Total Sulphur and Metals by 4-Acid Digest were subcontracted to SGS Perth Minerals, 10 Reid Rd Newburn WA, NATA Accreditation Number 1936, report # WM 138834.

Samples were diluted for Acid Extractable Sulphur due to sample matrix; hence the LOR was raised.

| | Sample Number | PE064484B.006 | PE064484B.007 | PE064484B.008 | PE064484B.009 | PE064484B.010 |
|-----------|---------------|---------------|---------------|---------------|---------------|----------------|
| | Sample Matrix | Tails | Tails | Ground | Tails | Tails & Ground |
| | Sample Date | 01 Dec 2011 |
| | Sample Name | LLT-3-1 | LLT-3-3 | LLT-3-4 | LLT-4-1 | LLT-5-1 |
| Parameter | Units | LOR | | | | |

pH in soil (1:2) Method: AN101

| | | | | | | | |
|---------------|----------|-----|------------|------------|------------|------------|------------|
| pH (1:2) aged | pH Units | 0.1 | 8.3 | 7.9 | 7.9 | 8.1 | 8.3 |
|---------------|----------|-----|------------|------------|------------|------------|------------|

Conductivity (1:2) in soil Method: AN106

| | | | | | | | |
|--------------------------------|-------|---|-------------|-------------|-------------|------------|------------|
| Conductivity (1:2) aged @ 25C* | µS/cm | 1 | 1500 | 2900 | 4400 | 440 | 260 |
|--------------------------------|-------|---|-------------|-------------|-------------|------------|------------|

Total Carbon/Sulphur in soil by LECO Method: CSA06V

| | | | | | | | |
|----------------------------|------------|-------|--------------|--------------|--------------|--------------|--------------|
| Sulphur* | % | 0.005 | 0.083 | 0.113 | 0.215 | 0.072 | 0.081 |
| Maximum Potential Acidity* | kg H2SO4/T | 0.1 | 2.5 | 3.5 | 6.6 | 2.2 | 2.5 |

HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014

| | | | | | | | |
|----------------------------|------|-------|--------------|--------------|--------------|----------|----------|
| Acid Soluble Sulphur (SHC) | %w/w | 0.005 | 0.066 | 0.073 | 0.083 | <0.025 † | <0.025 † |
|----------------------------|------|-------|--------------|--------------|--------------|----------|----------|

Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212

| | | | | | | | |
|--|---------------------|-----|------------|------------|------------|------------|------------|
| Fizz Rating Reaction* | No unit | - | Slight. | Slight. | Slight. | Slight. | Slight. |
| ANC as % CaCO ₃ | % CaCO ₃ | 0.1 | 2.9 | 4.1 | 3.6 | 2.5 | 2.8 |
| Acid Neutralisation Capacity/Neutralisation Potential kg | kg H2SO4/T | 1 | 29 | 40 | 35 | 25 | 27 |

Net Acid Generation Potential (NAGP) Method: AN215

| | | | | | | | |
|-------------------------------|------------|-------|--------------|--------------|-------------|--------------|--------------|
| Total Sulphur as % Sulphur | %w/w | 0.005 | 0.083 | 0.11 | 0.22 | 0.072 | 0.081 |
| Total Oxidisable Sulphur | kg H2SO4/T | 0.25 | 0.53 | 1.2 | 4.0 | 2.1 | 2.4 |
| Net Acid Production Potential | kg H2SO4/T | -800 | -28 | -39 | -31 | -23 | -25 |
| Total Oxidisable Sulphur | %w/w | 0.005 | 0.017 | 0.040 | 0.13 | 0.069 | 0.079 |

Single Addition Net Acid Generation (NAG) Method: AN216

| | | | | | | | |
|---|------------|-----|------------|------------|------------|------------|------------|
| pHox (NAG pH) | No unit | - | 9.6 | 9.5 | 9.3 | 9.3 | 9.6 |
| NAG as kg H ₂ SO ₄ /tonne to pH 4.5 | kg H2SO4/T | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| NAG as kg H ₂ SO ₄ /tonne to pH 7 | kg H2SO4/T | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| NAG as kg CaCO ₃ /tonne to pH 4.5 | kg CaCO3/T | 1 | <1 | <1 | <1 | <1 | <1 |
| NAG as kg CaCO ₃ /tonne to pH 7 | kg CaCO3/T | 1 | <1 | <1 | <1 | <1 | <1 |

Moisture Content Method: AN234

| | | | | | | | |
|------------|---|-----|------|------|------|------|------|
| % Moisture | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|------|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|------------|------------|------------|------------|------------|
| pH | pH Units | 0.1 | 9.0 | 9.0 | 9.0 | 9.4 | 9.6 |
|----|----------|-----|------------|------------|------------|------------|------------|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|------------|-------------|----------|------------|------------|
| Conductivity of Extract (1:5 as received) | µS/cm | 1 | 860 | 1500 | 2 | 220 | 150 |
|---|-------|---|------------|-------------|----------|------------|------------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|------|------|------|------|------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
|--------------------------------|-------|-----|------|------|------|------|------|

| Parameter | Units | LOR | PE064484B.006 Sample Number Sample Matrix Sample Date Sample Name | PE064484B.007 Tails Tails 01 Dec 2011 LLT-3-1 | PE064484B.008 Ground Ground 01 Dec 2011 LLT-3-3 | PE064484B.009 Tails Tails 01 Dec 2011 LLT-3-4 | PE064484B.010 Tails & Ground Tails & Ground 01 Dec 2011 LLT-4-1 | PE064484B.011 Tails & Ground Tails & Ground 01 Dec 2011 LLT-5-1 |
|-----------|-------|-----|---|---|---|---|---|---|
|-----------|-------|-----|---|---|---|---|---|---|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|------|------|------|----|----|
| Sulphate (water extractable)* | mg/kg | 5 | 1300 | 1200 | 2100 | <5 | 86 |
|-------------------------------|-------|---|------|------|------|----|----|

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|------|------|------|------|------|
| As* | ppm | 0.5 | 154 | 44.2 | 25.6 | 23.8 | 27.4 |
| Pb* | ppm | 0.2 | 110 | 35.0 | 23.1 | 30.9 | 28.6 |
| Au* | ppb | 1 | 720 | 700 | 267 | 376 | 290 |
| Ag* | ppm | 0.02 | 0.23 | 0.15 | 0.21 | 0.11 | 0.09 |
| Cd* | ppm | 0.02 | 0.39 | 0.21 | 0.14 | 0.26 | 0.23 |
| Cu* | ppm | 1 | 81 | 56 | 54 | 56 | 67 |
| Ni* | ppm | 0.5 | 75.4 | 49.1 | 65.8 | 30.5 | 38.1 |
| Zn* | ppm | 1 | 131 | 70 | 75 | 77 | 63 |
| Be* | ppm | 0.02 | 0.09 | 0.06 | 0.10 | 0.04 | 0.06 |
| Co* | ppm | 0.2 | 14.3 | 14.3 | 28.6 | 9.3 | 12.6 |
| Mn* | ppm | 0.5 | 355 | 363 | 436 | 293 | 386 |
| Sb* | ppm | 0.02 | 0.45 | 0.17 | 0.15 | 0.12 | 0.15 |
| Se* | ppm | 0.5 | 0.5 | <0.5 | 0.8 | <0.5 | <0.5 |

ICPAES after Four Acid Digest Digest Method: ICP40Q

| | | | | | | | |
|---------------|-----|----|-----|-----|-----|-----|-----|
| Chromium, Cr* | ppm | 10 | 240 | 170 | 290 | 130 | 150 |
|---------------|-----|----|-----|-----|-----|-----|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|
| Mercury, Hg* | ppm | 0.1 | 5.6 | 3.1 | 1.6 | 1.5 | 0.9 |
|--------------|-----|-----|-----|-----|-----|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|----|----|-----|-----|
| Boron, B* | ppm | 20 | <20 | 20 | 90 | <20 | <20 |
|-----------|-----|----|-----|----|----|-----|-----|

| Parameter | Units | LOR | PE064484B.011 Sample Number Sample Matrix Sample Date Sample Name | PE064484B.012 Ground Tails & Ground 01 Dec 2011 LLT-5-2 | PE064484B.013 Tails Tails 01 Dec 2011 LLT-8-1 | PE064484B.014 Tails Tails 01 Dec 2011 LLT-7-1 | PE064484B.015 Tails Tails 01 Dec 2011 LLT-6-2 | PE064484B.016 Ground Ground 01 Dec 2011 LLT-6-4 |
|-----------|-------|-----|---|---|---|---|---|---|
|-----------|-------|-----|---|---|---|---|---|---|

pH in soil (1:2) Method: AN101

| | | | | | | | |
|---------------|----------|-----|-----|-----|-----|-----|-----|
| pH (1:2) aged | pH Units | 0.1 | 8.3 | 8.9 | 8.7 | 8.2 | 8.1 |
|---------------|----------|-----|-----|-----|-----|-----|-----|

Conductivity (1:2) in soil Method: AN106

| | | | | | | | |
|--------------------------------|-------|---|------|-----|-----|------|------|
| Conductivity (1:2) aged @ 25C* | µS/cm | 1 | 2400 | 230 | 240 | 3700 | 5400 |
|--------------------------------|-------|---|------|-----|-----|------|------|

Total Carbon/Sulphur in soil by LECO Method: CSA06V

| | | | | | | | |
|----------------------------|------------|-------|-------|-------|-------|------|-------|
| Sulphur* | % | 0.005 | 0.088 | 0.039 | 0.047 | 0.12 | 0.199 |
| Maximum Potential Acidity* | kg H2SO4/T | 0.1 | 2.7 | 1.2 | 1.4 | 3.7 | 6.1 |

HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014

| | | | | | | | |
|-----------------------------|------|-------|-------|----------|----------|------|-------|
| Acid Soluble Sulphur (SHCl) | %w/w | 0.005 | 0.041 | <0.025 † | <0.025 † | 0.10 | 0.089 |
|-----------------------------|------|-------|-------|----------|----------|------|-------|

Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212

| | | | | | | | |
|--|---------------------|-----|-----------|-----------|---------|---------|---------|
| Fizz Rating Reaction* | No unit | - | Moderate. | Moderate. | Slight. | Slight. | Slight. |
| ANC as % CaCO ₃ | % CaCO ₃ | 0.1 | 11 | 5.4 | 1.6 | 2.5 | 3.0 |
| Acid Neutralisation Capacity/Neutralisation Potential kg | kg H2SO4/T | 1 | 100 | 53 | 15 | 25 | 30 |

Net Acid Generation Potential (NAGP) Method: AN215

| | | | | | | | |
|-------------------------------|------------|-------|-------|-------|-------|------|------|
| Total Sulphur as % Sulphur | %w/w | 0.005 | 0.088 | 0.039 | 0.047 | 0.12 | 0.20 |
| Total Oxidisable Sulphur | kg H2SO4/T | 0.25 | 1.5 | 1.2 | 1.3 | 0.63 | 3.4 |
| Net Acid Production Potential | kg H2SO4/T | -800 | -100 | -52 | -14 | -24 | -26 |

| | Sample Number | PE064484B.016 | PE064484B.017 | PE064484B.018 | PE064484B.019 | PE064484B.020 |
|--|---------------|---------------|---------------|---------------|---------------|---------------|
| | Sample Matrix | Heap Leach | Soil | Heap Leach | Soil | Heap Leach |
| | Sample Date | 01 Dec 2011 |
| | Sample Name | PRT-1-1 | PRT-1-3 | PRT-2-2 | PRT-2-3 | PRT-3-1 |

Parameter Units LOR

pH in soil (1:2) Method: AN101

| | pH Units | 0.1 | 7.8 | 7.6 | 7.6 | 7.7 | 7.5 |
|---------------|----------|-----|-----|-----|-----|-----|-----|
| pH (1:2) aged | | | | | | | |

Conductivity (1:2) in soil Method: AN106

| | µS/cm | 1 | 3700 | 7100 | 3600 | 4100 | 9300 |
|--------------------------------|-------|---|------|------|------|------|------|
| Conductivity (1:2) aged @ 25C* | | | | | | | |

Total Carbon/Sulphur in soil by LECO Method: CSA06V

| | % | 0.005 | 0.508 | 0.475 | 0.751 | 0.37 | 0.794 |
|----------------------------|------------|-------|-------|-------|-------|------|-------|
| Sulphur* | | | | | | | |
| Maximum Potential Acidity* | kg H2SO4/T | 0.1 | 16 | 15 | 23 | 11 | 24 |

HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014

| | %w/w | 0.005 | 0.42 | 0.45 | 0.55 | 0.30 | 0.40 |
|----------------------------|------|-------|------|------|------|------|------|
| Acid Soluble Sulphur (SHC) | | | | | | | |

Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212

| | No unit | - | Slight. | Moderate. | None. | Moderate. | None. |
|--|---------------------|-----|---------|-----------|-------|-----------|-------|
| Fizz Rating Reaction* | | | | | | | |
| ANC as % CaCO ₃ | % CaCO ₃ | 0.1 | 2.7 | 9.4 | 4.3 | 8.6 | 1.1 |
| Acid Neutralisation Capacity/Neutralisation Potential kg | kg H2SO4/T | 1 | 26 | 92 | 42 | 85 | 11 |

Net Acid Generation Potential (NAGP) Method: AN215

| | %w/w | 0.005 | 0.51 | 0.48 | 0.75 | 0.37 | 0.79 |
|-------------------------------|------------|-------|-------|-------|------|-------|------|
| Total Sulphur as % Sulphur | | | | | | | |
| Total Oxidisable Sulphur | kg H2SO4/T | 0.25 | 2.6 | 0.86 | 6.3 | 2.0 | 12 |
| Net Acid Production Potential | kg H2SO4/T | -800 | -24 | -91 | -36 | -82 | 1 |
| Total Oxidisable Sulphur | %w/w | 0.005 | 0.084 | 0.028 | 0.20 | 0.067 | 0.39 |

Single Addition Net Acid Generation (NAG) Method: AN216

| | No unit | - | 9.1 | 9.0 | 8.8 | 8.8 | 5.2 |
|---|------------|-----|------|------|------|------|------|
| pHox (NAG pH) | | | | | | | |
| NAG as kg H ₂ SO ₄ /tonne to pH 4.5 | kg H2SO4/T | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| NAG as kg H ₂ SO ₄ /tonne to pH 7 | kg H2SO4/T | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 1.3 |
| NAG as kg CaCO ₃ /tonne to pH 4.5 | kg CaCO3/T | 1 | <1 | <1 | <1 | <1 | <1 |
| NAG as kg CaCO ₃ /tonne to pH 7 | kg CaCO3/T | 1 | <1 | <1 | <1 | <1 | 1.4 |

Moisture Content Method: AN234

| | % | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|------------|---|-----|------|------|------|------|------|
| % Moisture | | | | | | | |

pH in soil (1:5) Method: AN101

| | pH Units | 0.1 | 8.5 | 8.4 | 8.4 | 8.5 | 8.2 |
|----|----------|-----|-----|-----|-----|-----|-----|
| pH | | | | | | | |

Conductivity and TDS by Calculation - Soil Method: AN106

| | µS/cm | 1 | 3 | 4 | 3 | 3 | 5 |
|---|-------|---|---|---|---|---|---|
| Conductivity of Extract (1:5 as received) | | | | | | | |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | mg/kg | 0.1 | 0.2 | 0.5 | 0.6 | 0.5 | 0.4 |
|--------------------------------|-------|-----|-----|-----|-----|-----|-----|
| Weak Acid Dissociable Cyanide* | | | | | | | |

| Parameter | Units | LOR | PE064484B.016 | PE064484B.017 | PE064484B.018 | PE064484B.019 | PE064484B.020 |
|---------------|-------|-----|---------------|---------------|---------------|---------------|---------------|
| Sample Number | | | PE064484B.016 | PE064484B.017 | PE064484B.018 | PE064484B.019 | PE064484B.020 |
| Sample Matrix | | | Heap Leach | Soil | Heap Leach | Soil | Heap Leach |
| Sample Date | | | 01 Dec 2011 |
| Sample Name | | | PRT-1-1 | PRT-1-3 | PRT-2-2 | PRT-2-3 | PRT-3-1 |

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|------|------|------|------|------|
| Sulphate (water extractable)* | mg/kg | 5 | 8000 | 7800 | 7800 | 7000 | 8800 |
|-------------------------------|-------|---|------|------|------|------|------|

