Section 46 Report and recommendations of the Environmental Protection Authority

Magellan Lead Carbonate Project, Wiluna – to facilitate the export of containerised lead from the Port of Fremantle, change to environmental conditions

Magellan Metals Pty Ltd

Report 1415

October 2011

Assessment and Compliance Services Process Timelines

Date	Progress stages	Time (weeks)
31/1/11	**Request received from Minister**	
21/2/11	**Request placed on public record**	**3**
29/9/11	**EPA report to the Minister for Environment**	**32**

ISSN (Print) 1836-0483
ISSN (Online) 1836-0491
Assessment No. 1868

Contents

1. Summary and recommendations

The Minister for Environment requested that the Environmental Protection Authority (EPA) inquire into the conditions set on this project and provide advice on the potential for transporting lead carbonate concentrate in alternative forms, including ingots. At the time of the Minister's request Ministerial Statement 559, as amended by 783, was in force.

Since this request, the Minister has imposed Interim Implementation Conditions on Magellan. The Interim Implementation Conditions are currently active.

The EPA has reviewed the original Ministerial Statement 559, as amended by 783, and the Interim Implementation Conditions in order to provide a set of recommended conditions that are enforceable and achievable.

The EPA acknowledges that given the history of Magellan Metals Pty Ltd's operations, the current conditions have evolved to provide the community with confidence that lead carbonate concentrate can be demonstrated to be able to be transported, without environmental and health implications.

Considering the history of the proposal, the EPA recommends that the strict level of conditions presented in the Interim Implementation Conditions remain in place for the time being. The EPA has recommended some amendments to ensure that they are more clearly enforceable, achievable and robust.

The EPA considers that the conditions placed on Magellan are much stricter than would normally be required for the transport and monitoring of this type of product. The EPA advises that these conditions should not necessarily be made the benchmark for other companies mining and transporting dangerous goods of this class. The EPA expects dangerous goods transport and handling in Western Australia to be managed by the Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007, and the Australian Code for the Transport of Dangerous Goods by Road and Rail 7th Edition (ADG7), which are administered by the Department of Mines and Petroleum (DMP). The EPA believes that the current transport and handling methods are more than sufficient to protect human health and the environment.

The EPA has also provided comments on the potential for downstream processing and the production of ingots within the report. The EPA recognises that downstream processing of lead carbonate concentrate may reduce the risk of lead being released into the environment during transport, however; this would need to be carefully weighed up against the potential environmental impacts from downstream processing. The EPA is advised that the proponent is currently investigating options for downstream processing and is not in a position to provide specific details to the EPA about the methods of downstream processing or its location. Therefore, at this point in time the EPA does not have the relevant information necessary to assess the environmental impacts of downstream processing and determine its environmental acceptability. The EPA has recommended a condition to ensure that these studies

are completed and reported. The outcome of these studies will allow an evaluation of downstream processing technologies by the EPA and other regulators. Should the proponent propose to develop additional ore reserves that it has identified since this proposal was first approved, the outcome of this evaluation can then inform any future decisions.

Recommendations

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that this report is pursuant to Section 46(6) of the *Environmental Protection Act 1986* for changing implementation conditions.

2. The Minister notes that the recommended changes are to update the current conditions relating to the assessment of the current proposal to ensure that the conditions are effective and enforceable.

3. The Minister notes that Magellan has mined 3.2 million tonnes of ore to date, of the 8.2 million tonnes allowed under the existing approval, and that Magellan anticipates that it will take a further three years to mine the remaining five million tonnes of ore.

4. That the Minister notes that Magellan has commissioned a 'Lead Metal Production Process Selection Study' to evaluate processing of the lead carbonate concentrate for any mining beyond the current approval. The final report is expected in November 2011.

5. That the Minister notes that the EPA has concluded that the environmental conditions subject to the changes outlined in Table 1 of Appendix 3 of this report, are appropriate and provided there is satisfactory implementation by the proponent of the amended conditions the proposal can be managed to meet the EPA's objectives.

6. The Minister imposes the amended conditions recommended in Appendix 5 of this report.

2. Introduction and background

The Minister for Environment has requested the EPA to consider and provide advice under Section 46(1) of the *Environmental Protection Act 1986* (EP Act) on Ministerial Conditions 559, as amended by Statement 783, imposed on Magellan Metals Pty Ltd (Magellan) on 2 February 2009.

On 23 February 2011 the Minister for Environment imposed Interim Implementation Conditions on Magellan under Section 45B of the EP Act in order to strengthen the auditing, monitoring and reporting requirements of the project to allow Magellan to resume the transportation of lead carbonate concentrate, following a stop order that was issued on 31 December 2010. The Interim Implementation Conditions

superseded Ministerial Statement 559 and 783 and are effective until the completion of this review and the Minister decides on the conditions that the proposal will be subject to.

Magellan's current proposal is for mining and production of lead carbonate concentrate at Wiluna and the transport of the lead carbonate concentrate to Fremantle Port in sealed bulk bags contained inside steel shipping containers.

To date Magellan has mined 3.2 million tonnes of ore out of the 8.2 million tonnes approved. Magellan has indicated that it will take a further three years to mine the approved amount of ore.

At the time of releasing this report Magellan's operations are on care and maintenance while it conducts an end to end review of its operations. Magellan has also commissioned Hatch Engineering to conduct a comprehensive "Lead Metal Production Process Selection Study" with the final report expected in November 2011 (Ivernia 2011). The results of this study will aid Magellan to make a decision on whether it is viable to proceed with the construction of a lead smelter and refinery for future operations.

The purpose of this report is to examine the effectiveness of Ministerial Statement 559, as amended by Statement 783, and to report on any improvements that can be made. The EPA has also considered the existing Interim Implementation Conditions issued on 23 February 2011 when preparing this report.

The summary and recommendations are presented in Section 1 of this report. The introduction and background are described in Section 2. Section 3 describes the proposal and Section 4 presents details of the review process, potential for downstream processing and the recommended conditions.

The history of Magellan's operations is discussed in Appendix 1 and references are listed in Appendix 2. An explanation for the changes to the conditions is presented in Appendix 3, followed by Magellan's position on downstream processing in Appendix 4. The identified decision making authorities and recommended conditions are provided in Appendix 5.

3. The proposal

No change has been requested to the approved proposal. Magellan has approval to transport lead carbonate concentrate from the mine site at Wiluna, to Fremantle Port in sealed bulk bags contained inside steel shipping containers.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 3 of the proponent's document, *Proposal and Project Conditions Review to Facilitate the Export of Containerised Lead from the Port of Fremantle* (Enesar Consulting, 2007).

Table 1: Summary of key proposal characteristics

Project characteristic	**Quantities/Description**
Life of the project (mine production)	Up to 10 years
Size of ore body	Not more than 8.2 million tonnes
Depth of mine pit	Not more than 50 metres
Area of disturbance (including access)	Not more than 320 hectares
Major components: • Open pit • Waste dumps • Infrastructure (plant site water supply, roads, accommodation camp, etc) • Tailings storage facilities TOTAL AREA	 55 hectares 138 hectares 57 hectares 70 hectares 320 hectares
Tailings storage facility (2 cells)	Combined total capacity of 4 million tonnes
Ore mining rate	1 million tonnes per year (maximum)
Solid waste materials	2.4 million tonnes per year (maximum)
Water supply: • Source • Maximum hourly requirement • Maximum annual requirement	 Calcrete and chert aquifers southeast of the mine site 170 kilolitres per hour 1.5 million kilolitres per annum
Lead concentrate transport	Road to Leonora and then rail to the Port of Fremantle in sealed bulk bags within locked steel shipping containers.
Power generation	Natural gas – up to 139 terajoules per annum
Fuel storage: • Capacity • Quantity used	 50 kilolitres of storage 1.8 million litres per year (approximately)

4. The review and recommended conditions

Section 46(6) of the EP Act requires the EPA to report to the Minister for Environment on whether or not the proposed changes to conditions or procedures should be allowed. In addition, the EPA may make recommendations as it sees fit.

The following issues have been considered in the review of Ministerial Statement 559, as amended by Statement 783, and the Interim Implementation Conditions:

a) Practices and processes.

b) Transport route.

c) Auditing.

d) Reporting and monitoring.

The EPA is aware that the Interim Implementation Conditions were prepared in consultation with the Office of the Environmental Protection Authority (OEPA) and relevant Decision Making Authorities (DMAs). As such it is also necessary for the EPA to provide information within this report that explains the rationale for the Interim Implementation Conditions.

Table 1 in Appendix 3 of this report explains in detail the recommended changes from the original conditions, Ministerial Statement 559, as amended by 783, to the recommended conditions and the reasons for the changes.

As discussed above, the EPA considers that the Interim Implementation Conditions placed on Magellan are much stricter than would normally be required for the transport and monitoring of this type of dangerous goods. Below is a discussion of key matters the EPA took into account in recommending the conditions included as Appendix 5.

Transportation of lead carbonate concentrate

It is important to understand the difference between lead carbonate and lead carbonate concentrate. Lead carbonate has a lead content of approximately 6% and is naturally occurring in the ground at the mine-site. Soil at the mine site has a natural lead content of between 1% and 3%. Lead carbonate concentrate is the product once the lead carbonate has been processed at the mine-site and has a lead content of approximately 65%. Although the main purpose of the conditions is to ensure that lead carbonate concentrate is not released to the environment it is also important to ensure that the lead carbonate dust, naturally occurring at the mine site is not transferred along the transport route and at the port, where the lead content in the environment may be less, in quantities that would cause harm to human health or the environment.

.

The transportation of lead carbonate concentrate in Western Australia has to comply with the 'Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007' and the 'Australian Code for the Transport of Dangerous Goods by Road and Rail 7th Edition (ADG7).

The transport of Magellan lead in Intermediate Bulk Containers (bulk bags) with a sieve proof and water resistant liner meets these regulations. In addition to these transport requirements, Magellan also transport the bulk bags in locked shipping containers. The transportation of the bulk bags in locked shipping containers is over and above what is required and is best practice. This additional level of protection eliminates the likelihood of lead carbonate concentrate being released into the environment unless there is a breach of container integrity.

Monitoring results to date show that lead carbonate concentrate has not escaped into the environment from within the shipping containers. The EPA is confident that the method of transportation of lead carbonate concentrate in bulk bags within shipping containers is appropriate to protect human health and the environment.