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|------|------|------|------|------|
| As* | ppm | 0.5 | 143 | 39.8 | 62.6 | 34.7 | 403 |
| Pb* | ppm | 0.2 | 110 | 37.2 | 55.3 | 35.3 | 78.3 |
| Au* | ppb | 1 | 366 | 136 | 750 | 460 | 1150 |
| Ag* | ppm | 0.02 | 0.45 | 0.19 | 0.49 | 0.39 | 3.50 |
| Cd* | ppm | 0.02 | 0.82 | 0.37 | 0.97 | 0.60 | 1.32 |
| Cu* | ppm | 1 | 147 | 73 | 129 | 96 | 531 |
| Ni* | ppm | 0.5 | 29.6 | 47.5 | 15.4 | 34.4 | 88.1 |
| Zn* | ppm | 1 | 201 | 108 | 174 | 134 | 169 |
| Be* | ppm | 0.02 | 0.06 | 0.15 | 0.04 | 0.09 | 0.13 |
| Co* | ppm | 0.2 | 11.2 | 27.9 | 8.5 | 15.0 | 21.0 |
| Mn* | ppm | 0.5 | 343 | 735 | 367 | 589 | 342 |
| Sb* | ppm | 0.02 | 0.34 | 0.16 | 0.29 | 0.21 | 0.40 |
| Se* | ppm | 0.5 | 0.8 | 0.9 | 0.7 | 0.7 | 1.0 |

ICPAES after Four Acid Digest Digest Method: ICP40Q

| | | | | | | | |
|---------------|-----|----|----|-----|----|-----|-----|
| Chromium, Cr* | ppm | 10 | 80 | 130 | 30 | 100 | 250 |
|---------------|-----|----|----|-----|----|-----|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|
| Mercury, Hg* | ppm | 0.1 | 5.8 | 2.6 | 8.9 | 6.1 | 2.6 |
|--------------|-----|-----|-----|-----|-----|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|----|-----|----|----|
| Boron, B* | ppm | 20 | <20 | 60 | <20 | 60 | 50 |
|-----------|-----|----|-----|----|-----|----|----|

| Parameter | Units | LOR | PE064484B.021 | PE064484B.022 | PE064484B.023 | PE064484B.024 | PE064484B.025 |
|---------------|-------|-----|---------------|---------------|---------------|---------------|---------------|
| Sample Number | | | PE064484B.021 | PE064484B.022 | PE064484B.023 | PE064484B.024 | PE064484B.025 |
| Sample Matrix | | | Soil | Soil | Soil | Tails | Soil |
| Sample Date | | | 01 Dec 2011 |
| Sample Name | | | PRT-3-3 | PRT-4-1 | PRT-4-3 | PRT-6-1 | PRT-8 |

pH in soil (1:2) Method: AN101

| | | | | | | | |
|---------------|----------|-----|-----|-----|-----|-----|-----|
| pH (1:2) aged | pH Units | 0.1 | 8.0 | 6.8 | 7.1 | 6.8 | 7.3 |
|---------------|----------|-----|-----|-----|-----|-----|-----|

Conductivity (1:2) in soil Method: AN106

| | | | | | | | |
|--------------------------------|-------|---|------|-----|------|------|-----|
| Conductivity (1:2) aged @ 25C* | µS/cm | 1 | 2000 | 130 | 3000 | 1900 | 180 |
|--------------------------------|-------|---|------|-----|------|------|-----|

Total Carbon/Sulphur in soil by LECO Method: CSA06V

| | | | | | | | |
|----------------------------|------------|-------|-------|-------|------|-------|-------|
| Sulphur* | % | 0.005 | 0.213 | 0.062 | 0.17 | 0.896 | 0.058 |
| Maximum Potential Acidity* | kg H2SO4/T | 0.1 | 6.5 | 1.9 | 5.2 | 27 | 1.8 |

HCl Extractable S, Ca and Mg in Soil ICP OES Method: AN014

| | | | | | | | |
|-----------------------------|------|-------|----------|----------|-------|------|-------|
| Acid Soluble Sulphur (SHCl) | %w/w | 0.005 | <0.025 † | <0.025 † | 0.064 | 0.65 | 0.030 |
|-----------------------------|------|-------|----------|----------|-------|------|-------|

Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: AN212

| | | | | | | | |
|--|---------------------|-----|---------|---------|-----------|-----------|-----------|
| Fizz Rating Reaction* | No unit | - | Slight. | Slight. | Moderate. | Moderate. | Moderate. |
| ANC as % CaCO ₃ | % CaCO ₃ | 0.1 | 0.8 | 2.2 | 11 | 2.6 | 20 |
| Acid Neutralisation Capacity/Neutralisation Potential kg | kg H2SO4/T | 1 | 7.6 | 22 | 110 | 25 | 200 |

Net Acid Generation Potential (NAGP) Method: AN215

| | | | | | | | |
|-------------------------------|------------|-------|------|-------|------|------|-------|
| Total Sulphur as % Sulphur | %w/w | 0.005 | 0.21 | 0.062 | 0.17 | 0.90 | 0.058 |
| Total Oxidisable Sulphur | kg H2SO4/T | 0.25 | 6.5 | 1.4 | 3.2 | 7.4 | 0.85 |
| Net Acid Production Potential | kg H2SO4/T | -800 | -1 | -20 | -100 | -18 | -200 |

MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Acid Neutralising Capacity or Neutralisation Potential(ANC/NP) Method: ME-(AU)-[ENV]AN212

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|--|--------------|--------------------------------------|-----|-------|----------|---------------|
| Fizz Rating Reaction* | LB037013 | No unit | - | None. | | |
| ANC as % CaCO ₃ | LB037013 | % CaCO ₃ | 0.1 | <0.1 | | |
| Acid Neutralisation Capacity/Neutralisation Potential kg H ₂ SO ₄ /t | LB037013 | kg H ₂ SO ₄ /T | 1 | <1 | 0 - 4% | NA |

Conductivity (1:2) in soil Method: ME-(AU)-[ENV]AN106

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|--------------------------------|--------------|-------|-----|----|----------|---------------|
| Conductivity (1:2) aged @ 25C* | LB037010 | µS/cm | 1 | <1 | 5 - 8% | NA |

Conductivity and TDS by Calculation - Soil Method: ME-(AU)-[ENV]AN106

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|--------------|-------|-----|----|----------|---------------|
| Conductivity of Extract (1:5 as received) | LB036997 | µS/cm | 1 | <1 | 0 - 5% | 100% |

HCl Extractable S, Ca and Mg in Soil ICP OES Method: ME-(AU)-[ENV]AN014

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|-----------------------------|--------------|-------|-------|---------------|----------|---------------|
| Acid Soluble Sulphur (SHCl) | LB037012 | %w/w | 0.005 | <0.005 - 0.29 | 0 - 4% | NA |

Moisture Content Method: ME-(AU)-[ENV]AN234

| Parameter | QC Reference | Units | LOR | DUP %RPD |
|------------|--------------|-------|-----|----------|
| % Moisture | LB037008 | % | 0.5 | 0% |

pH in soil (1:2) Method: ME-(AU)-[ENV]AN101

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---------------|--------------|----------|-----|-----------|----------|---------------|
| pH (1:2) aged | LB037009 | pH Units | 0.1 | 4.8 - 7.1 | 2% | NA |

pH in soil (1:5) Method: ME-(AU)-[ENV]AN101

| Parameter | QC Reference | Units | LOR | DUP %RPD | LCS %Recovery |
|-----------|--------------|----------|-----|----------|---------------|
| pH | LB036996 | pH Units | 0.1 | 1 - 2% | 99% |

Single Addition Net Acid Generation (NAG) Method: ME-(AU)-[ENV]AN216

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|--------------|--------------------------------------|-----|-----------|----------|---------------|
| pHox (NAG pH) | LB037011 | No unit | - | 6.1 - 6.2 | 0 - 6% | 100% |
| NAG as kg H ₂ SO ₄ /tonne to pH 4.5 | LB037011 | kg H ₂ SO ₄ /T | 0.5 | <0.5 | 0% | 113% |
| NAG as kg H ₂ SO ₄ /tonne to pH 7 | LB037011 | kg H ₂ SO ₄ /T | 0.5 | <0.5 | 0 - 12% | 104 - 105% |
| NAG as kg CaCO ₃ /tonne to pH 4.5 | LB037011 | kg CaCO ₃ /T | 1 | <1 | 0% | 113% |
| NAG as kg CaCO ₃ /tonne to pH 7 | LB037011 | kg CaCO ₃ /T | 1 | <1 | 0 - 12% | 104 - 105% |

Sulphate (water extractable) in Soil Method: ME-(AU)-[ENV]AN275

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD |
|-------------------------------|--------------|-------|-----|----|----------|
| Sulphate (water extractable)* | LB036993 | mg/kg | 5 | <5 | 5 - 12% |

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN077/AN287

| Parameter | QC Reference | Units | LOR | DUP %RPD |
|--------------------------------|--------------|-------|-----|----------|
| Weak Acid Dissociable Cyanide* | LB036992 | mg/kg | 0.1 | 0% |

| METHOD | METHODOLOGY SUMMARY |
|--------|---|
| AN002 | Into a glass bottle or plastic jar weigh 20g of air-dried or as received sample, and add 100mL distilled water. If suspensions are prepared on different sample weights, ensure that the 1:5 soil to water ratio is maintained. |
| AN004 | Soils, sediments and sludges are pulverised using an LM2 ringmill. The dry sample is pulverised to a particle size of >90% passing through a -75µm sieve. |
| AN014 | This method is for the determination of soluble sulphate (SO ₄ -S) by extraction with hydrochloric acid. Sulphides should not react and would normally be expelled. Sulphur is determined by ICP. |
| AN101 | pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+. |
| AN106 | Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2520 B. |
| AN106 | Resistivity of the extract is reported on the extract basis and is the reciprocal of conductivity. |
| AN212 | Samples are initially evaluated to determine the strength of reagents needed using a 'fizz' test. Samples are then subjected to an excess of hydrochloric acid followed by alkaline back titration to pH 7. Results are expressed in kg H ₂ SO ₄ /tonne or Kg CaCO ₃ /tonne after correction for moisture content if applicable. |
| AN215 | This is purely a calculation based on results obtained from Total Sulphur, Sulphate Method, and Acid Neutralisation Capacity Method (ME-(AU)-[ENV]AN212). |
| AN216 | Pulverised sub-sample of a waste rock or an as received sample of filter cake, soil or sludge is subjected to an oxidising digest with hydrogen peroxide. The pH and EC of the NAG suspension is recorded at various stages in the digest. The acid produced (if any) is titrated using standardised NaOH to pH 7.0. NAG results are reported to 0.5 kg H ₂ SO ₄ /tonne. |
| AN234 | The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water. |
| AN275 | Suphate by Aquakem DA following 1:5 DI water extraction: Sulphate is precipitated in an acidic medium with barium chloride. The resulting turbidity is measured photometrically at 405nm and compared with standard calibration solutions to determine the sulphate concentration in the sample. Reference APHA 4500-SO42-. Internal reference AN275. |

FOOTNOTES

| | | | |
|-----|---|-----|--|
| IS | Insufficient sample for analysis. | QFH | QC result is above the upper tolerance |
| LNR | Sample listed, but not received. | QFL | QC result is below the lower tolerance |
| * | This analysis is not covered by the scope of accreditation. | - | The sample was not analysed for this analyte |
| ^ | Performed by outside laboratory. | NVL | Not Validated |
| LOR | Limit of Reporting | | |
| ↑↓ | Raised or Lowered Limit of Reporting | | |

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf>

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LABORATORY DETAILS

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WA 6429

Laboratory SGS Newburn Environmental
Address 10 Reid Rd
Newburn WA 6105

Project **Historical Contaminated Site Assessment**
Order Number **12474**
Samples 58

SGS Reference PE066149 R0
Report Number 0000038280
Date Reported 17 Apr 2012
Date Received 27 Mar 2012

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

Metals analysis subcontracted to SGS Perth Minerals, 10 Reid Rd Newburn WA, NATA Accreditation Number 1936, WM140207.

Duplicate result for WAD Cyanide was less than 5 times LOR and therefore preclude acceptance criteria for RPD.



ANALYTICAL REPORT

PE066149 R0

| Parameter | Units | LOR | PE066149.001 Sample Number Sample Matrix Sample Date Sample Name | PE066149.002 Tails 10/3/12 8:53 LLM-2 Tails | PE066149.003 Tails 10/3/12 9:05 LLT-9 Tails | PE066149.004 Tails 10/3/12 9:15 LLT-10 Tails | PE066149.005 Tails 10/3/12 9:20 LLT-11 Tails | PE066149.005 Soil & Tails 10/3/12 9:25 LLT-12 Soil & Tails |
|-----------|-------|-----|--|--|--|---|---|---|
|-----------|-------|-----|--|--|--|---|---|---|

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|------|-----|-----|-----|-----|
| % Moisture | % | 0.5 | <0.5 | 0.5 | 0.9 | 1.1 | 3.3 |
|------------|---|-----|------|-----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|-----|-----|-----|-----|-----|
| pH | pH Units | 0.1 | 8.0 | 9.1 | 8.5 | 8.8 | 8.1 |
|----|----------|-----|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|----|----|-----|----|------|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | 33 | 46 | 940 | 68 | 1300 |
|---|-------|---|----|----|-----|----|------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|----|---|-----|----|---|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 11 | 8 | 990 | 10 | 9 |
|-----------------------------------|-------|---|----|---|-----|----|---|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|----|---|-----|---|-------|
| Sulphate (water extractable)* | mg/kg | 5 | 11 | 9 | 510 | 5 | 44000 |
|-------------------------------|-------|---|----|---|-----|---|-------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|------|------|------|------|-----|
| Water Soluble Fluoride* | mg/kg | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 1.5 |
|-------------------------|-------|-----|------|------|------|------|-----|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|------|------|-----|------|-----|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | <0.1 | <0.1 | 0.2 | <0.1 | 0.2 |
|--------------------------------|-------|-----|------|------|-----|------|-----|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|---|----|----|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 3 | 2 | 16 | 3 | <1 |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | 13 | 9 | 73 | 15 | <4 |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|-------|-------|-------|-------|-------|
| As* | ppm | 0.5 | 22.9 | 33.7 | 55.1 | 42.2 | 51.6 |
| Pb* | ppm | 0.2 | 21.6 | 29.0 | 93.3 | 71.4 | 20.9 |
| Au* | ppb | 1 | 600 | 493 | 970 | 423 | 1030 |
| Ag* | ppm | 0.02 | 0.13 | 0.08 | 0.15 | 0.09 | 0.21 |
| Cd* | ppm | 0.02 | 0.19 | 0.25 | 0.45 | 0.24 | 0.16 |
| Cu* | ppm | 1 | 60 | 102 | 70 | 56 | 75 |
| Ni* | ppm | 0.5 | 24.9 | 56.7 | 168.0 | 142.0 | 129.0 |
| Zn* | ppm | 1 | 52 | 77 | 93 | 83 | 83 |
| Be* | ppm | 0.02 | 0.05 | 0.07 | 0.10 | 0.08 | 0.20 |
| Co* | ppm | 0.2 | 9.4 | 13.4 | 18.1 | 20.1 | 36.0 |
| Mn* | ppm | 0.5 | 319.0 | 360.0 | 423.0 | 349.0 | 806.0 |
| Sb* | ppm | 0.02 | 0.11 | 0.13 | 0.18 | 0.14 | 0.20 |
| Se* | ppm | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.9 |

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|----|-----|-----|-----|-----|
| Chromium, Cr* | ppm | 3 | 62 | 287 | 301 | 532 | 384 |
|---------------|-----|---|----|-----|-----|-----|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|---|-----|-----|-----|
| Mercury, Hg* | ppm | 0.001 | 0.7 | 1 | 4.3 | 1.4 | 1.9 |
|--------------|-----|-------|-----|---|-----|-----|-----|

| | Sample Number | PE066149.001 | PE066149.002 | PE066149.003 | PE066149.004 | PE066149.005 |
|---------------|---------------|--------------|--------------|--------------|---------------------|---------------------|
| Sample Matrix | Tails | Tails | Tails | Tails | Tails | Soil & Tails |
| Sample Date | 10/3/12 8:53 | 10/3/12 9:05 | 10/3/12 9:15 | 10/3/12 9:20 | 10/3/12 9:25 | 10/3/12 9:25 |
| Sample Name | LLM-2 Tails | LLT-9 Tails | LLT-10 Tails | LLT-11 Tails | LLT-12 Soil & Tails | LLT-12 Soil & Tails |

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| Parameter | Units | LOR | | | | |
|-----------|-------|-----|-----|-----|-----|-----------|
| Boron, B* | ppm | 20 | <20 | <20 | <20 | 30 |

| | Sample Number | PE066149.006 | PE066149.007 | PE066149.008 | PE066149.009 | PE066149.010 |
|---------------|---------------|-----------------------|---------------------|--------------|-----------------|-----------------|
| Sample Matrix | Tails | Natural Ground | Soil & Tails | Tails | Concrete | Concrete |
| Sample Date | 10/3/12 9:33 | 10/3/12 9:40 | 10/3/12 9:45 | 10/3/12 9:50 | 10/3/12 10:00 | 10/3/12 10:00 |
| Sample Name | LLT-13 Tails | LLT-14 Natural Ground | LLT-15 Soil & Tails | LLT-16 Tails | LLT-17 Concrete | LLT-17 Concrete |