The EPA understands that the Interim Implementation Conditions have addressed:

- bringing forward many of the practices and processes which were in the approved *Health, Hygiene and Environmental Management Program* (Strategen 2009a) and the *Health, Hygiene and Environmental Monitoring Program* (Strategen 2009b) into the conditions to improve enforceability;
- introducing strict timeframes for analysing the samples and reporting;
- ensuring that the Managing Director of the proponent, or his delegate report potential non-compliances to the relevant authorities;
- clarifying any conditions which were unclear, or unachievable;
- increasing the frequency for auditing and ensuring that it was carried out by an independent third party;
- increasing the frequency of reporting the results of monitoring;
- ensuring the proponent is responsible for public availability of monitoring and audit reports;
- clarifying the timing of the sampling program; and
- introducing an upper limit to the baseline trigger levels, where a health guideline or health investigation level is available.

The EPA has assessed the original conditions and the Interim Implementation Conditions and has recommended some changes which address:

- the requirement for an Environmental Management Program which focuses solely on environmental issues to replace the approved Health, Hygiene and Environmental Management Program which currently includes broader matters;
- the updating of timelines where required to improve clarity and ensure achievability;
- the updating of the Environmental Management Program to be approved by the Chief Executive Officer (CEO) of the OEPA, to allow improvements to be made on a regular basis;
- the consideration of downstream processing and the provision of a report;
- the cleanliness of shipping containers and ensuring that they are free from visible mud containing lead carbonate prior to leaving the mine site and prior to being loaded onto the train at Leonora;
- the removal of conditions which are no longer relevant;

- the inclusion of a clear requirement for sampling, and any changes in sampling frequency to be on the approval of the CEO of the OEPA;
- the reporting to be escalated to the Managing Director or board member of the proponent if isotopic testing shows the presence of Magellan lead above baseline trigger levels;
- the requirement for an independent review of all sampling and analysis methods to ensure results are reliable;
- the inclusion of recommendations on independent audits and the proponent implementing the relevant recommendations; and
- the independent inspector carrying out inspections and reporting functions only.

Downstream processing of lead

The Minister for Environment has requested the EPA to provide advice with regard to the possibility of downstream processing of lead concentrate to produce lead ingots.

The EPA recognises that downstream processing of lead carbonate concentrate may reduce the risk of lead being released into the environment during transport, however this would need to be carefully weighed up against the potential environmental impacts from downstream processing. At this point in time the EPA does not have the relevant information necessary to assess the environmental impacts of downstream processing and determine its environmental acceptability.

The EPA notes that Magellan has indicated in its letter of 9 June 2011 (Ivernia 2011) that it would not be financially viable to establish downstream processing facilities at the present time due to the amount of remaining resource approved in the current conditions (approximately three years mining). However, Magellan is conducting studies into the option of downstream processing in view of the company identifying an increase in the Magellan ore reserve. The EPA is aware that this may lead to a new or revised proposal being referred to develop these reserves.

Magellan has commissioned Hatch Engineering to conduct a 'Lead Metal Production Process Selection Study' (Ivernia 2011), with the final report due in November 2011. The study will develop engineering concepts and cost estimates for various available smelting and refining technologies to allow an optimum selection to be made. On the basis of this study, Magellan expects to be in a position to make a decision on whether to proceed to a feasibility study into the development of a downstream processing facility and associated environmental impact assessment in quarter one of 2012.

There are many methods utilised to refine lead and a number of by-products and wastes produced. In today's environment, best practice for refineries and smelters, in particular, has improved. The EPA notes that Magellan is currently not in a position to provide specific details of the method of downstream processing or its location. The EPA considers that refining concentrates to produce ingots may pose environmental risks that have not been adequately quantified at this time and considers that the assessment of downstream processing needs to be rigorous and properly considered in accordance with the requirements of the EP Act. The EPA is not in a position, at this time, to conclude that downstream processing and the production of ingots is the best environmental solution, especially given that current

transport and handling meets the EPA's objectives for protecting human health and the environment.

The EPA is aware that Magellan may refer a new or revised proposal to the EPA and hence, the question of the environmental acceptability of downstream processing to ingots needs to be determined. In view that the proponent has begun the additional studies to determine options for downstream processing, including providing a timeframe for their completion, the EPA has recommended condition 6 to ensure that these studies are completed and reported. The condition ensures that:

- methods of downstream processing and material usage are identified;
- best available technology is utilised;
- emissions sources and limits for the selected technology are identified;
- potential locations are provided; and
- the report is peer reviewed.

The outcome of these studies will allow an evaluation of downstream processing technologies by the EPA and other regulators. In particular, it is expected that the studies will provide information on what is best practice with regard to emissions as a basis for determining whether downstream processing to ingots is likely to be environmentally acceptable. The EPA advises that this information will inform any subsequent decision as to whether a new or revised proposal, if referred, can be implemented.

Key Proposal Characteristics Table

The key characteristics table remains unchanged, however the EPA notes that there are project characteristics detailed in the key characteristics table which do not need to be included as they are not of environmental consequence. Section 45C of the EP Act provides the appropriate process to make changes to the proposal without a revised proposal being referred to the EPA, where the proponent can demonstrate that the changes are unlikely to have a significant detrimental effect on the environment.

The life of the project which is included in the key characteristics table was originally provided by the proponent and was the expected timeframe for the project based on the per annum mining rate, rather than limitations being placed on the project because of environmental reasons.

The hydrological survey carried out in 1999 (Morgan 1999) for the proposal was based on ten years continuous pumping, however Magellan has not mined for the full ten years as proposed.

The EPA notes that Magellan has a groundwater licence GWL96342(2) to take 2,500,000 kilolitres (kL) of water per annum until 17 May 2014. Magellan is required to submit monitoring data on a regular basis to the Department of Water (DoW) as part of the licence requirements and any concerns would be addressed.

Consultation

The EPA has consulted with Decision Making Authorities (DMAs) during this review and the development of the recommended conditions. These included the Department of Mines and Petroleum (DMP), Department of Environment and Conservation (DEC), Department of Health (DoH), Department of Transport (DoT) and Fremantle Ports.

The EPA has also consulted with the proponent to understand issues relating to the achievability of the original conditions and the Interim Implementation Conditions, and to understand its position on downstream processing.

The recommended conditions which include the outcome of this consultation are provided in Appendix 5.

Appendix 1
Magellan History

In 1999 Magellan referred a proposal to the Department of Environmental Protection to establish a lead carbonate refinery within the mine site. The proposal was assessed and the level of assessment was set at Not Assessed – Managed under Part V of the EP Act on 2 December 1999.

Magellan has developed an open-cut lead carbonate mine and processing facilities approximately 30 kilometres (km) west of the Wiluna town site to produce lead concentrate and export the concentrate through the Port of Geraldton. This proposal was approved in November 2000 when Statement 559 was issued by the then Minister for Environment.

On 29 December 2004, the then Minister for Environment approved a variation of the above proposal to export through the Port of Esperance, rather than the Port of Geraldton.

Mining commenced in November 2004 and Magellan exported concentrate in bulk from June 2005 until March 2007 through the Port of Esperance. The export of bulk lead carbonate concentrate through the Port of Esperance was halted by the DEC due to fugitive lead and nickel dust pollution from the Port of Esperance. Subsequently, the Magellan mine was put on care and maintenance.

A Parliamentary Inquiry into the cause and extent of lead pollution in the Esperance area was referred to the Education and Health Standing Committee and a report of its findings and recommendations was tabled in the Legislative Assembly on 6 September 2007 by the Education and Health Standing Committee.

Magellan sought to change the export handling and transport procedures to transport lead carbonate concentrate through the Port of Fremantle in sealed bulk bags contained inside locked steel shipping containers. The change to the proposal was approved on 2 February 2009 when Ministerial Statement 783 was issued by the then Minister for Environment.

Magellan began exporting containerised lead concentrate through the Port of Fremantle in September 2009 and mining recommenced in February 2010.

On 31 December 2010, Magellan was issued with a ‘Stop Work Order’ from the Minister for Environment under section 48(4)(a) of the EP Act, following two instances of a potential non-compliance issue relating to lead levels outside the bulk bags, within the shipping containers, exceeding trigger levels.

On 3 January 2011, an order was served on Magellan under section 48 (4)(b) of the EP Act requiring specific actions to be undertaken.

An independent audit revealed that there had been no exceedance of shipping container trigger levels and that the high readings of lead were as a result of inaccuracies in completeness of the chain of custody documents causing incorrect calculations during the analysis of the samples (Laboratory Quality Management Services 2011). Despite the results Magellan were non-compliant with Ministerial Statement 559, as amended by Statement 783, as they did not report the perceived exceedance to the relevant authorities within 12 hours of knowing the result, as

stated in the Health, Hygiene and Environmental Monitoring Program (Strategen, 2009b), required by condition 9 of Ministerial Statement 559, as amended by Statement 783.

The DEC carried out sampling within Magellan's shipping container storage area at Fremantle Ports in January 2011. Results showed that although Magellan lead was present in some of the samples taken it was well below relevant assessment criteria and does not pose a risk to human health, the environment or any environmental value (DEC 2011).

On 31 January 2011 the Minister for Environment requested that the EPA inquire into the conditions set on this project.

On 17 February 2011 the Minister for Environment requested that the EPA also consider the potential for transporting lead carbonate concentrate in alternate forms, including ingots.

On 23 February 2011, the Minister for Environment imposed Interim Implementation Conditions on Magellan under section 46A of the EP Act and the order was lifted. The Interim Implementation Conditions superseded Ministerial Statement 559 and 783. Magellan resumed transportation of lead carbonate concentrate on 25 February 2011.

On 24 February 2011 the OEPA was made aware that between 10 November 2010 and 4 January 2011 a total of 10 trains carrying 159 containers of lead carbonate concentrate were routed to the Port of Fremantle along a 12 kilometre rail line that was not approved under the Ministerial Conditions.

The decision to divert some trains was made by the rail transport contractor without Magellan's approval or knowledge and contrary to the approved transport route developed between Magellan and the contractor.

Magellan has since amended its contracts with the rail transport contractor to reiterate compliance with the rail route contained in the *Health, Hygiene and Environmental Management Program* (Strategen 2009a), required by Condition 6 of Ministerial Statement 559, as amended by Statement 783.