Moisture Content Method: AN002

| Parameter | Units | LOR | | | | |
|------------|-------|-----|------------|------------|------------|------------|
| % Moisture | % | 0.5 | 0.9 | 2.1 | 2.5 | 1.1 |

pH in soil (1:5) Method: AN101

| Parameter | Units | LOR | | | | |
|-----------|----------|-----|------------|------------|------------|------------|
| pH | pH Units | 0.1 | 9.2 | 8.8 | 8.8 | 8.7 |

Conductivity and TDS by Calculation - Soil Method: AN106

| Parameter | Units | LOR | | | | |
|---|-------|-----|------------|-----------|------------|-------------|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | 170 | 93 | 170 | 5900 |

Chloride (water extractable) Method: AN274

| Parameter | Units | LOR | | | | |
|-----------------------------------|-------|-----|------------|----------|------------|-------------|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 190 | 7 | 160 | 7700 |

Sulphate (water extractable) in Soil Method: AN275

| Parameter | Units | LOR | | | | |
|-------------------------------|-------|-----|----------|----|----|-------------|
| Sulphate (water extractable)* | mg/kg | 5 | 8 | <5 | <5 | 4400 |

Water Soluble Fluoride in Soil Method: AN141

| Parameter | Units | LOR | | | | |
|-------------------------|-------|-----|------|------|------|------|
| Water Soluble Fluoride* | mg/kg | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| Parameter | Units | LOR | | | | |
|--------------------------------|-------|-----|------|------|------|------------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | <0.1 | <0.1 | <0.1 | 0.1 |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| Parameter | Units | LOR | | | | |
|---|-------|-----|----|----|----------|-----------|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | <1 | <1 | 2 | 22 |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | <4 | <4 | 9 | 99 |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| Parameter | Units | LOR | | | | |
|-----------|-------|------|--------------|---------------|---------------|--------------|
| As* | ppm | 0.5 | 23.2 | 5.9 | 6.5 | 44.2 |
| Pb* | ppm | 0.2 | 25.4 | 9.0 | 9.7 | 45.8 |
| Au* | ppb | 1 | 495 | 65 | 30 | 445 |
| Ag* | ppm | 0.02 | 0.12 | <0.02 | 0.02 | 0.15 |
| Cd* | ppm | 0.02 | 0.18 | 0.08 | 0.13 | 0.24 |
| Cu* | ppm | 1 | 63 | 37 | 34 | 105 |
| Ni* | ppm | 0.5 | 61.8 | 81.3 | 121.0 | 65.0 |
| Zn* | ppm | 1 | 55 | 46 | 63 | 82 |
| Be* | ppm | 0.02 | 0.10 | 0.15 | 0.19 | 0.08 |
| Co* | ppm | 0.2 | 17.4 | 26.3 | 41.2 | 21.8 |
| Mn* | ppm | 0.5 | 508.0 | 1010.0 | 1880.0 | 506.0 |
| Sb* | ppm | 0.02 | 0.14 | 0.10 | 0.10 | 0.16 |
| Se* | ppm | 0.5 | <0.5 | <0.5 | <0.5 | 0.7 |

| Parameter | Units | LOR | PE066149.006 | PE066149.007 | PE066149.008 | PE066149.009 | PE066149.010 |
|---------------|-------|-----|--------------|-----------------------|---------------------|--------------|-----------------|
| Sample Number | | | PE066149.006 | PE066149.007 | PE066149.008 | PE066149.009 | PE066149.010 |
| Sample Matrix | | | Tails | Natural Ground | Soil & Tails | Tails | Concrete |
| Sample Date | | | 10/3/12 9:33 | 10/3/12 9:40 | 10/3/12 9:45 | 10/3/12 9:50 | 10/3/12 10:00 |
| Sample Name | | | LLT-13 Tails | LLT-14 Natural Ground | LLT-15 Soil & Tails | LLT-16 Tails | LLT-17 Concrete |

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|-----|-----|-----|-----|-----|
| Chromium, Cr* | ppm | 3 | 476 | 173 | 461 | 154 | 122 |
|---------------|-----|---|-----|-----|-----|-----|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|-----|-----|-----|------|
| Mercury, Hg* | ppm | 0.001 | 0.7 | 0.1 | 0.1 | 0.8 | 15.7 |
|--------------|-----|-------|-----|-----|-----|-----|------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|-----|-----|-----|-----|
| Boron, B* | ppm | 20 | <20 | <20 | <20 | <20 | 190 |
|-----------|-----|----|-----|-----|-----|-----|-----|

| Parameter | Units | LOR | PE066149.011 | PE066149.012 | PE066149.013 | PE066149.014 | PE066149.015 |
|---------------|-------|-----|---------------|---------------------|---------------|---------------------|---------------|
| Sample Number | | | PE066149.011 | PE066149.012 | PE066149.013 | PE066149.014 | PE066149.015 |
| Sample Matrix | | | Tails | Soil & Tails | Tails | Soil & Tails | Tails |
| Sample Date | | | 10/3/12 11:30 | 10/3/12 11:35 | 10/3/12 11:40 | 10/3/12 11:45 | 10/3/12 11:47 |
| Sample Name | | | PRT-12 Tails | PRT-13 Soil & Tails | PRT-14 Tails | PRT-15 Soil & Tails | PRT-16 Tails |

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|-----|-----|------|-----|-----|
| % Moisture | % | 0.5 | 0.6 | 1.7 | <0.5 | 2.0 | 1.4 |
|------------|---|-----|-----|-----|------|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|-----|-----|-----|-----|-----|
| pH | pH Units | 0.1 | 8.2 | 8.4 | 7.7 | 8.3 | 8.7 |
|----|----------|-----|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|-----|------|----|------|-----|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | 170 | 1600 | 27 | 2100 | 110 |
|---|-------|---|-----|------|----|------|-----|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|-----|------|----|------|---|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 140 | 1300 | 11 | 1500 | 7 |
|-----------------------------------|-------|---|-----|------|----|------|---|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|---|------|----|------|----|
| Sulphate (water extractable)* | mg/kg | 5 | 6 | 1000 | <5 | 3300 | <5 |
|-------------------------------|-------|---|---|------|----|------|----|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|------|-----|------|-----|------|
| Water Soluble Fluoride* | mg/kg | 0.5 | <0.5 | 1.3 | <0.5 | 2.7 | <0.5 |
|-------------------------|-------|-----|------|-----|------|-----|------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|------|------|------|------|------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
|--------------------------------|-------|-----|------|------|------|------|------|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|---|---|----|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | <1 | 2 | 1 | 4 | 3 |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | <4 | 8 | 5 | 18 | 15 |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|-------|-------|-------|--------|-------|
| As* | ppm | 0.5 | 29.0 | 22.7 | 30.3 | 13.2 | 31.7 |
| Pb* | ppm | 0.2 | 115.0 | 26.8 | 94.5 | 26.4 | 54.7 |
| Au* | ppb | 1 | 1660 | 421 | 1420 | 324 | 382 |
| Ag* | ppm | 0.02 | 0.49 | 0.31 | 0.75 | 0.24 | 0.33 |
| Cd* | ppm | 0.02 | 0.29 | 0.34 | 0.33 | 0.18 | 0.35 |
| Cu* | ppm | 1 | 254 | 119 | 237 | 97 | 141 |
| Ni* | ppm | 0.5 | 43.9 | 65.2 | 33.3 | 88.3 | 103.0 |
| Zn* | ppm | 1 | 221 | 148 | 199 | 111 | 236 |
| Be* | ppm | 0.02 | 0.06 | 0.12 | 0.06 | 0.26 | 0.13 |
| Co* | ppm | 0.2 | 5.1 | 16.8 | 6.0 | 40.6 | 21.6 |
| Mn* | ppm | 0.5 | 87.6 | 468.0 | 140.0 | 1080.0 | 611.0 |
| Sb* | ppm | 0.02 | 0.19 | 0.15 | 0.20 | 0.13 | 0.14 |

| Parameter | Units | LOR | PE066149.011 | PE066149.012 | PE066149.013 | PE066149.014 | PE066149.015 |
|---------------|-------|-----|---------------|---------------------|---------------|---------------------|---------------|
| Sample Number | | | PE066149.011 | PE066149.012 | PE066149.013 | PE066149.014 | PE066149.015 |
| Sample Matrix | | | Tails | Soil & Tails | Tails | Soil & Tails | Tails |
| Sample Date | | | 10/3/12 11:30 | 10/3/12 11:35 | 10/3/12 11:40 | 10/3/12 11:45 | 10/3/12 11:47 |
| Sample Name | | | PRT-12 Tails | PRT-13 Soil & Tails | PRT-14 Tails | PRT-15 Soil & Tails | PRT-16 Tails |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133 (continued)

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| Se* | ppm | 0.5 | 2.7 | 1.5 | 3.0 | 1.4 | 1.3 |
|-----|-----|-----|-----|-----|-----|-----|-----|

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|-----|-----|-----|-----|-----|
| Chromium, Cr* | ppm | 3 | 153 | 381 | 109 | 290 | 197 |
|---------------|-----|---|-----|-----|-----|-----|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|-----|-----|-----|-----|
| Mercury, Hg* | ppm | 0.001 | 1.1 | 0.5 | 0.2 | 0.5 | 0.5 |
|--------------|-----|-------|-----|-----|-----|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|----|----|-----|-----|-----|
| Boron, B* | ppm | 20 | 20 | 20 | <20 | 110 | <20 |
|-----------|-----|----|----|----|-----|-----|-----|

| Parameter | Units | LOR | PE066149.016 | PE066149.017 | PE066149.018 | PE066149.019 | PE066149.020 |
|---------------|-------|-----|---------------|---------------------|---------------|---------------------|---------------|
| Sample Number | | | PE066149.016 | PE066149.017 | PE066149.018 | PE066149.019 | PE066149.020 |
| Sample Matrix | | | Soil | Soil & Tails | Soil | Soil & Tails | Tails |
| Sample Date | | | 10/3/12 11:50 | 10/3/12 11:53 | 10/3/12 11:57 | 10/3/12 12:00 | 10/3/12 12:10 |
| Sample Name | | | PRT-17 Soil | PRT-18 Soil & Tails | PRT-19 Soil | PRT-20 Soil & Tails | PRT-21 Tails |

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|-----|-----|-----|-----|-----|
| % Moisture | % | 0.5 | 8.8 | 4.9 | 5.2 | 1.6 | 0.8 |
|------------|---|-----|-----|-----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|-----|-----|-----|-----|-----|
| pH | pH Units | 0.1 | 8.2 | 7.8 | 9.0 | 8.7 | 8.0 |
|----|----------|-----|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|------|------|-----|-----|------|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | 8000 | 1800 | 870 | 120 | 1700 |
|---|-------|---|------|------|-----|-----|------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|-------|----|------|----|----|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 11000 | 69 | 1100 | 13 | 30 |
|-----------------------------------|-------|---|-------|----|------|----|----|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|-------|------|-----|----|------|
| Sulphate (water extractable)* | mg/kg | 5 | 10000 | 5500 | 100 | <5 | 6200 |
|-------------------------------|-------|---|-------|------|-----|----|------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|
| Water Soluble Fluoride* | mg/kg | 0.5 | 0.8 | 0.9 | 4.5 | 0.6 | 0.6 |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|

| Parameter | Units | LOR | PE066149.016 | PE066149.017 | PE066149.018 | PE066149.019 | PE066149.020 |
|---------------|-------|-----|---------------|---------------------|---------------|---------------------|---------------|
| Sample Number | | | PE066149.016 | PE066149.017 | PE066149.018 | PE066149.019 | PE066149.020 |
| Sample Matrix | | | Soil | Soil & Tails | Soil | Soil & Tails | Tails |
| Sample Date | | | 10/3/12 11:50 | 10/3/12 11:53 | 10/3/12 11:57 | 10/3/12 12:00 | 10/3/12 12:10 |
| Sample Name | | | PRT-17 Soil | PRT-18 Soil & Tails | PRT-19 Soil | PRT-20 Soil & Tails | PRT-21 Tails |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|------|------|------|------|------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
|--------------------------------|-------|-----|------|------|------|------|------|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|---|----|----|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 14 | 1 | 10 | 8 | <1 |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | 63 | 5 | 42 | 36 | <4 |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|-------|--------|-------|--------|-------|
| As* | ppm | 0.5 | 5.6 | 2.7 | 5.5 | 5.1 | 95.4 |
| Pb* | ppm | 0.2 | 2.9 | 14.0 | 3.4 | 20.9 | 106.0 |
| Au* | ppb | 1 | 19 | 81 | 35 | 44 | 1020 |
| Ag* | ppm | 0.02 | <0.02 | 0.03 | <0.02 | <0.02 | 0.63 |
| Cd* | ppm | 0.02 | 0.05 | 1.63 | 0.05 | 0.15 | 1.13 |
| Cu* | ppm | 1 | 61 | 60 | 52 | 49 | 243 |
| Ni* | ppm | 0.5 | 54.7 | 100.0 | 79.3 | 60.2 | 34.0 |
| Zn* | ppm | 1 | 58 | 552 | 71 | 77 | 344 |
| Be* | ppm | 0.02 | 0.16 | 0.30 | 0.20 | 0.16 | 0.08 |
| Co* | ppm | 0.2 | 15.7 | 37.3 | 33.7 | 24.7 | 18.0 |
| Mn* | ppm | 0.5 | 424.0 | 1930.0 | 534.0 | 1080.0 | 517.0 |
| Sb* | ppm | 0.02 | 0.10 | 0.06 | 0.05 | 0.12 | 0.26 |
| Se* | ppm | 0.5 | 0.6 | 0.7 | 0.8 | <0.5 | 1.0 |

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|-----|-----|-----|-----|-----|
| Chromium, Cr* | ppm | 3 | 255 | 151 | 211 | 121 | 461 |
|---------------|-----|---|-----|-----|-----|-----|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|--------|-----|--------|-----|-----|
| Mercury, Hg* | ppm | 0.001 | <0.001 | 0.2 | <0.001 | 0.3 | 9.7 |
|--------------|-----|-------|--------|-----|--------|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|----|----|----|----|-----|
| Boron, B* | ppm | 20 | 90 | 30 | 80 | 30 | <20 |
|-----------|-----|----|----|----|----|----|-----|

| Parameter | Units | LOR | PE066149.021 | PE066149.022 | PE066149.023 | PE066149.024 | PE066149.025 |
|---------------|-------|-----|---------------|---------------------|---------------------|---------------------|-----------------|
| Sample Number | | | PE066149.021 | PE066149.022 | PE066149.023 | PE066149.024 | PE066149.025 |
| Sample Matrix | | | Tails | Soil & Tails | Soil & Tails | Soil & Tails | Concrete |
| Sample Date | | | 10/3/12 12:15 | 10/3/12 12:25 | 10/3/12 12:25 | 10/3/12 12:30 | 10/3/12 12:45 |
| Sample Name | | | PRT-22 Tails | PRT-23 Soil & Tails | PRT-24 Soil & Tails | PRT-25 Soil & Tails | PRT-26 Concrete |

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|------|-----|------|-----|------|
| % Moisture | % | 0.5 | <0.5 | 1.2 | <0.5 | 2.2 | <0.5 |
|------------|---|-----|------|-----|------|-----|------|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|-----|-----|-----|-----|-----|
| pH | pH Units | 0.1 | 8.1 | 9.2 | 8.2 | 9.0 | 8.8 |
|----|----------|-----|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|------|-----|-----|-----|----|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | 1200 | 100 | 940 | 100 | 85 |
|---|-------|---|------|-----|-----|-----|----|

| | Sample Number | PE066149.021 | PE066149.022 | PE066149.023 | PE066149.024 | PE066149.025 |
|-----------|---------------|---------------|---------------------|---------------------|---------------------|-----------------|
| | Sample Matrix | Tails | Soil & Tails | Soil & Tails | Soil & Tails | Concrete |
| | Sample Date | 10/3/12 12:15 | 10/3/12 12:25 | 10/3/12 12:25 | 10/3/12 12:30 | 10/3/12 12:45 |
| | Sample Name | PRT-22 Tails | PRT-23 Soil & Tails | PRT-24 Soil & Tails | PRT-25 Soil & Tails | PRT-26 Concrete |
| Parameter | Units | LOR | | | | |