Magellan collected soil samples from 26 sites along the 12 kilometre unapproved route. The soil sampling showed no evidence of the presence of Magellan lead in the environment.

On 5 April 2011 Magellan voluntarily ceased the transportation of lead carbonate concentrate and placed the mine on care and maintenance in response to mud containing Magellan lead being found on the outside of a proportion of shipping containers at the Port of Fremantle, West Kalgoorlie, Forrestfield and Leonora.

Investigations have found that the mud containing lead on the containers was from the Magellan mine origin but no evidence was found that the lead was from the lead carbonate concentrate within the sealed bags.

Appendix 2
References

DEC (2011), *Report on Sampling and Analysis Undertaken in Magellan Shipping Containers Storage Area, Fremantle Port.* Department of Environment and Conservation, Pollution Response Unit, Environment Regulation Division. January, 2011.

DMP (2009), *Review of Amended Conditions relating to the Magellan Lead Carbonate Project, Wiluna.* Email from Department of Mines and Petroleum to Magellan Metals Pty Ltd dated 26 February 2009.

DMP (2011a), *Query from EPA on sea container design regulations*. Email from Department of Mines and Petroleum to the Office of the Environmental Protection Authority dated 27 January 2011.

DMP (2011b), *Guidelines for Preparing Mine Closure Plans*. Prepared by the Department of Mines and Petroleum and the Environmental Protection Authority. May, 2011.

Education and Health Standing Committee (2007), *Inquiry into the Cause and Extent of Lead Pollution in the Esperance Area*. Report No. 8 in the 37th Parliament. Published by the Legislative Assembly, Parliament of Western Australia, Perth, September, 2007.

Enesar Consulting Pty Ltd (2007), *Proposal and Project Conditions Review to Facilitate the Export of Containerised Lead from the Port of Fremantle*, Magellan Metals Pty Ltd, Magellan Lead Project, Australia.

Environmental Protection Authority (2000). *Magellan Lead Carbonate Project.* Magellan Metals Pty Ltd. Report and recommendations of the Environmental Protection Authority. Bulletin 996, September 2000.

Environmental Protection Authority (2007), *Magellan Lead Carbonate Project, Wiluna – To Facilitate the Export of Containerised Lead from the Port of Fremantle, Change to Environmental Conditions.* Magellan Metals Pty Ltd. Section 46 Report and recommendations of the Environmental Protection Authority. Bulletin 1276, December 2007.

Environmental Protection Authority (2009), *Magellan Lead Carbonate Project, Wiluna – Containerised Lead Carbonate Exports through the Port of Fremantle. Additional advice on draft environmental Conditions*. Magellan Metals Pty Ltd. Section 46 Report and recommendations of the Environmental Protection Authority. Report 1314, February 2009.

Ivernia Magellan Metals Pty Ltd (July 2009), *Compliance Assessment Plan*, Magellan Metals Pty Ltd, July 2009.

Ivernia Magellan Metals Pty Ltd (June 2011), *Magellan Metals' position on the viability of smelting lead into ingots*. Letter from Magellan Metals Pty Ltd to the Office of the Environmental Protection Authority dated 9 June 2011.

Laboratory Quality Management Services Pty Ltd (2011), *Review of Analytical Procedures Used and Data Produced by SGS Australia Pty Ltd for the Magellan Metals Pty Ltd 'Lead in Shipping Container Monitoring Program'.* Unpublished report prepared for the Office of the Environmental Protection Authority. February, 2011.

Morgan K.H (1999), *Hydrogeological Investigation, Magellan Project, East Murchison Mineral Field, Western Australia*. Unpublished report prepared for Magellan Metals Pty Ltd. July, 1999.

Outback Ecology (2008), *Stygofauna assessment for the Magellan Lead Project – Wiluna 2008*. Unpublished report prepared for Magellan Metals Pty Ltd, September 2008.

Strategen (2009a), *Health, Hygiene and Environmental Management Program.* Magellan Lead Carbonate Concentrate. Prepared for Magellan Metals Pty Ltd, June, 2009.

Strategen (2009b), *Health, Hygiene and Environmental Monitoring Program.* Magellan Lead Carbonate Concentrate*.* Prepared for Magellan Metals Pty Ltd, June, 2009.

Strategen (2009c), *Implementation of Condition 10 of EPA Assessment No. 1773,* Magellan Lead Carbonate Concentrate. Prepared for Magellan Metals Pty Ltd, June, 2009.

Strategen (2009d), *Emergency Response Plan,* Magellan Lead Carbonate Concentrate. Prepared for Magellan Metals Pty Ltd, June, 2009.

Appendix 3

Table of Changes from Ministerial Statement 559, amended by 783 to the Recommended Conditions

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

Conditions in MS 559, as amended by MS 783	**Recommended Conditions**	**Purpose of Change**
1 Implementation	1 Proposal Implementation	This condition has changed in its layout from Ministerial Statement 559. It has been updated to be in line with more recent conditions however, the purpose stays the same.
2 Proponent Commitments		*This condition has not been brought forward into the recommended conditions, as proponent commitments in Ministerial Statements may not prove to be enforceable.
3 Proponent (as amended by MS 783)	2 Proponent Nomination and Contact Details	This condition has changed in its layout from Ministerial Statement 559. It has been updated to be in line with more recent conditions however the purpose stays the same.
4 Commencement		This condition has not been brought forward into the proposed conditions as the condition is no longer relevant, on the grounds that the proposal has already substantially commenced.
5 Compliance Reporting (as amended by MS 783)	3 Compliance Reporting	This condition has been updated as the proponent has already provided, and had approved, a Compliance Assessment Plan. Condition 3-1 states that the proponent shall maintain the approved Compliance Assessment Plan. *Condition 3-4 of the recommended conditions states that the proponent is now expected to report any non compliances within five business days, as opposed to as soon as practicable, as stated in condition 5-5 of Ministerial Statement 559, as amended by Statement 783. This change promotes clarity and improves enforceability as a timeframe has been specified. This condition is the most recent compliance condition that is being used for other proposals. *Condition 3-5 has been updated to include the date the Compliance Assessment Report is due and what time period should be covered by the Report. This change promotes clarity and is the most recent compliance condition that is being used for other proposals. *Condition 3-6 has been added so that the proponent is responsible for ensuring that the Minister for Environment and the reference group, currently Fremantle Ports Inner Harbour Community Liaison Group, established by the Fremantle Port Authority (FPA) are made aware that the Assessment Compliance Report is

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

		available.
6 Dust Control – Health, Hygiene and Environmental Management Program (as amended by MS 783)	4. Bagging and Shipping Container Management	This condition is a refinement of condition 6, Dust Control – Health, Hygiene and Environmental Management Program, of Ministerial Statement 559, as amended by Statement 783. Condition 4-1 (2) has been updated to clearly specify the route that has been approved to transport the locked shipping containers containing lead carbonate concentrate from the mine site to Fremantle Port. Figures 1 to 16 have been included in the conditions to clearly show the transport route. This information was previously included in the Health, Hygiene and Environmental Management Program, approved in June 2009 (Strategen 2009a). However, by bringing the detail into the condition it increases transparency and makes the approved route legally enforceable. Condition 4-1 (2) also clarifies that the shipping containers shall be stored in a secure manner at Leonora, rather than in a secure area, as was interpreted in condition 6-1 (2) of Ministerial Statement 559, as amended by Statement 783. Condition 4-1 (4) has been updated as it is not feasible to measure the moisture content of the lead carbonate concentrate prior to it being removed from the State. As the lead carbonate concentrate is transported in sealed waterproof bags, within a locked shipping container it is unlikely that the moisture content of the lead carbonate concentrate will change significantly between leaving the mine site and leaving the State. *Condition 4-1 (7, 8 and 9) have been added to condition 4. These points were included within the Health, Hygiene and Environmental Management Program, required by condition 6 of Ministerial Statement 559, as amended by 783 approved in June 2009 (Strategen 2009a) and have been brought forward into the conditions to increase their enforceability. *Condition 4-2 has been updated and requires the proponent to prepare an Environmental Management Program prior to recommencing mining, rather than the preparation of a Health, Hygiene and Environmental Management Program, as detailed in condition 6-2 of Ministerial Statement 559, as amended by Statement 783. Condition 4-2 ensures the focus is on Environmental issues only, and not on broader issues which are dealt with by

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

		other agencies. *Condition 4-4 has been updated to allow revisions of the Environmental Management Program to be approved by the CEO of the OEPA on the advice of the CEO of the DMP. This will allow improvements to the Environment Management Program and operations to be made more easily and regularly, if required.
	5. Prevention of Discharge of Lead Carbonate	*This is a new condition that has been added to emphasise the importance that no lead carbonate concentrate shall be discharged from within the shipping containers which will cause the degradation of soil, water or air as identified in the results of monitoring sites detailed in Schedule 2.
	6. Downstream Processing Report	*This is a new condition that has been added to ensure that the proponent provides the CEO of the OEPA with a report detailing options of downstream processing by a given date. This requires the proponent to carry out the studies discussed within the report.
	7. Shipping Container Cleanliness	*This is a new condition that has been added to ensure that Shipping Containers are free from visible mud containing lead carbonate prior to being removed from the mine-site and also prior to being loaded onto the train at Leonora. This condition improves enforceability and aims to reduce the spread of lead carbonate from the mine-site.
7 Decommissioning and Rehabilitation Plan (as amended by MS 783)		*This condition has not been carried forward into the recommended conditions. From 1 July 2011, the EPA will generally not assess mine closure as part of its Environmental Impact Assessment of mining proposals under the EP Act, where they are subject to the *Mining Act 1978*. DMP will manage mine closure and rehabilitation as per the EPA/DMP Guidelines for Preparing Mine Plans (2011b) and in accordance with the requirements of the *Mining Act 1978*.
8 Subterranean Fauna (Stygofauna) Sampling Plan		*This condition has not been carried forward into the new conditions. The purpose of this condition was to increase scientific knowledge about subterranean fauna and the impact from groundwater abstraction. The sampling plan was implemented and results have shown that only one taxon, the amphipod *Paramelitidae gen. nov*, was restricted to the project area. This taxon has been repeatedly found within the project area throughout the surveys.