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|-----------|-----------|-----------|-----------|-----------|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 31 | 16 | 16 | 24 | 26 |
|-----------------------------------|-------|---|-----------|-----------|-----------|-----------|-----------|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|-------------|----|-------------|----|-----------|
| Sulphate (water extractable)* | mg/kg | 5 | 3700 | <5 | 2800 | <5 | 42 |
|-------------------------------|-------|---|-------------|----|-------------|----|-----------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|------|------------|------|------|------|
| Water Soluble Fluoride* | mg/kg | 0.5 | <0.5 | 0.8 | <0.5 | <0.5 | <0.5 |
|-------------------------|-------|-----|------|------------|------|------|------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|------------|------|------|------|------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.2 | <0.1 | <0.1 | <0.1 | <0.1 |
|--------------------------------|-------|-----|------------|------|------|------|------|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|----------|----|-----------|-----------|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | <1 | 1 | <1 | 3 | 3 |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | <4 | 7 | <4 | 12 | 15 |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|--------------|--------------|--------------|---------------|--------------|
| As* | ppm | 0.5 | 211.0 | 87.2 | 117.0 | 28.4 | 35.3 |
| Pb* | ppm | 0.2 | 106.0 | 109.0 | 33.2 | 33.2 | 72.9 |
| Au* | ppb | 1 | 900 | 1420 | 890 | 440 | 1790 |
| Ag* | ppm | 0.02 | 0.83 | 0.95 | 0.53 | 0.31 | 0.79 |
| Cd* | ppm | 0.02 | 1.47 | 1.03 | 0.65 | 0.43 | 1.08 |
| Cu* | ppm | 1 | 232 | 289 | 153 | 100 | 105 |
| Ni* | ppm | 0.5 | 33.7 | 51.7 | 26.0 | 101.0 | 31.3 |
| Zn* | ppm | 1 | 818 | 336 | 168 | 137 | 556 |
| Be* | ppm | 0.02 | 0.07 | 0.16 | 0.09 | 0.19 | 0.17 |
| Co* | ppm | 0.2 | 17.4 | 20.4 | 20.2 | 30.6 | 19.8 |
| Mn* | ppm | 0.5 | 511.0 | 675.0 | 715.0 | 1240.0 | 414.0 |
| Sb* | ppm | 0.02 | 0.55 | 0.28 | 0.32 | 0.12 | 0.09 |
| Se* | ppm | 0.5 | 1.1 | 1.5 | 0.7 | 0.5 | 0.6 |

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|-----------|------------|-----------|------------|-----------|
| Chromium, Cr* | ppm | 3 | 58 | 267 | 30 | 374 | 80 |
|---------------|-----|---|-----------|------------|-----------|------------|-----------|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-------------|-------------|-----------|------------|------------|
| Mercury, Hg* | ppm | 0.001 | 10.7 | 10.1 | 11 | 0.8 | 2.8 |
|--------------|-----|-------|-------------|-------------|-----------|------------|------------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|-----|-----------|-----|-----------|
| Boron, B* | ppm | 20 | <20 | <20 | 20 | <20 | 40 |
|-----------|-----|----|-----|-----|-----------|-----|-----------|



ANALYTICAL REPORT

PE066149 R0

| | Sample Number | PE066149.026 | PE066149.027 | PE066149.028 | PE066149.029 | PE066149.030 |
|-----------|---------------|--------------|--------------|------------------------|------------------------|--------------|
| Parameter | Sample Matrix | Tails | Tails | Natural Ground | Natural Ground | Soil |
| | Sample Date | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| | Sample Name | LLT-1 Tails | LLT-2 Tails | LLT-4.3 Natural Ground | LLT-8.2 Natural Ground | PRT-6.2 Soil |
| | Units | LOR | | | | |

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|------------|------------|------------|------------|------------|
| % Moisture | % | 0.5 | 3.7 | 0.8 | 0.6 | 1.6 | 2.8 |
|------------|---|-----|------------|------------|------------|------------|------------|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|------------|------------|------------|------------|------------|
| pH | pH Units | 0.1 | 9.1 | 9.3 | 8.3 | 9.7 | 8.8 |
|----|----------|-----|------------|------------|------------|------------|------------|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|-------------|-------------|------------|------------|-------------|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | 2600 | 1500 | 930 | 390 | 2700 |
|---|-------|---|-------------|-------------|------------|------------|-------------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|-------------|-------------|------------|------------|-------------|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 2200 | 1500 | 180 | 360 | 1600 |
|-----------------------------------|-------|---|-------------|-------------|------------|------------|-------------|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|-------------|------------|-------------|-----------|-------------|
| Sulphate (water extractable)* | mg/kg | 5 | 3500 | 890 | 2300 | 97 | 4500 |
|-------------------------------|-------|---|-------------|------------|-------------|-----------|-------------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|------------|------|------|------------|------------|
| Water Soluble Fluoride* | mg/kg | 0.5 | 1.8 | <0.5 | <0.5 | 0.9 | 2.3 |
|-------------------------|-------|-----|------------|------|------|------------|------------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|------|------------|------------|------|------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | <0.1 | 0.1 | 0.1 | <0.1 | <0.1 |
|--------------------------------|-------|-----|------|------------|------------|------|------|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|-----------|-----------|-----------|-----------|----------|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 18 | 4 | 4 | 2 | 1 |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | 79 | 19 | 16 | 11 | 6 |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|--------------|--------------|--------------|--------------|---------------|
| As* | ppm | 0.5 | 23.8 | 35.2 | 8.4 | 14.2 | 19.2 |
| Pb* | ppm | 0.2 | 6.8 | 42.2 | 17.3 | 15.1 | 30.8 |
| Au* | ppb | 1 | 98 | 234 | 373 | 74 | 760 |
| Ag* | ppm | 0.02 | <0.02 | 0.06 | 0.16 | <0.02 | 0.27 |
| Cd* | ppm | 0.02 | 0.07 | 0.20 | 0.73 | 0.07 | 0.47 |
| Cu* | ppm | 1 | 57 | 82 | 36 | 54 | 112 |
| Ni* | ppm | 0.5 | 171.0 | 52.5 | 73.7 | 41.3 | 98.1 |
| Zn* | ppm | 1 | 60 | 74 | 864 | 116 | 178 |
| Be* | ppm | 0.02 | 0.23 | 0.06 | 0.09 | 0.30 | 0.23 |
| Co* | ppm | 0.2 | 56.7 | 13.9 | 20.0 | 16.5 | 36.9 |
| Mn* | ppm | 0.5 | 764.0 | 346.0 | 605.0 | 675.0 | 1130.0 |
| Sb* | ppm | 0.02 | 0.08 | 0.10 | 0.11 | 0.37 | 0.09 |
| Se* | ppm | 0.5 | 0.8 | <0.5 | <0.5 | 0.5 | 0.8 |

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|------------|------------|------------|-----------|------------|
| Chromium, Cr* | ppm | 3 | 378 | 138 | 242 | 89 | 251 |
|---------------|-----|---|------------|------------|------------|-----------|------------|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|------------|------------|----------|------------|------------|
| Mercury, Hg* | ppm | 0.001 | 0.2 | 2.6 | 2 | 0.1 | 2.5 |
|--------------|-----|-------|------------|------------|----------|------------|------------|

| | Sample Number | PE066149.026 | PE066149.027 | PE066149.028 | PE066149.029 | PE066149.030 |
|---------------|---------------|--------------|------------------------|------------------------|----------------|--------------|
| Sample Matrix | Tails | Tails | Tails | Natural Ground | Natural Ground | Soil |
| Sample Date | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| Sample Name | LLT-1 Tails | LLT-2 Tails | LLT-4.3 Natural Ground | LLT-8.2 Natural Ground | PRT-6.2 Soil | |
| Parameter | Units | LOR | | | | |

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | ppm | 20 | 160 | <20 | <20 | <20 | 50 |
|-----------|-----|----|-----|-----|-----|-----|----|
| Boron, B* | | | | | | | |

| | Sample Number | PE066149.031 | PE066149.032 | PE066149.033 | PE066149.034 | PE066149.035 |
|---------------|---------------------|---------------------|--------------|----------------------|----------------------|---------------|
| Sample Matrix | Contamination | Contamination | Soil | Natural Ground | Contamination | Contamination |
| Sample Date | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| Sample Name | PRT-7 Contamination | PRT-9 Contamination | PRT-10 Soil | PRT-5 Natural Ground | PRT-11 Contamination | |
| Parameter | Units | LOR | | | | |

Moisture Content Method: AN002

| | % | 0.5 | <0.5 | <0.5 | 1.2 | 1.8 | 1.2 |
|------------|---|-----|------|------|-----|-----|-----|
| % Moisture | | | | | | | |

pH in soil (1:5) Method: AN101

| | pH Units | 0.1 | 9.0 | 9.3 | 8.9 | 9.2 | 8.4 |
|----|----------|-----|-----|-----|-----|-----|-----|
| pH | | | | | | | |

Conductivity and TDS by Calculation - Soil Method: AN106

| | µS/cm | 2 | 65 | 61 | 72 | 110 | 1300 |
|---|-------|---|----|----|----|-----|------|
| Conductivity of Extract (1:5 as received) | | | | | | | |

Chloride (water extractable) Method: AN274

| | mg/kg | 5 | 5 | 6 | 5 | 10 | 470 |
|-----------------------------------|-------|---|---|---|---|----|-----|
| Chloride (water extractable 1:5)* | | | | | | | |

Sulphate (water extractable) in Soil Method: AN275

| | mg/kg | 5 | <5 | <5 | <5 | <5 | 2900 |
|-------------------------------|-------|---|----|----|----|----|------|
| Sulphate (water extractable)* | | | | | | | |

Water Soluble Fluoride in Soil Method: AN141

| | mg/kg | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
|-------------------------|-------|-----|------|------|------|------|------|
| Water Soluble Fluoride* | | | | | | | |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | mg/kg | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 |
|--------------------------------|-------|-----|------|------|------|------|-----|
| Weak Acid Dissociable Cyanide* | | | | | | | |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | mg/kg | 1 | 1 | <1 | 2 | <1 | 23 |
|---|-------|---|---|----|---|----|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | | | | | | | |
| Water Soluble Nitrate as NO ₃ * | | | | | | | |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | ppm | 0.5 | 83.9 | 48.8 | 57.2 | 18.1 | 138.0 |
|-----|-----|-----|------|------|------|------|-------|
| As* | | | | | | | |
| Pb* | | | | | | | |
| Au* | | | | | | | |
| Ag* | | | | | | | |
| Cd* | | | | | | | |
| Cu* | | | | | | | |
| Ni* | | | | | | | |
| Zn* | | | | | | | |
| Be* | | | | | | | |
| Co* | | | | | | | |
| Mn* | | | | | | | |
| Sb* | | | | | | | |
| Se* | | | | | | | |

| Parameter | Units | LOR | PE066149.031 Sample Number Sample Matrix Sample Date Sample Name Contamination | PE066149.032 Sample Number Sample Matrix Sample Date Sample Name Contamination | PE066149.033 Sample Number Sample Matrix Sample Date Sample Name Soil | PE066149.034 Sample Number Sample Matrix Sample Date Sample Name Natural Ground | PE066149.035 Sample Number Sample Matrix Sample Date Sample Name Contamination |
|-----------|-------|-----|---|---|--|--|---|
|-----------|-------|-----|---|---|--|--|---|

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|----|-----|----|-----|----|
| Chromium, Cr* | ppm | 3 | 51 | 511 | 94 | 240 | 41 |
|---------------|-----|---|----|-----|----|-----|----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|-----|-----|-----|------|
| Mercury, Hg* | ppm | 0.001 | 4.1 | 3.1 | 4.8 | 8.4 | 27.8 |
|--------------|-----|-------|-----|-----|-----|-----|------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|-----|----|----|-----|
| Boron, B* | ppm | 20 | <20 | <20 | 20 | 50 | <20 |
|-----------|-----|----|-----|-----|----|----|-----|

| Parameter | Units | LOR | PE066149.036 Sample Number Sample Matrix Sample Date Sample Name Natural Ground | PE066149.037 Sample Number Sample Matrix Sample Date Sample Name DMS-01.2 Trans | PE066149.038 Sample Number Sample Matrix Sample Date Sample Name DMS-01.4 Trans | PE066149.039 Sample Number Sample Matrix Sample Date Sample Name DTD-01.3 Tails | PE066149.040 Sample Number Sample Matrix Sample Date Sample Name Tails & Ground |
|-----------|-------|-----|--|--|--|--|--|
|-----------|-------|-----|--|--|--|--|--|

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|-----|-----|-----|-----|-----|
| % Moisture | % | 0.5 | 2.2 | 3.5 | 4.6 | 1.1 | 2.6 |
|------------|---|-----|-----|-----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|---|---|---|---|---|
| pH | pH Units | 0.1 | - | - | - | - | - |
|----|----------|-----|---|---|---|---|---|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|---|---|---|---|---|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | - | - | - | - | - |
|---|-------|---|---|---|---|---|---|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|---|---|---|---|---|
| Chloride (water extractable 1:5)* | mg/kg | 5 | - | - | - | - | - |
|-----------------------------------|-------|---|---|---|---|---|---|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|---|---|---|---|---|
| Sulphate (water extractable)* | mg/kg | 5 | - | - | - | - | - |
|-------------------------------|-------|---|---|---|---|---|---|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|---|---|---|---|---|
| Water Soluble Fluoride* | mg/kg | 0.5 | - | - | - | - | - |
|-------------------------|-------|-----|---|---|---|---|---|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|---|---|---|---|---|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | - | - | - | - | - |
|--------------------------------|-------|-----|---|---|---|---|---|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|---|---|---|---|---|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | - | - | - | - | - |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | - | - | - | - | - |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|---|---|---|---|---|
| As* | ppm | 0.5 | - | - | - | - | - |
| Pb* | ppm | 0.2 | - | - | - | - | - |
| Au* | ppb | 1 | - | - | - | - | - |
| Ag* | ppm | 0.02 | - | - | - | - | - |
| Cd* | ppm | 0.02 | - | - | - | - | - |
| Cu* | ppm | 1 | - | - | - | - | - |
| Ni* | ppm | 0.5 | - | - | - | - | - |
| Zn* | ppm | 1 | - | - | - | - | - |
| Be* | ppm | 0.02 | - | - | - | - | - |
| Co* | ppm | 0.2 | - | - | - | - | - |
| Mn* | ppm | 0.5 | - | - | - | - | - |
| Sb* | ppm | 0.02 | - | - | - | - | - |

| Parameter | Units | LOR | PE066149.036 | PE066149.037 | PE066149.038 | PE066149.039 | PE066149.040 |
|---------------|-------|-----|----------------------------|----------------|----------------|----------------|-------------------------|
| Sample Number | | | PE066149.036 | PE066149.037 | PE066149.038 | PE066149.039 | PE066149.040 |
| Sample Matrix | | | Natural Ground | Trans | Trans | Tails | Tails & Ground |
| Sample Date | | | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| Sample Name | | | DMS-01.1 Natural Ground | DMS-01.2 Trans | DMS-01.4 Trans | DTD-01.3 Tails | DTD-01.6 Tails & Ground |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133 (continued)

| | | | | | | | |
|-----|-----|-----|---|---|---|---|---|
| Se* | ppm | 0.5 | - | - | - | - | - |
|-----|-----|-----|---|---|---|---|---|

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|---|---|---|---|---|
| Chromium, Cr* | ppm | 3 | - | - | - | - | - |
|---------------|-----|---|---|---|---|---|---|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|-----|--------|-----|--------|
| Mercury, Hg* | ppm | 0.001 | 1.4 | 2.1 | <0.001 | 0.2 | <0.001 |
|--------------|-----|-------|-----|-----|--------|-----|--------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|---|---|---|---|---|
| Boron, B* | ppm | 20 | - | - | - | - | - |
|-----------|-----|----|---|---|---|---|---|

| Parameter | Units | LOR | PE066149.041 | PE066149.042 | PE066149.043 | PE066149.044 | PE066149.045 |
|---------------|-------|-----|-------------------------|----------------|-------------------------|----------------|-------------------------|
| Sample Number | | | PE066149.041 | PE066149.042 | PE066149.043 | PE066149.044 | PE066149.045 |
| Sample Matrix | | | Tails & Ground | Tails | Tails & Ground | Tails | Tails & Ground |
| Sample Date | | | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| Sample Name | | | DTD-02.6 Tails & Ground | DTD-03.3 Tails | DTD-03.6 Tails & Ground | DTD-04.1 Tails | DTD-04.6 Tails & Ground |

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|-----|-----|-----|-----|-----|
| % Moisture | % | 0.5 | 1.5 | 2.9 | 3.2 | 1.0 | 2.5 |
|------------|---|-----|-----|-----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|---|---|---|---|---|
| pH | pH Units | 0.1 | - | - | - | - | - |
|----|----------|-----|---|---|---|---|---|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|---|---|---|---|---|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | - | - | - | - | - |
|---|-------|---|---|---|---|---|---|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|---|---|---|---|---|
| Chloride (water extractable 1:5)* | mg/kg | 5 | - | - | - | - | - |
|-----------------------------------|-------|---|---|---|---|---|---|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|---|---|---|---|---|
| Sulphate (water extractable)* | mg/kg | 5 | - | - | - | - | - |
|-------------------------------|-------|---|---|---|---|---|---|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|---|---|---|---|---|
| Water Soluble Fluoride* | mg/kg | 0.5 | - | - | - | - | - |
|-------------------------|-------|-----|---|---|---|---|---|