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

		This has shown that groundwater abstraction has not impacted this taxon. Groundwater monitoring indicated that there has been a slight reduction in the storage capacity of the aquifer and no obvious regional impacts. It therefore appears that there has been no adverse affects on stygal communities within the project areas as a result of groundwater extraction by Magellan (Outback Ecology 2008). The EPA considers that scientific knowledge has increased and there has been no adverse impact on stygal communities. Therefore, sampling can cease.
9 Health, Hygiene and Environmental Monitoring Program (as inserted by MS 783)	8 Sampling Program	*This condition replaces condition 9, Health, Hygiene and Environmental Monitoring Program, of Ministerial Statement 559, as amended by Statement 783. This condition has improved by including additional specification around sampling sites and frequency. *Condition 8 of the recommended conditions clearly describes the monitoring program that shall be implemented and is supported by figures 2 to 16, showing the sampling sites. This condition also clearly identifies what sampling is required, when it is to be carried out, what is to be measured and the method to be used. This level of detail within the condition will remove any confusion and will enhance enforceability. The dust deposition results are now required to be reported in mg/m^2/month, as per the Australian/New Zealand Standard 3580.10.1:2003, rather than mg/kg as stated in the Health, Hygiene and Environmental Monitoring Program (Strategen 2009b), approved by the Minister for Environment in June 2009. *Condition 8-2 has been amended to specify that the NATA accredited analytical laboratory is to be accredited for the sample type that is being analysed. *Condition 8-3 has been added to allow the CEO of the OEPA to determine the ceasing of the sampling program, or part thereof, if the transport of Lead Carbonate Concentrate by Magellan stops. *Condition 8-4 has been added to allow the CEO of the OEPA to approve changes to the sampling

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

		program providing the proponent demonstrates positive monitoring results for a given time frame.
	9 Sampling Analysis and reporting timing obligations	This is a new condition. The approved Health, Hygiene and Environmental Monitoring Program (Strategen 2009b), required by condition 9 of Ministerial Statement 559, as amended by Statement 783 included the requirement for samples to be analysed if trigger levels were higher than baseline levels, but did not detail the timeframes in which the analysis was to be carried out and what was to be included in the reporting. In addition to what was required in the Health, Hygiene and Environmental Monitoring Program (Strategen 2009b) this condition includes a requirement that all samples are submitted for analysis within strict timeframes, which ensures that the analysis of samples is not delayed, and that results are reported to the relevant agencies no later than the next business day. It also ensures that the Managing Director of Magellan or the company secretary is responsible for reporting any results above the baseline trigger levels and the results of isotopic testing within one business day. *If the isotopic analysis shows that the increase above baseline trigger levels is due to Magellan lead then the Managing Director or a member of the board is responsible for reporting this to the relevant authorities. This puts the responsibility upon the Managing Director of Magellan and a board member to be aware of, and responsible for, non compliances. The list of agencies that are to receive copies of the certificates of analysis for monitoring results and isotopic testing has been expanded to include the DMP and the Department of Transport (DoT). Additionally the proponent is now required to report all sampling and results to the OEPA every three months in order to allow the OEPA to closely monitor the proponent's compliance with conditions on a frequent basis and identify any non compliances within a shorter timeframe. Sampling results are to be made publically available within five business days of receipt. Consistent with the Health, Hygiene and Environmental Monitoring Program (Strategen 2009b), if isotopic testing shows that the increase

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

		above the baseline trigger level is not due to Magellan lead, the new lead level will become the baseline for that particular site. In addition to what was required in the Health, Hygiene and Environmental Monitoring Program (Strategen 2009b), this condition includes an upper baseline limit, which is the relevant health guideline or health investigation level for that sample type, as detailed in condition 20. The analysis and reporting functions have been added into the conditions to make them more enforceable. *This condition has also been updated to allow the CEO of the OEPA to approve changes to the sampling analysis and reporting timelines in response to the proponent demonstrating positive monitoring results for a given time period.
	10 Monitoring Triggers, contingency measures and ceasing Transport	This is a new condition. The approved Health, Hygiene and Environmental Monitoring Program (Strategen 2009b), required by condition 9 of Ministerial Statement 559, as amended by Statement 783, included the same contingency actions. These actions have been brought forward into the recommended conditions to improve enforceability. In addition to what was required in the Health, Hygiene and Environmental Monitoring Program, this condition states that the transportation of lead carbonate concentrate cannot recommence until a recommencement plan has been submitted and approved by the CEO of the OEPA.
12 Emergency Response Plan (as inserted by MS 783)	11 Emergency Response Plan	*This condition has been carried forward from Ministerial Statement 559, as amended by Statement 783, however it has been updated to focus on lead carbonate concentrate, as opposed to lead carbonate and refers to the implementation of the Emergency Response Plan (Strategen 2009d) which was approved on 13 August 2009. The condition has also been updated to allow the CEO of the OEPA to approve any revisions, on the advice of the Fire and Emergency Service Authority (FESA), the Port Authority and relevant Local Governments. This will allow improvements to the Plan to be made more easily and regularly, if required.
	12 Quality Control for	*This is a new condition which has been added to ensure that the sampling methodology and analysis