ANALYTICAL REPORT

PE066149 R0

| Parameter | Units | LOR | PE066149.041 Tails & Ground 19 Mar 2012 DTD-02.6 Tails & Ground | PE066149.042 Tails 19 Mar 2012 DTD-03.3 Tails | PE066149.043 Tails & Ground 19 Mar 2012 DTD-03.6 Tails & Ground | PE066149.044 Tails 19 Mar 2012 DTD-04.1 Tails | PE066149.045 Tails & Ground 19 Mar 2012 DTD-04.6 Tails & Ground |
|-----------|-------|-----|--|--|--|--|--|
|-----------|-------|-----|--|--|--|--|--|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|---|---|---|---|---|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | - | - | - | - | - |
|--------------------------------|-------|-----|---|---|---|---|---|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|---|---|---|---|---|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | - | - | - | - | - |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | - | - | - | - | - |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|---|---|---|---|---|
| As* | ppm | 0.5 | - | - | - | - | - |
| Pb* | ppm | 0.2 | - | - | - | - | - |
| Au* | ppb | 1 | - | - | - | - | - |
| Ag* | ppm | 0.02 | - | - | - | - | - |
| Cd* | ppm | 0.02 | - | - | - | - | - |
| Cu* | ppm | 1 | - | - | - | - | - |
| Ni* | ppm | 0.5 | - | - | - | - | - |
| Zn* | ppm | 1 | - | - | - | - | - |
| Be* | ppm | 0.02 | - | - | - | - | - |
| Co* | ppm | 0.2 | - | - | - | - | - |
| Mn* | ppm | 0.5 | - | - | - | - | - |
| Sb* | ppm | 0.02 | - | - | - | - | - |
| Se* | ppm | 0.5 | - | - | - | - | - |

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | |
|---------------|-----|---|---|---|---|---|---|
| Chromium, Cr* | ppm | 3 | - | - | - | - | - |
|---------------|-----|---|---|---|---|---|---|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|------------|------------|--------|--------|------------|
| Mercury, Hg* | ppm | 0.001 | 0.2 | 0.3 | <0.001 | <0.001 | 0.2 |
|--------------|-----|-------|------------|------------|--------|--------|------------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|---|---|---|---|---|
| Boron, B* | ppm | 20 | - | - | - | - | - |
|-----------|-----|----|---|---|---|---|---|

| Parameter | Units | LOR | PE066149.046 Tails 19 Mar 2012 DTD-05.3 Tails | PE066149.047 Tails & Ground 19 Mar 2012 DTD-05.7 Tails & Ground | PE066149.048 Tails 19 Mar 2012 DTD-06.1 Tails | PE066149.049 Ground 19 Mar 2012 DTD-06.5 Ground | PE066149.050 Tails 19 Mar 2012 DTD-07.3 Tails |
|-----------|-------|-----|--|--|--|--|--|
|-----------|-------|-----|--|--|--|--|--|

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|------------|------------|------------|------------|------------|
| % Moisture | % | 0.5 | 2.2 | 1.4 | 0.8 | 2.0 | 1.6 |
|------------|---|-----|------------|------------|------------|------------|------------|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|----------|-----|---|---|---|---|---|
| pH | pH Units | 0.1 | - | - | - | - | - |
|----|----------|-----|---|---|---|---|---|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|---|---|---|---|---|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | - | - | - | - | - |
|---|-------|---|---|---|---|---|---|

| Parameter | Units | LOR | PE066149.046 Sample Number Sample Matrix Sample Date Sample Name | PE066149.047 Tails 19 Mar 2012 DTD-05.3 Tails | PE066149.048 Tails & Ground 19 Mar 2012 DTD-05.7 Tails & Ground | PE066149.049 Tails 19 Mar 2012 DTD-06.1 Tails | PE066149.049 Ground 19 Mar 2012 DTD-06.5 Ground | PE066149.050 Tails 19 Mar 2012 DTD-07.3 Tails |
|-----------|-------|-----|--|--|---|--|---|--|
|-----------|-------|-----|--|--|---|--|---|--|

Chloride (water extractable) Method: AN274

| | | | | | | | | |
|-----------------------------------|-------|---|---|---|---|---|---|---|
| Chloride (water extractable 1:5)* | mg/kg | 5 | - | - | - | - | - | - |
|-----------------------------------|-------|---|---|---|---|---|---|---|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | | |
|-------------------------------|-------|---|---|---|---|---|---|---|
| Sulphate (water extractable)* | mg/kg | 5 | - | - | - | - | - | - |
|-------------------------------|-------|---|---|---|---|---|---|---|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | | |
|-------------------------|-------|-----|---|---|---|---|---|---|
| Water Soluble Fluoride* | mg/kg | 0.5 | - | - | - | - | - | - |
|-------------------------|-------|-----|---|---|---|---|---|---|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | | |
|--------------------------------|-------|-----|---|---|---|---|---|---|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | - | - | - | - | - | - |
|--------------------------------|-------|-----|---|---|---|---|---|---|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | | |
|---|-------|---|---|---|---|---|---|---|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | - | - | - | - | - | - |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | - | - | - | - | - | - |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | | |
|-----|-----|------|---|---|---|---|---|---|
| As* | ppm | 0.5 | - | - | - | - | - | - |
| Pb* | ppm | 0.2 | - | - | - | - | - | - |
| Au* | ppb | 1 | - | - | - | - | - | - |
| Ag* | ppm | 0.02 | - | - | - | - | - | - |
| Cd* | ppm | 0.02 | - | - | - | - | - | - |
| Cu* | ppm | 1 | - | - | - | - | - | - |
| Ni* | ppm | 0.5 | - | - | - | - | - | - |
| Zn* | ppm | 1 | - | - | - | - | - | - |
| Be* | ppm | 0.02 | - | - | - | - | - | - |
| Co* | ppm | 0.2 | - | - | - | - | - | - |
| Mn* | ppm | 0.5 | - | - | - | - | - | - |
| Sb* | ppm | 0.02 | - | - | - | - | - | - |
| Se* | ppm | 0.5 | - | - | - | - | - | - |

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | | | | |
|---------------|-----|---|---|---|---|---|---|---|
| Chromium, Cr* | ppm | 3 | - | - | - | - | - | - |
|---------------|-----|---|---|---|---|---|---|---|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | | |
|--------------|-----|-------|--------|------------|--------|------------|--------|--------|
| Mercury, Hg* | ppm | 0.001 | <0.001 | 0.2 | <0.001 | 0.7 | <0.001 | <0.001 |
|--------------|-----|-------|--------|------------|--------|------------|--------|--------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | | |
|-----------|-----|----|---|---|---|---|---|---|
| Boron, B* | ppm | 20 | - | - | - | - | - | - |
|-----------|-----|----|---|---|---|---|---|---|



ANALYTICAL REPORT

PE066149 R0

| Parameter | Units | LOR | PE066149.051 | PE066149.052 | PE066149.053 | PE066149.054 | PE066149.055 |
|---------------|-------|-----|---------------------|----------------|----------------|-----------------|----------------------|
| Sample Number | | | PE066149.051 | PE066149.052 | PE066149.053 | PE066149.054 | PE066149.055 |
| Sample Matrix | | | Fresh Rock | Tails | Tails | Ground | Contamination |
| Sample Date | | | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| Sample Name | | | DTD-07.7 Fresh Rock | DTD-08.6 Tails | DTD-09.3 Tails | DTD-09.6 Ground | DTD-10 Contamination |

Moisture Content Method: AN002

| % Moisture | % | 0.5 | 2.3 | 2.2 | 2.7 | 4.6 | 1.2 |
|------------|---|-----|-----|-----|-----|-----|-----|
| % Moisture | % | 0.5 | 2.3 | 2.2 | 2.7 | 4.6 | 1.2 |

pH in soil (1:5) Method: AN101

| pH | pH Units | 0.1 | - | - | - | - | - |
|----|----------|-----|---|---|---|---|---|
| pH | pH Units | 0.1 | - | - | - | - | - |

Conductivity and TDS by Calculation - Soil Method: AN106

| Conductivity of Extract (1:5 as received) | µS/cm | 2 | - | - | - | - | - |
|---|-------|---|---|---|---|---|---|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | - | - | - | - | - |

Chloride (water extractable) Method: AN274

| Chloride (water extractable 1:5)* | mg/kg | 5 | - | - | - | - | - |
|-----------------------------------|-------|---|---|---|---|---|---|
| Chloride (water extractable 1:5)* | mg/kg | 5 | - | - | - | - | - |

Sulphate (water extractable) in Soil Method: AN275

| Sulphate (water extractable)* | mg/kg | 5 | - | - | - | - | - |
|-------------------------------|-------|---|---|---|---|---|---|
| Sulphate (water extractable)* | mg/kg | 5 | - | - | - | - | - |

Water Soluble Fluoride in Soil Method: AN141

| Water Soluble Fluoride* | mg/kg | 0.5 | - | - | - | - | - |
|-------------------------|-------|-----|---|---|---|---|---|
| Water Soluble Fluoride* | mg/kg | 0.5 | - | - | - | - | - |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | - | - | - | - | - |
|--------------------------------|-------|-----|---|---|---|---|---|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | - | - | - | - | - |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | - | - | - | - | - |
|---|-------|---|---|---|---|---|---|
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | - | - | - | - | - |
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | - | - | - | - | - |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | - | - | - | - | - |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| As* | ppm | 0.5 | - | - | - | - | - |
|-----|-----|------|---|---|---|---|---|
| Pb* | ppm | 0.2 | - | - | - | - | - |
| Au* | ppb | 1 | - | - | - | - | - |
| Ag* | ppm | 0.02 | - | - | - | - | - |
| Cd* | ppm | 0.02 | - | - | - | - | - |
| Cu* | ppm | 1 | - | - | - | - | - |
| Ni* | ppm | 0.5 | - | - | - | - | - |
| Zn* | ppm | 1 | - | - | - | - | - |
| Be* | ppm | 0.02 | - | - | - | - | - |
| Co* | ppm | 0.2 | - | - | - | - | - |
| Mn* | ppm | 0.5 | - | - | - | - | - |
| Sb* | ppm | 0.02 | - | - | - | - | - |
| Se* | ppm | 0.5 | - | - | - | - | - |
| As* | ppm | 0.5 | - | - | - | - | - |
| Pb* | ppm | 0.2 | - | - | - | - | - |
| Au* | ppb | 1 | - | - | - | - | - |
| Ag* | ppm | 0.02 | - | - | - | - | - |
| Cd* | ppm | 0.02 | - | - | - | - | - |
| Cu* | ppm | 1 | - | - | - | - | - |
| Ni* | ppm | 0.5 | - | - | - | - | - |
| Zn* | ppm | 1 | - | - | - | - | - |
| Be* | ppm | 0.02 | - | - | - | - | - |
| Co* | ppm | 0.2 | - | - | - | - | - |
| Mn* | ppm | 0.5 | - | - | - | - | - |
| Sb* | ppm | 0.02 | - | - | - | - | - |
| Se* | ppm | 0.5 | - | - | - | - | - |

ICPAES after Aqua Regia Digest Method: ICP12S

| Chromium, Cr* | ppm | 3 | - | - | - | - | - |
|---------------|-----|---|---|---|---|---|---|
| Chromium, Cr* | ppm | 3 | - | - | - | - | - |

Rare Earth Metals in soil by ICPMS Method: IMS12S

| Mercury, Hg* | ppm | 0.001 | <0.001 | 0.4 | 0.3 | <0.001 | 0.1 |
|--------------|-----|-------|--------|-----|-----|--------|-----|
| Mercury, Hg* | ppm | 0.001 | <0.001 | 0.4 | 0.3 | <0.001 | 0.1 |

| Parameter | Units | LOR | PE066149.051 | PE066149.052 | PE066149.053 | PE066149.054 | PE066149.055 |
|---------------|-------|-----|---------------------|----------------|----------------|-----------------|----------------------|
| Sample Number | | | PE066149.051 | PE066149.052 | PE066149.053 | PE066149.054 | PE066149.055 |
| Sample Matrix | | | Fresh Rock | Tails | Tails | Ground | Contamination |
| Sample Date | | | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| Sample Name | | | DTD-07.7 Fresh Rock | DTD-08.6 Tails | DTD-09.3 Tails | DTD-09.6 Ground | DTD-10 Contamination |

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|---|---|---|---|---|
| Boron, B* | ppm | 20 | - | - | - | - | - |
|-----------|-----|----|---|---|---|---|---|

| Parameter | Units | LOR | PE066149.056 | PE066149.057 | PE066149.058 |
|---------------|-------|-----|----------------------|----------------------|----------------------|
| Sample Number | | | PE066149.056 | PE066149.057 | PE066149.058 |
| Sample Matrix | | | Contamination | Contamination | Contamination |
| Sample Date | | | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| Sample Name | | | DTD-11 Contamination | DTD-12 Contamination | DTD-13 Contamination |

Moisture Content Method: AN002

| | | | | | |
|------------|---|-----|-----|-----|-----|
| % Moisture | % | 0.5 | 2.6 | 2.5 | 3.7 |
|------------|---|-----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | |
|----|----------|-----|---|---|---|
| pH | pH Units | 0.1 | - | - | - |
|----|----------|-----|---|---|---|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | |
|---|-------|---|---|---|---|
| Conductivity of Extract (1:5 as received) | µS/cm | 2 | - | - | - |
|---|-------|---|---|---|---|

Chloride (water extractable) Method: AN274

| | | | | | |
|-----------------------------------|-------|---|---|---|---|
| Chloride (water extractable 1:5)* | mg/kg | 5 | - | - | - |
|-----------------------------------|-------|---|---|---|---|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | |
|-------------------------------|-------|---|---|---|---|
| Sulphate (water extractable)* | mg/kg | 5 | - | - | - |
|-------------------------------|-------|---|---|---|---|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | |
|-------------------------|-------|-----|---|---|---|
| Water Soluble Fluoride* | mg/kg | 0.5 | - | - | - |
|-------------------------|-------|-----|---|---|---|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | |
|--------------------------------|-------|-----|---|---|---|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | - | - | - |
|--------------------------------|-------|-----|---|---|---|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | |
|---|-------|---|---|---|---|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | - | - | - |
| Water Soluble Nitrate as NO ₃ * | mg/kg | 4 | - | - | - |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | |
|-----|-----|------|---|---|---|
| As* | ppm | 0.5 | - | - | - |
| Pb* | ppm | 0.2 | - | - | - |
| Au* | ppb | 1 | - | - | - |
| Ag* | ppm | 0.02 | - | - | - |
| Cd* | ppm | 0.02 | - | - | - |
| Cu* | ppm | 1 | - | - | - |
| Ni* | ppm | 0.5 | - | - | - |
| Zn* | ppm | 1 | - | - | - |
| Be* | ppm | 0.02 | - | - | - |
| Co* | ppm | 0.2 | - | - | - |
| Mn* | ppm | 0.5 | - | - | - |
| Sb* | ppm | 0.02 | - | - | - |
| Se* | ppm | 0.5 | - | - | - |



ANALYTICAL REPORT

PE066149 R0

| | | | | |
|-----------|---------------|---------------|---------------|---------------|
| | Sample Number | PE066149.056 | PE066149.057 | PE066149.058 |
| | Sample Matrix | Contamination | Contamination | Contamination |
| | Sample Date | 19 Mar 2012 | 19 Mar 2012 | 19 Mar 2012 |
| | Sample Name | DTD-11 | DTD-12 | DTD-13 |
| | | Contamination | Contamination | Contamination |
| Parameter | Units | LOR | | |

ICPAES after Aqua Regia Digest Method: ICP12S

| | | | | | |
|---------------------------|-----|---|---|---|---|
| Chromium, Cr ⁺ | ppm | 3 | - | - | - |
|---------------------------|-----|---|---|---|---|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | |
|--------------------------|-----|-------|-------------|------------|------------|
| Mercury, Hg ⁺ | ppm | 0.001 | 56.7 | 0.4 | 5.8 |
|--------------------------|-----|-------|-------------|------------|------------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | |
|-----------------------|-----|----|---|---|---|
| Boron, B ⁺ | ppm | 20 | - | - | - |
|-----------------------|-----|----|---|---|---|

MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Chloride (water extractable) Method: ME-(AU)-[ENV]AN274

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD |
|-----------------------------------|--------------|-------|-----|----|----------|
| Chloride (water extractable 1:5)* | LB039073 | mg/kg | 5 | <5 | 18 - 29% |

Conductivity and TDS by Calculation - Soil Method: ME-(AU)-[ENV]AN106

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|--------------|-------|-----|----|----------|---------------|
| Conductivity of Extract (1:5 as received) | LB038849 | µS/cm | 2 | <2 | 0 - 1% | 100 - 101% |

Moisture Content Method: ME-(AU)-[ENV]AN002

| Parameter | QC Reference | Units | LOR | DUP %RPD |
|------------|--------------|-------|-----|----------|
| % Moisture | LB038512 | % | 0.5 | 0 - 9% |

pH in soil (1:5) Method: ME-(AU)-[ENV]AN101

| Parameter | QC Reference | Units | LOR | DUP %RPD | LCS %Recovery |
|-----------|--------------|----------|-----|----------|---------------|
| pH | LB038847 | pH Units | 0.1 | 0 - 1% | 100% |

Sulphate (water extractable) in Soil Method: ME-(AU)-[ENV]AN275

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD |
|-------------------------------|--------------|-------|-----|----|----------|
| Sulphate (water extractable)* | LB039073 | mg/kg | 5 | <5 | 0 - 6% |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: ME-(AU)-[ENV]AN258

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|--------------|-------|-----|----|----------|---------------|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | LB039180 | mg/kg | 1 | <1 | | |
| Water Soluble Nitrate as NO ₃ * | LB039180 | mg/kg | 4 | <4 | 0 - 3% | NA |

Water Soluble Fluoride in Soil Method: ME-(AU)-[ENV]AN141

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|-------------------------|--------------|-------|-----|------|----------|---------------|--------------|
| Water Soluble Fluoride* | LB039175 | mg/kg | 0.5 | <0.5 | 0% | NA | NA |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN077/AN287

| Parameter | QC Reference | Units | LOR | DUP %RPD |
|--------------------------------|--------------|-------|-----|----------|
| Weak Acid Dissociable Cyanide* | LB038482 | mg/kg | 0.1 | 0 - 33% |

METHOD

METHODOLOGY SUMMARY

| | |
|-------|---|
| AN002 | The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water. |
| AN101 | pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+. |
| AN106 | Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as $\mu\text{mhos/cm}$ or $\mu\text{S/cm}$ @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2520 B. |
| AN141 | Determination of Fluoride by ISE: A fluoride ion selective electrode and reference electrode combination, in the presence of a pH/complexation buffer, is used to determine the fluoride concentration on the soil water extract. The electrode millivolt response is measured logarithmically against fluoride concentration. Reference APHA F- C. |
| AN258 | Nitrate and Nitrite by FIA:: In an acidic medium, nitrate is reduced quantitatively to nitrite by cadmium metal. This nitrite plus any original nitrite is determined as an intense red-pink azo dye at 540 nm following diazotisation with sulphanilamide and subsequent coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. Without the cadmium reduction only the original nitrite is determined. Reference APHA 4500-NO3- F. |
| AN274 | Chloride by Aquakem DA following 1:5 or 1:2 DI water extraction: Chloride reacts with mercuric thiocyanate forming a mercuric chloride complex. In the presence of ferric iron, highly coloured ferric thiocyanate is formed which is proportional to the chloride concentration. Results reported on dry sample basis. Reference APHA 4500Cl- |
| AN275 | Suphate by Aquakem DA following 1:5 DI water extraction: Sulphate is precipitated in an acidic medium with barium chloride. The resulting turbidity is measured photometrically at 405nm and compared with standard calibration solutions to determine the sulphate concentration in the sample. Reference APHA 4500-SO42-. Internal reference AN275. |

FOOTNOTES

| | | | |
|-----|---|-----|--|
| IS | Insufficient sample for analysis. | QFH | QC result is above the upper tolerance |
| LNR | Sample listed, but not received. | QFL | QC result is below the lower tolerance |
| * | This analysis is not covered by the scope of accreditation. | - | The sample was not analysed for this analyte |
| ^ | Performed by outside laboratory. | NVL | Not Validated |
| LOR | Limit of Reporting | | |
| ↑↓ | Raised or Lowered Limit of Reporting | | |

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf>

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CLIENT DETAILS

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Client Focus Operations
Address PMB 3
Coolgardie
WA 6429

LABORATORY DETAILS

Manager [REDACTED]
Laboratory SGS Newburn Environmental
Address 10 Reid Rd
Newburn WA 6105

Project **Contaminated Site Assessment**
Order Number **13430**
Samples 27

SGS Reference **PE067517 R0**
Report Number 0000041092
Date Reported 07 Jun 2012
Date Received 16 May 2012

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(898/20210).

Metals Analysis subcontracted to SGS Perth Minerals, 10 Reid Rd Newburn WA, NATA Accreditation Number 1936, WM141675.



ANALYTICAL REPORT

PE067517 R0

| Parameter | Units | LOR | PE067517.001 Tails 10 May 2012 RTD1.1 | PE067517.002 Tails 10 May 2012 RTD1.2 | PE067517.003 Natural Ground 10 May 2012 RTD1.3 | PE067517.004 Tails 10 May 2012 RTD2.1 | PE067517.005 Tails 10 May 2012 RTD2.2 |
|-----------|-------|-----|--|--|---|--|--|
|-----------|-------|-----|--|--|---|--|--|

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|-----|-----|-----|-----|-----|
| % Moisture | % | 0.5 | 1.2 | 1.5 | 2.0 | 1.1 | 1.7 |
|------------|---|-----|-----|-----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|---------|---|-----|-----|-----|-----|-----|
| pH | No unit | - | 8.1 | 7.8 | 8.3 | 7.9 | 6.3 |
|----|---------|---|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|------|------|------|------|------|
| Conductivity of Extract (1:5 as received) | µS/cm | 1 | 2500 | 2500 | 3400 | 1400 | 2300 |
|---|-------|---|------|------|------|------|------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|------|------|------|-----|-----|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 2300 | 2000 | 2200 | 320 | 770 |
|-----------------------------------|-------|---|------|------|------|-----|-----|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|------|------|------|------|------|
| Sulphate (water extractable)* | mg/kg | 5 | 2800 | 5400 | 4300 | 4600 | 4400 |
|-------------------------------|-------|---|------|------|------|------|------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|------|-----|-----|-----|------|
| Water Soluble Fluoride* | mg/kg | 0.5 | <0.5 | 0.9 | 1.5 | 0.7 | <0.5 |
|-------------------------|-------|-----|------|-----|-----|-----|------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|-----|-----|-----|-----|-----|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.3 | 0.6 | 0.5 | 0.3 | 0.8 |
|--------------------------------|-------|-----|-----|-----|-----|-----|-----|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|----|----|---|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 33 | 36 | 34 | 8 | 17 |
|---|-------|---|----|----|----|---|----|

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|------|------|------|------|------|
| As* | ppm | 0.5 | 2660 | 2290 | 2870 | 4890 | 6290 |
| Pb* | ppm | 0.2 | 218 | 161 | 190 | 193 | 223 |
| Au* | ppb | 1 | 324 | 337 | 438 | <1 | <1 |
| Ag* | ppm | 0.02 | 0.58 | 0.34 | 0.45 | 0.99 | 0.80 |
| Cd* | ppm | 0.02 | 1.63 | 2.38 | 1.74 | 2.06 | 1.60 |
| Cu* | ppm | 1 | 148 | 155 | 122 | 167 | 151 |
| Ni* | ppm | 0.5 | 51.8 | 153 | 116 | 83.1 | 86.4 |
| Zn* | ppm | 1 | 301 | 562 | 520 | 578 | 354 |
| Be* | ppm | 0.02 | 0.07 | 0.11 | 0.11 | 0.08 | 0.06 |
| Co* | ppm | 0.2 | 14.7 | 46.8 | 22.5 | 18.8 | 13.6 |
| Mn* | ppm | 0.5 | 308 | 554 | 394 | 475 | 351 |
| Sb* | ppm | 0.02 | 0.66 | 1.69 | 1.42 | 1.00 | 1.21 |
| Se* | ppm | 0.5 | 1.1 | 2.2 | 1.3 | 1.4 | 1.4 |

| Parameter | Units | LOR | PE067517.001 Tails RTD1.1 | PE067517.002 Tails RTD1.2 | PE067517.003 Natural Ground RTD1.3 | PE067517.004 Tails RTD2.1 | PE067517.005 Tails RTD2.2 |
|-----------|-------|-----|---------------------------------|---------------------------------|--|---------------------------------|---------------------------------|
|-----------|-------|-----|---------------------------------|---------------------------------|--|---------------------------------|---------------------------------|

ICPAES after Four Acid Digest Digest Method: ICP40Q

| | | | | | | | |
|---------------|-----|----|-----|------|-----|-----|-----|
| Chromium, Cr* | ppm | 10 | 153 | 2810 | 800 | 249 | 425 |
|---------------|-----|----|-----|------|-----|-----|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|-----|-----|-----|------|
| Mercury, Hg* | ppm | 0.001 | 4.5 | 3.7 | 5.7 | 9.3 | 11.6 |
|--------------|-----|-------|-----|-----|-----|-----|------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|----|----|-----|-----|
| Boron, B* | ppm | 20 | <20 | 20 | 30 | <20 | <20 |
|-----------|-----|----|-----|----|----|-----|-----|

| Parameter | Units | LOR | PE067517.006 Natural Ground RTD2.3 | PE067517.007 Tails RTD3.1 | PE067517.008 Soil & Tails RTD3.2 | PE067517.009 Natural Ground RTD3.3 | PE067517.010 Tails RTD4.1 |
|-----------|-------|-----|--|---------------------------------|--|--|---------------------------------|
|-----------|-------|-----|--|---------------------------------|--|--|---------------------------------|

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|-----|-----|-----|-----|-----|
| % Moisture | % | 0.5 | 3.4 | 1.5 | 1.3 | 6.8 | 1.0 |
|------------|---|-----|-----|-----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|---------|---|-----|-----|-----|-----|-----|
| pH | No unit | - | 8.4 | 8.2 | 8.3 | 7.6 | 7.1 |
|----|---------|---|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|------|------|------|------|-----|
| Conductivity of Extract (1:5 as received) | µS/cm | 1 | 2200 | 2300 | 5100 | 1300 | 460 |
|---|-------|---|------|------|------|------|-----|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|------|------|------|------|----|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 1400 | 2500 | 6400 | 1200 | 58 |
|-----------------------------------|-------|---|------|------|------|------|----|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|------|------|------|-----|------|
| Sulphate (water extractable)* | mg/kg | 5 | 2700 | 3000 | 4300 | 750 | 1300 |
|-------------------------------|-------|---|------|------|------|-----|------|

| Parameter | Units | LOR | PE067517.006 Natural Ground RTD2.3 | PE067517.007 Tails RTD3.1 | PE067517.008 Soil & Tails RTD3.2 | PE067517.009 Natural Ground RTD3.3 | PE067517.010 Tails RTD4.1 |
|-----------|-------|-----|--|---------------------------------|--|--|---------------------------------|
|-----------|-------|-----|--|---------------------------------|--|--|---------------------------------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|-----|------|------|-----|------|
| Water Soluble Fluoride* | mg/kg | 0.5 | 1.4 | <0.5 | <0.5 | 1.1 | <0.5 |
|-------------------------|-------|-----|-----|------|------|-----|------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|-----|-----|-----|-----|------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.4 | 1.1 | 0.8 | 0.1 | <0.1 |
|--------------------------------|-------|-----|-----|-----|-----|-----|------|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|----|-----|----|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 33 | 68 | 140 | 11 | <1 |
|---|-------|---|----|----|-----|----|----|

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|------|------|------|------|------|
| As* | ppm | 0.5 | 2570 | 3790 | 550 | 417 | 6540 |
| Pb* | ppm | 0.2 | 111 | 187 | 27.8 | 26.2 | 224 |
| Au* | ppb | 1 | 442 | 285 | <1 | 90 | 430 |
| Ag* | ppm | 0.02 | 0.54 | 0.64 | 1.12 | 0.21 | 0.44 |
| Cd* | ppm | 0.02 | 0.93 | 1.32 | 0.25 | 0.21 | 1.66 |
| Cu* | ppm | 1 | 113 | 139 | 12 | 35 | 134 |
| Ni* | ppm | 0.5 | 467 | 114 | 14.3 | 795 | 91.4 |
| Zn* | ppm | 1 | 272 | 300 | 33 | 82 | 346 |
| Be* | ppm | 0.02 | 0.05 | 0.07 | 0.04 | 0.06 | 0.05 |
| Co* | ppm | 0.2 | 40.0 | 17.8 | 3.1 | 63.5 | 17.5 |
| Mn* | ppm | 0.5 | 385 | 510 | 64.4 | 597 | 331 |
| Sb* | ppm | 0.02 | 0.65 | 2.05 | 0.53 | 0.40 | 1.41 |
| Se* | ppm | 0.5 | 0.8 | 1.4 | 282 | <0.5 | 1.7 |

ICPAES after Four Acid Digest Digest Method: ICP40Q

| | | | | | | | |
|---------------|-----|----|------|-----|-----|------|-----|
| Chromium, Cr* | ppm | 10 | 1580 | 744 | 296 | 1750 | 247 |
|---------------|-----|----|------|-----|-----|------|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|-----|-----|-----|-----|
| Mercury, Hg* | ppm | 0.001 | 5.2 | 5.6 | 5.3 | 1.2 | 3.9 |
|--------------|-----|-------|-----|-----|-----|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|----|-----|-----|----|-----|
| Boron, B* | ppm | 20 | 20 | <20 | <20 | 30 | <20 |
|-----------|-----|----|----|-----|-----|----|-----|



ANALYTICAL REPORT

PE067517 R0

| Parameter | Units | LOR | PE067517.011 Tails & Soil 10 May 2012 RTD4.2 | PE067517.012 Natural Ground 10 May 2012 RTD4.3 | PE067517.013 Tails 10 May 2012 RTD5.1 | PE067517.014 Tails 10 May 2012 RTD5.2 | PE067517.015 Natural Ground 10 May 2012 RTD5.4 |
|-----------|-------|-----|---|---|--|--|---|
|-----------|-------|-----|---|---|--|--|---|

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|-----|----|-----|-----|-----|
| % Moisture | % | 0.5 | 1.5 | 10 | 1.1 | 1.0 | 4.4 |
|------------|---|-----|-----|----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|---------|---|-----|-----|-----|-----|-----|
| pH | No unit | - | 7.1 | 7.4 | 7.5 | 7.5 | 7.7 |
|----|---------|---|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|------|------|------|------|------|
| Conductivity of Extract (1:5 as received) | µS/cm | 1 | 3000 | 2800 | 1600 | 1200 | 2000 |
|---|-------|---|------|------|------|------|------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|------|------|-----|-----|------|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 2400 | 1900 | 190 | 300 | 1100 |
|-----------------------------------|-------|---|------|------|-----|-----|------|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|------|------|------|------|------|
| Sulphate (water extractable)* | mg/kg | 5 | 7100 | 7100 | 3100 | 6900 | 5100 |
|-------------------------------|-------|---|------|------|------|------|------|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|-----|-----|------|------|-----|
| Water Soluble Fluoride* | mg/kg | 0.5 | 0.7 | 0.8 | <0.5 | <0.5 | 1.1 |
|-------------------------|-------|-----|-----|-----|------|------|-----|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|-----|-----|-----|-----|-----|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.5 | 0.5 | 0.3 | 0.6 | 0.9 |
|--------------------------------|-------|-----|-----|-----|-----|-----|-----|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|----|---|---|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 19 | 11 | 2 | 3 | 10 |
|---|-------|---|----|----|---|---|----|

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|------|------|------|------|------|
| As* | ppm | 0.5 | 5010 | 4030 | 7710 | 5400 | 1650 |
| Pb* | ppm | 0.2 | 233 | 179 | 180 | 224 | 96.7 |
| Au* | ppb | 1 | 352 | 197 | <1 | 447 | 392 |
| Ag* | ppm | 0.02 | 0.36 | 0.36 | 0.66 | 0.62 | 0.49 |
| Cd* | ppm | 0.02 | 1.23 | 1.09 | 1.64 | 1.89 | 0.85 |
| Cu* | ppm | 1 | 144 | 132 | 146 | 137 | 105 |
| Ni* | ppm | 0.5 | 77.9 | 126 | 66.9 | 66.8 | 367 |
| Zn* | ppm | 1 | 327 | 323 | 337 | 497 | 256 |
| Be* | ppm | 0.02 | 0.06 | 0.11 | 0.04 | 0.05 | 0.08 |
| Co* | ppm | 0.2 | 15.0 | 18.9 | 19.3 | 14.6 | 35.1 |
| Mn* | ppm | 0.5 | 405 | 349 | 349 | 341 | 379 |
| Sb* | ppm | 0.02 | 0.99 | 1.45 | 1.34 | 1.12 | 0.89 |
| Se* | ppm | 0.5 | 1.3 | 1.2 | 1.5 | 1.3 | 0.8 |

| Parameter | Units | LOR | PE067517.011 | PE067517.012 | PE067517.013 | PE067517.014 | PE067517.015 |
|---------------|-------|-----|--------------|----------------|--------------|--------------|----------------|
| Sample Number | | | PE067517.011 | PE067517.012 | PE067517.013 | PE067517.014 | PE067517.015 |
| Sample Matrix | | | Tails & Soil | Natural Ground | Tails | Tails | Natural Ground |
| Sample Date | | | 10 May 2012 | 10 May 2012 | 10 May 2012 | 10 May 2012 | 10 May 2012 |
| Sample Name | | | RTD4.2 | RTD4.3 | RTD5.1 | RTD5.2 | RTD5.4 |

ICPAES after Four Acid Digest Digest Method: ICP40Q

| | | | | | | | |
|---------------|-----|----|-----|------|-----|-----|------|
| Chromium, Cr* | ppm | 10 | 261 | 1010 | 173 | 223 | 1330 |
|---------------|-----|----|-----|------|-----|-----|------|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|-----|-----|-----|-----|
| Mercury, Hg* | ppm | 0.001 | 4.4 | 4.6 | 7.3 | 7.8 | 3.9 |
|--------------|-----|-------|-----|-----|-----|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|-----|-----|-----|----|
| Boron, B* | ppm | 20 | <20 | <20 | <20 | <20 | 20 |
|-----------|-----|----|-----|-----|-----|-----|----|

| Parameter | Units | LOR | PE067517.016 | PE067517.017 | PE067517.018 | PE067517.019 | PE067517.020 |
|---------------|-------|-----|--------------|--------------|----------------|--------------|--------------|
| Sample Number | | | PE067517.016 | PE067517.017 | PE067517.018 | PE067517.019 | PE067517.020 |
| Sample Matrix | | | Tails | Tails | Natural Ground | Tails | Tails |
| Sample Date | | | 10 May 2012 | 10 May 2012 | 10 May 2012 | 10 May 2012 | 10 May 2012 |
| Sample Name | | | RTD6.1 | RTD6.2 | RTD6.4 | RTD7.1 | RTD7.2 |

Moisture Content Method: AN002

| | | | | | | | |
|------------|---|-----|-----|-----|-----|-----|-----|
| % Moisture | % | 0.5 | 1.9 | 3.1 | 4.3 | 4.1 | 2.3 |
|------------|---|-----|-----|-----|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | | | | |
|----|---------|---|-----|-----|-----|-----|-----|
| pH | No unit | - | 8.0 | 7.9 | 7.8 | 7.9 | 8.0 |
|----|---------|---|-----|-----|-----|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | | | | |
|---|-------|---|------|------|------|------|------|
| Conductivity of Extract (1:5 as received) | µS/cm | 1 | 1500 | 1600 | 2700 | 3500 | 3500 |
|---|-------|---|------|------|------|------|------|

Chloride (water extractable) Method: AN274

| | | | | | | | |
|-----------------------------------|-------|---|-----|------|------|------|------|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 950 | 1600 | 2300 | 3800 | 1700 |
|-----------------------------------|-------|---|-----|------|------|------|------|

Sulphate (water extractable) in Soil Method: AN275

| | | | | | | | |
|-------------------------------|-------|---|------|------|------|------|------|
| Sulphate (water extractable)* | mg/kg | 5 | 2300 | 3800 | 4200 | 5300 | 8400 |
|-------------------------------|-------|---|------|------|------|------|------|

| Parameter | Units | LOR | PE067517.016 Tails 10 May 2012 RTD6.1 | PE067517.017 Tails 10 May 2012 RTD6.2 | PE067517.018 Natural Ground 10 May 2012 RTD6.4 | PE067517.019 Tails 10 May 2012 RTD7.1 | PE067517.020 Tails 10 May 2012 RTD7.2 |
|-----------|-------|-----|--|--|---|--|--|
|-----------|-------|-----|--|--|---|--|--|

Water Soluble Fluoride in Soil Method: AN141

| | | | | | | | |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|
| Water Soluble Fluoride* | mg/kg | 0.5 | 0.6 | 0.9 | 1.7 | 0.7 | 0.7 |
|-------------------------|-------|-----|-----|-----|-----|-----|-----|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | | | | |
|--------------------------------|-------|-----|-----|-----|-----|-----|-----|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.6 | 0.6 | 0.7 | 0.5 | 0.4 |
|--------------------------------|-------|-----|-----|-----|-----|-----|-----|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | | | | |
|---|-------|---|----|----|----|----|----|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 15 | 19 | 22 | 61 | 22 |
|---|-------|---|----|----|----|----|----|

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | | | | |
|-----|-----|------|------|------|------|------|------|
| As* | ppm | 0.5 | 1130 | 1720 | 1270 | 5890 | 3900 |
| Pb* | ppm | 0.2 | 126 | 154 | 90.2 | 298 | 263 |
| Au* | ppb | 1 | <1 | 288 | 132 | 217 | <1 |
| Ag* | ppm | 0.02 | 0.49 | 0.31 | 0.26 | 1.05 | 0.71 |
| Cd* | ppm | 0.02 | 1.03 | 1.13 | 0.84 | 2.47 | 1.99 |
| Cu* | ppm | 1 | 170 | 115 | 112 | 183 | 157 |
| Ni* | ppm | 0.5 | 91.5 | 87.9 | 174 | 107 | 77.2 |
| Zn* | ppm | 1 | 379 | 339 | 268 | 607 | 528 |
| Be* | ppm | 0.02 | 0.08 | 0.06 | 0.14 | 0.09 | 0.07 |
| Co* | ppm | 0.2 | 17.6 | 13.1 | 24.4 | 22.9 | 19.3 |
| Mn* | ppm | 0.5 | 450 | 381 | 553 | 416 | 433 |
| Sb* | ppm | 0.02 | 0.70 | 0.82 | 1.08 | 2.03 | 1.06 |
| Se* | ppm | 0.5 | 0.7 | 0.9 | 1.8 | 1.6 | 1.4 |

ICPAES after Four Acid Digest Digest Method: ICP40Q

| | | | | | | | |
|---------------|-----|----|-----|-----|------|-----|-----|
| Chromium, Cr* | ppm | 10 | 307 | 349 | 1730 | 390 | 320 |
|---------------|-----|----|-----|-----|------|-----|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|-----|-----|-----|---|---|
| Mercury, Hg* | ppm | 0.001 | 4.5 | 4.8 | 2.8 | 8 | 8 |
|--------------|-----|-------|-----|-----|-----|---|---|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|-----|-----|----|-----|-----|
| Boron, B* | ppm | 20 | <20 | <20 | 60 | <20 | <20 |
|-----------|-----|----|-----|-----|----|-----|-----|



ANALYTICAL REPORT

PE067517 R0

| Parameter | Units | LOR | PE067517.021 | PE067517.022 | PE067517.023 | PE067517.024 | PE067517.025 |
|---------------|-------|-----|----------------|--------------|--------------|----------------|--------------|
| Sample Number | | | PE067517.021 | PE067517.022 | PE067517.023 | PE067517.024 | PE067517.025 |
| Sample Matrix | | | Natural Ground | Tails | Tails | Natural Ground | Tails |
| Sample Date | | | 10 May 2012 | 10 May 2012 | 10 May 2012 | 10 May 2012 | 10 May 2012 |
| Sample Name | | | RTD7.3 | RTD8.1 | RTD8.2 | RTD8.3 | RTD9.1 |

Moisture Content Method: AN002

| % Moisture | % | 0.5 | 5.8 | 1.2 | 1.2 | 6.4 | 2.1 |
|------------|---|-----|-----|-----|-----|-----|-----|
| | | | | | | | |

pH in soil (1:5) Method: AN101

| pH | No unit | - | 8.0 | 8.0 | 8.7 | 8.8 | 8.8 |
|----|---------|---|-----|-----|-----|-----|-----|
| | | | | | | | |

Conductivity and TDS by Calculation - Soil Method: AN106

| Conductivity of Extract (1:5 as received) | µS/cm | 1 | 1500 | 1700 | 760 | 780 | 430 |
|---|-------|---|------|------|-----|-----|-----|
| | | | | | | | |

Chloride (water extractable) Method: AN274

| Chloride (water extractable 1:5)* | mg/kg | 5 | 2200 | 120 | 150 | 630 | 1200 |
|-----------------------------------|-------|---|------|-----|-----|-----|------|
| | | | | | | | |

Sulphate (water extractable) in Soil Method: AN275

| Sulphate (water extractable)* | mg/kg | 5 | 4500 | 5300 | 5900 | 2900 | 1900 |
|-------------------------------|-------|---|------|------|------|------|------|
| | | | | | | | |

Water Soluble Fluoride in Soil Method: AN141

| Water Soluble Fluoride* | mg/kg | 0.5 | 1.2 | <0.5 | 0.5 | 3.3 | <0.5 |
|-------------------------|-------|-----|-----|------|-----|-----|------|
| | | | | | | | |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 |
|--------------------------------|-------|-----|-----|-----|-----|-----|-----|
| | | | | | | | |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 39 | 3 | 2 | 3 | 19 |
|---|-------|---|----|---|---|---|----|
| | | | | | | | |

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| As* | ppm | 0.5 | 1770 | 6380 | 6660 | 981 | 1530 |
|-----|-----|------|------|------|------|------|------|
| Pb* | ppm | 0.2 | 133 | 401 | 362 | 66.4 | 120 |
| Au* | ppb | 1 | 473 | 284 | 229 | 117 | 252 |
| Ag* | ppm | 0.02 | 0.50 | 0.67 | 0.60 | 0.16 | 0.28 |
| Cd* | ppm | 0.02 | 1.17 | 2.39 | 2.30 | 0.47 | 0.66 |
| Cu* | ppm | 1 | 115 | 187 | 163 | 85 | 122 |
| Ni* | ppm | 0.5 | 298 | 88.7 | 78.5 | 691 | 62.5 |
| Zn* | ppm | 1 | 320 | 596 | 532 | 158 | 216 |
| Be* | ppm | 0.02 | 0.15 | 0.06 | 0.06 | 0.05 | 0.09 |
| Co* | ppm | 0.2 | 35.8 | 19.5 | 15.6 | 52.8 | 18.9 |
| Mn* | ppm | 0.5 | 565 | 346 | 350 | 368 | 461 |
| Sb* | ppm | 0.02 | 1.42 | 1.49 | 1.33 | 0.75 | 0.85 |
| Se* | ppm | 0.5 | 1.1 | 1.8 | 1.7 | <0.5 | 0.9 |

| Parameter | Units | LOR | PE067517.021 | PE067517.022 | PE067517.023 | PE067517.024 | PE067517.025 |
|---------------|-------|-----|----------------|--------------|--------------|----------------|--------------|
| Sample Number | | | PE067517.021 | PE067517.022 | PE067517.023 | PE067517.024 | PE067517.025 |
| Sample Matrix | | | Natural Ground | Tails | Tails | Natural Ground | Tails |
| Sample Date | | | 10 May 2012 | 10 May 2012 | 10 May 2012 | 10 May 2012 | 10 May 2012 |
| Sample Name | | | RTD7.3 | RTD8.1 | RTD8.2 | RTD8.3 | RTD9.1 |

ICPAES after Four Acid Digest Digest Method: ICP40Q

| | | | | | | | |
|---------------|-----|----|------|-----|-----|------|-----|
| Chromium, Cr* | ppm | 10 | 1620 | 286 | 231 | 1990 | 246 |
|---------------|-----|----|------|-----|-----|------|-----|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | | | | |
|--------------|-----|-------|---|-----|-----|-----|-----|
| Mercury, Hg* | ppm | 0.001 | 4 | 4.9 | 6.5 | 1.2 | 1.7 |
|--------------|-----|-------|---|-----|-----|-----|-----|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | | | | |
|-----------|-----|----|----|-----|-----|----|-----|
| Boron, B* | ppm | 20 | 30 | <20 | <20 | 30 | <20 |
|-----------|-----|----|----|-----|-----|----|-----|

| Parameter | Units | LOR | PE067517.026 | PE067517.027 |
|---------------|-------|-----|--------------|----------------|
| Sample Number | | | PE067517.026 | PE067517.027 |
| Sample Matrix | | | Tails | Natural Ground |
| Sample Date | | | 10 May 2012 | 10 May 2012 |
| Sample Name | | | RTD9.2 | RTD9.3 |

Moisture Content Method: AN002

| | | | | |
|------------|---|-----|-----|-----|
| % Moisture | % | 0.5 | 1.2 | 4.0 |
|------------|---|-----|-----|-----|

pH in soil (1:5) Method: AN101

| | | | | |
|----|---------|---|-----|-----|
| pH | No unit | - | 9.0 | 9.2 |
|----|---------|---|-----|-----|

Conductivity and TDS by Calculation - Soil Method: AN106

| | | | | |
|---|-------|---|-----|------|
| Conductivity of Extract (1:5 as received) | µS/cm | 1 | 820 | 1200 |
|---|-------|---|-----|------|

Chloride (water extractable) Method: AN274

| | | | | |
|-----------------------------------|-------|---|------|------|
| Chloride (water extractable 1:5)* | mg/kg | 5 | 1100 | 1400 |
|-----------------------------------|-------|---|------|------|

Sulphate (water extractable) in Soil Method: AN275

| | | | | |
|-------------------------------|-------|---|-----|-----|
| Sulphate (water extractable)* | mg/kg | 5 | 710 | 440 |
|-------------------------------|-------|---|-----|-----|

| | | |
|---------------|--------------|----------------|
| Sample Number | PE067517.026 | PE067517.027 |
| Sample Matrix | Tails | Natural Ground |
| Sample Date | 10 May 2012 | 10 May 2012 |
| Sample Name | RTD9.2 | RTD9.3 |

| Parameter | Units | LOR | | |
|-----------|-------|-----|--|--|
|-----------|-------|-----|--|--|

Water Soluble Fluoride in Soil Method: AN141

| | | | | |
|-------------------------|-------|-----|------------|------------|
| Water Soluble Fluoride* | mg/kg | 0.5 | 0.6 | 1.5 |
|-------------------------|-------|-----|------------|------------|

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287

| | | | | |
|--------------------------------|-------|-----|------------|------------|
| Weak Acid Dissociable Cyanide* | mg/kg | 0.1 | 0.3 | 0.1 |
|--------------------------------|-------|-----|------------|------------|

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: AN258

| | | | | |
|---|-------|---|-----------|-----------|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | mg/kg | 1 | 24 | 18 |
|---|-------|---|-----------|-----------|

Metals in Soil by Aqua Regia digest, ICP MS Method: ARM133

| | | | | |
|-----|-----|------|-------------|-------------|
| As* | ppm | 0.5 | 1560 | 568 |
| Pb* | ppm | 0.2 | 132 | 37.2 |
| Au* | ppb | 1 | 277 | 78 |
| Ag* | ppm | 0.02 | 0.39 | 0.15 |
| Cd* | ppm | 0.02 | 0.62 | 0.21 |
| Cu* | ppm | 1 | 130 | 61 |
| Ni* | ppm | 0.5 | 79.0 | 442 |
| Zn* | ppm | 1 | 205 | 96 |
| Be* | ppm | 0.02 | 0.10 | 0.07 |
| Co* | ppm | 0.2 | 18.6 | 36.8 |
| Mn* | ppm | 0.5 | 499 | 361 |
| Sb* | ppm | 0.02 | 0.92 | 0.69 |
| Se* | ppm | 0.5 | 1.0 | <0.5 |

ICPAES after Four Acid Digest Digest Method: ICP40Q

| | | | | |
|---------------|-----|----|------------|-------------|
| Chromium, Cr* | ppm | 10 | 251 | 1600 |
|---------------|-----|----|------------|-------------|

Rare Earth Metals in soil by ICPMS Method: IMS12S

| | | | | |
|--------------|-----|-------|------------|----------|
| Mercury, Hg* | ppm | 0.001 | 3.1 | 1 |
|--------------|-----|-------|------------|----------|

Metals in Soils from Alkali Fusion ICP AES Method: ICP90Q

| | | | | |
|-----------|-----|----|-----|-----------|
| Boron, B* | ppm | 20 | <20 | 40 |
|-----------|-----|----|-----|-----------|

MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Chloride (water extractable) Method: ME-(AU)-[ENV]AN274

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD |
|-----------------------------------|--------------|-------|-----|----|----------|
| Chloride (water extractable 1:5)* | LB042052 | mg/kg | 5 | <5 | 0% |

Conductivity and TDS by Calculation - Soil Method: ME-(AU)-[ENV]AN106

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|--------------|-------|-----|----|----------|---------------|
| Conductivity of Extract (1:5 as received) | LB041861 | µS/cm | 1 | <1 | 0 - 3% | 100 - 101% |

Moisture Content Method: ME-(AU)-[ENV]AN002

| Parameter | QC Reference | Units | LOR | DUP %RPD |
|------------|--------------|-------|-----|----------|
| % Moisture | LB041574 | % | 0.5 | 0 - 5% |

pH in soil (1:5) Method: ME-(AU)-[ENV]AN101

| Parameter | QC Reference | Units | LOR | DUP %RPD | LCS %Recovery |
|-----------|--------------|---------|-----|----------|---------------|
| pH | LB041860 | No unit | - | 0 - 1% | 100% |

Sulphate (water extractable) in Soil Method: ME-(AU)-[ENV]AN275

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD |
|-------------------------------|--------------|-------|-----|----|----------|
| Sulphate (water extractable)* | LB042052 | mg/kg | 5 | <5 | 1 - 21% |

Total Oxidised Nitrogen NOx (Water Extract) in Soil Method: ME-(AU)-[ENV]AN258

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery |
|---|--------------|-------|-----|----|----------|---------------|
| Water Soluble Nitrate Nitrogen, NO ₃ as N* | LB042064 | mg/kg | 1 | <1 | 0 - 5% | NA |

MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Water Soluble Fluoride in Soil Method: ME-(AU)-[ENV]AN141

| Parameter | QC Reference | Units | LOR | MB | DUP %RPD | LCS %Recovery | MS %Recovery |
|-------------------------|--------------|-------|-----|------|----------|---------------|--------------|
| Water Soluble Fluoride* | LB042022 | mg/kg | 0.5 | <0.5 | 0 - 80% | NA | NA |

Weak Acid Dissociable Cyanide in soil by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN077/AN287

| Parameter | QC Reference | Units | LOR | DUP %RPD |
|--------------------------------|--------------|-------|-----|----------|
| Weak Acid Dissociable Cyanide* | LB041657 | mg/kg | 0.1 | 0 - 26% |

METHOD

METHODOLOGY SUMMARY

| | |
|-------|---|
| AN002 | The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water. |
| AN101 | pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water (or 0.01M CaCl ₂) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+. |
| AN106 | Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as μmhos/cm or μS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2520 B. |
| AN141 | Determination of Fluoride by ISE: A fluoride ion selective electrode and reference electrode combination, in the presence of a pH/complexation buffer, is used to determine the fluoride concentration on the soil water extract. The electrode millivolt response is measured logarithmically against fluoride concentration. Reference APHA F- C. |
| AN258 | Nitrate and Nitrite by FIA:: In an acidic medium, nitrate is reduced quantitatively to nitrite by cadmium metal. This nitrite plus any original nitrite is determined as an intense red-pink azo dye at 540 nm following diazotisation with sulphanilamide and subsequent coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. Without the cadmium reduction only the original nitrite is determined. Reference APHA 4500-NO3- F. |
| AN274 | Chloride by Aquakem DA following 1:5 or 1:2 DI water extraction: Chloride reacts with mercuric thiocyanate forming a mercuric chloride complex. In the presence of ferric iron, highly coloured ferric thiocyanate is formed which is proportional to the chloride concentration. Results reported on dry sample basis. Reference APHA 4500Cl- |
| AN275 | Sulphate by Aquakem DA following 1:5 DI water extraction: Sulphate is precipitated in an acidic medium with barium chloride. The resulting turbidity is measured photometrically at 405nm and compared with standard calibration solutions to determine the sulphate concentration in the sample. Reference APHA 4500-SO42-. Internal reference AN275. |

FOOTNOTES

| | | | |
|-----|---|-----|--|
| IS | Insufficient sample for analysis. | QFH | QC result is above the upper tolerance |
| LNR | Sample listed, but not received. | QFL | QC result is below the lower tolerance |
| * | This analysis is not covered by the scope of accreditation. | - | The sample was not analysed for this analyte |
| ^ | Performed by outside laboratory. | NVL | Not Validated |
| LOR | Limit of Reporting | | |
| ↑↓ | Raised or Lowered Limit of Reporting | | |

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf>

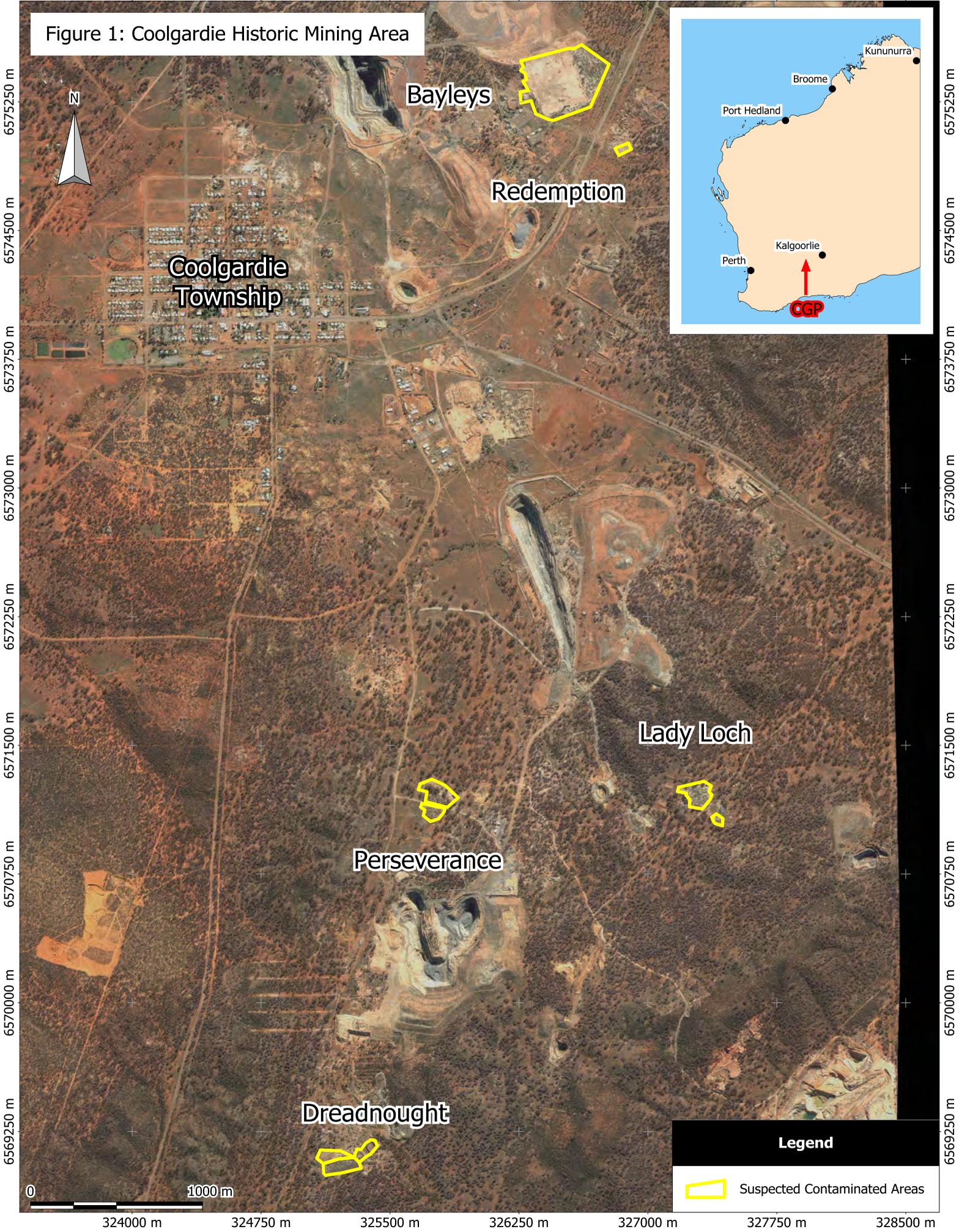
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324000 m 324750 m 325500 m 326250 m 327000 m 327750 m 328500 m

Figure 1: Coolgardie Historic Mining Area

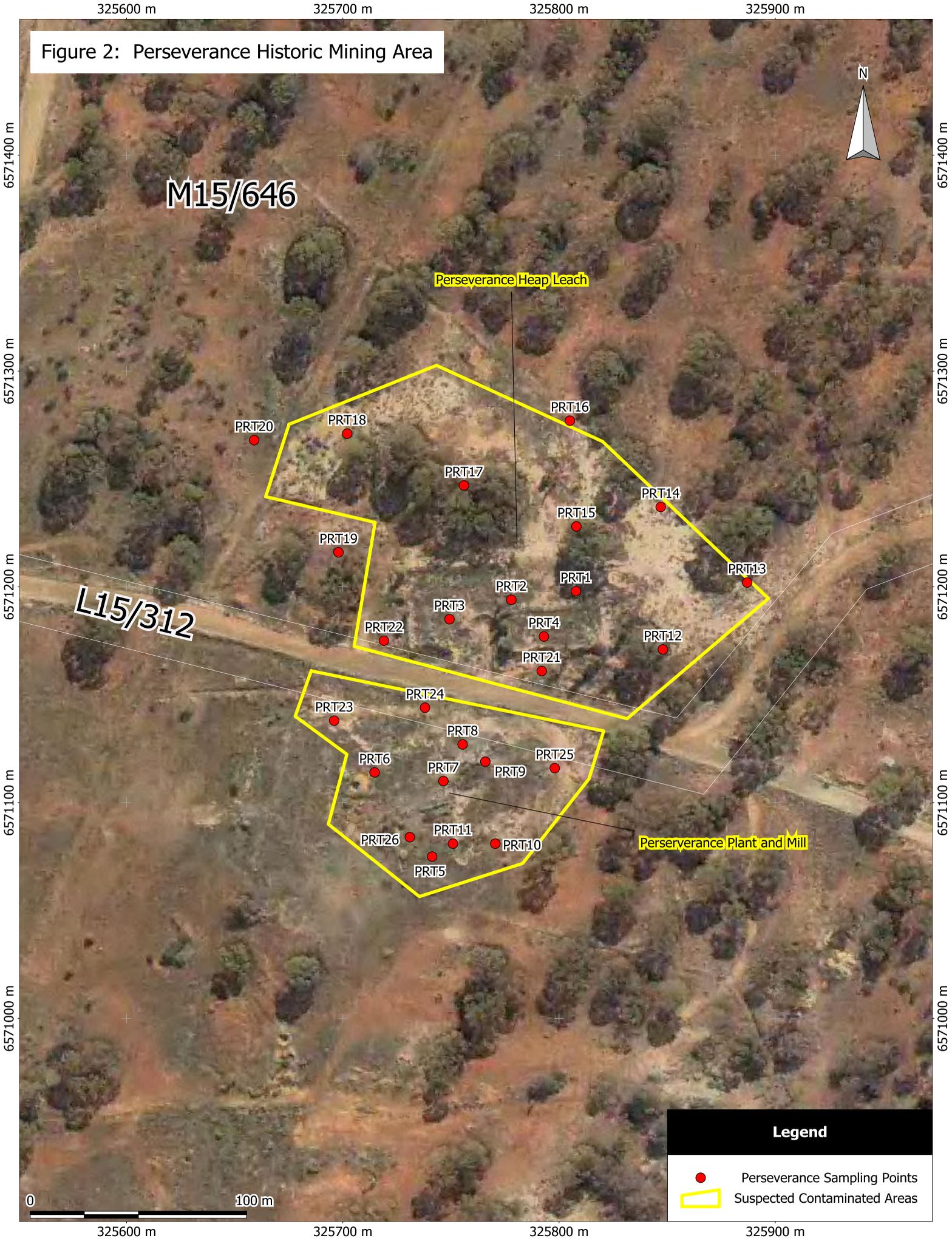


Legend

 Suspected Contaminated Areas

324000 m 324750 m 325500 m 326250 m 327000 m 327750 m 328500 m

Figure 2: Perseverance Historic Mining Area



Legend

- Perseverance Sampling Points
- ▭ Suspected Contaminated Areas

Figure 3: Lady Loch Historic Mining Area



Legend

- Lady Loch Sampling Points
- ▭ Suspected Contaminated Areas
- Tenement Boundaries

M15/966

M15/646

Lady Loch Historical Tails

Lady Loch Stamp Battery

325050 m

325200 m

325350 m

325500 m

Figure 4: Dreadnought Historic Mining Area

6569400 m

6569400 m



L15/213

Dreadnought Historical Sumps

Dreadnought Mill Site

DTD13

DTD12

DTD11

DMS02

DMS01

DTD10

DTD07

DTD06

DTD01

DTD08

DTD02

DTD05

DTD09

DTD03

DTD04

Dreadnought Historical Tails

M15/958

M15/966

6569100 m

6569100 m

6568950 m

6568950 m

6568800 m

6568800 m

Legend

-  Dreadnought Sampling Points
-  Suspected Contaminated Areas

0 200 m

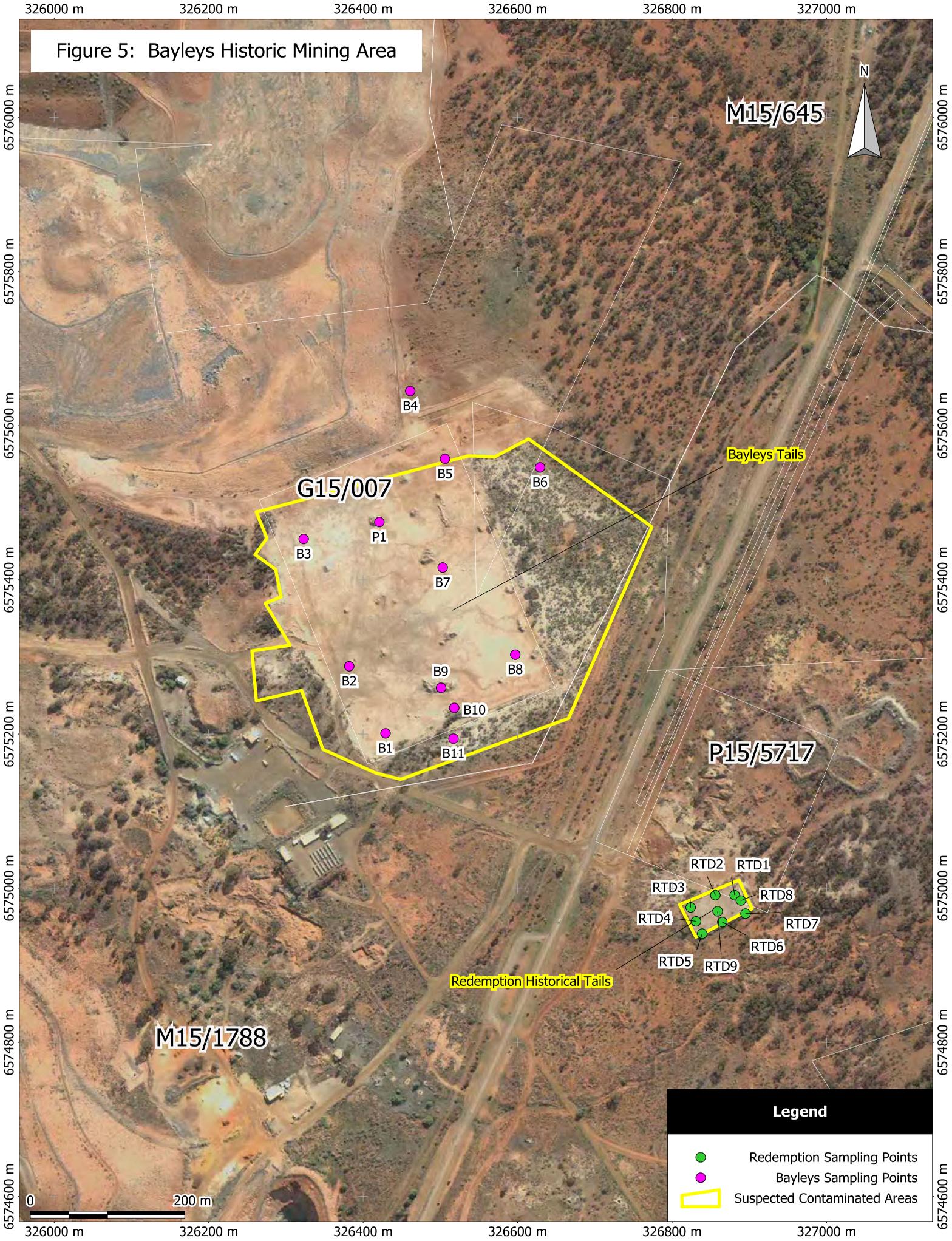
325050 m

325200 m

325350 m

325500 m

Figure 5: Bayleys Historic Mining Area



M15/645



Bayleys Tails

G15/007

P15/5717

M15/1788

Redemption Historical Tails

Legend

-  Redemption Sampling Points
-  Bayleys Sampling Points
-  Suspected Contaminated Areas

0 200 m