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

	Sampling and Analysis	is being carried out in the correct manner. This condition has come about due to the errors that occurred during the in container monitoring (Laboratory Quality Management Services, 2011). It aims to ensure confidence in the monitoring results.
	13 Ongoing audits of the Environmental Management Program	This is a new condition which has been added to ensure that an independent third party carries out a compliance/assurance audit of the Environmental Management Program every three months, and suggest recommendations for change. This condition allows for the auditor to focus in detail on different section of the Program each quarter. This condition aims to allow for the identification of potential non compliances in a shorter timeframe and that practices are put in place to eliminate non compliances in the future.
	14 Ongoing audits of the Sampling Program	This is a new condition which has been added to ensure that an independent third party carries out a compliance/assurance audit of the Sampling Program, analysis, monitoring and reporting function every three months, and suggest recommendations for change. This condition allows for the auditor to focus in detail on different section of the Program each quarter. This condition aims to allow for the identification of potential non compliances in a shorter timeframe and that practices are put in place to eliminate non compliances in the future.
	15 Audit Reports to be made publicly available	This is a new condition which ensures that the public have access to the results of the auditing reports within a given time period. This allows for transparency and openness.
10 Accredited Auditor (as inserted by MS 783)	16 Independent Inspector	*This condition has been carried forward from Ministerial Statement 559, as amended by Statement 783, however has been amended as the audit function, as required as part of condition 10 of Ministerial Statement 559, as amended by Statement 783, has been removed from this condition as auditing is now carried out by an independent third party, as described in conditions 13 and 14. This condition also states that 'in container' monitoring shall be carried out in 1% of containers over a quarter of a calendar year. The addition of the timescale enhances enforceability and ensures that adequate monitoring is undertaken. *This condition has been updated to clarify that part

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

		of the role of the independent inspector is to report any visible lead carbonate on the outside of the shipping containers and any visible lead carbonate concentrate inside the shipping containers, immediately to the proponent. The independent inspector is required to carry out the recommendations detailed in the '*Review of Analytical Procedures Used and Data Produced by SGS Australia Pty Ltd for the Magellan Metals Pty Ltd 'Lead in Shipping Container Monitoring Program'* (Laboratory Quality Management Services, 2011). This will ensure that the sampling results are robust and reliable.
11. Public Reporting of Outcomes of Auditing and Monitoring (as inserted by MS 783)	17 Reporting of Inspections and Monitoring	This condition has been carried forward from MS 559, as amended by 783, however it has been amended to put the responsibility on the proponent to ensure reports from the Independent Inspector are made publicly available within 5 working days. This improves enforceability as these conditions can only apply to the proponent and not to the independent inspector.
13 Performance Review (as inserted by MS 783)		*This condition has not been brought forward to the recommended conditions as the timescale for the reporting has now lapsed. The points included in the performance review condition have now been included as part of the compliance reporting condition.
14 Financial Assurance (As inserted by MS 783)	18 Financial Assurance	This condition has been carried forward from Ministerial Statement 559, as amended by Statement 783, however has been amended to ensure that the bank guarantee is paid to the CEO of the OEPA.
	19 Environmental Risk Assessment	*This is a new condition which has been included to ensure that an environmental risk assessment is carried out by the proponent to identify the potential pathways for lead carbonate contamination at each of the areas of operation. This risk assessment was originally included in the Health, Hygiene and Environmental Management Program required by Condition 6 of MS 559, as amended by 783, and has been included in the recommended conditions to increase enforceability.
15 Definitions	20 Definitions	The definitions have been updated. The baseline trigger levels and how they were determined was detailed in the approved Health, Hygiene and Environmental Monitoring Program (Strategen 2009b), as required by condition 9 of Ministerial Statement 559, as amended by Statement 783. If

Table 1 Table of Changes from Ministerial Statement 559, as amended by 783 to the Recommended Conditions

		non Magellan lead is found above the existing baseline trigger level, the baseline trigger value is increased to that value. This condition has been updated to include, where available, a health guideline or health investigation level as the upper limit to the baseline trigger level. This ensures that the baseline trigger levels cannot increase because of Magellan lead above the relevant health guideline level.

* Change/Addition since the Interim Implementation Conditions

Appendix 4

Magellan’s Response to Downstream Processing

Ivernia
Magellan Metals Pty Ltd
www.ivernia.com

A.B.N 68 075 523 661

96 Welshpool Rd
Welshpool 6106
Western Australia
Telephone: (+61 8) 9267 7000
Facsimile: (+61 8) 9267 7070

7 June 2011

General Manager
Office of the Environmental Protection Authority
The Atrium,
Level 8, 168 St Georges Terrace,
Perth, Western Australia 6000

cc Mark Jeffries & Helen Butterworth

Dear Sir,

Magellan Metals Pty Ltd - - Interim Implementation Conditions under section 46A of the Environmental Protection Act 1986

Section 46(1) review of Magellan Metals' Ministerial Conditions – Magellan Metals' position on the viability of smelting lead into ingots

This letter is in response to your letter of 19 April 2011 requesting that Magellan Metals provide information on its current position regarding the smelting of lead into ingots including; the possible locations for a refinery, technology that may be considered, and relevant environmental standards that may apply. A further discussion was held on this matter with Kim Taylor, Mark Jeffries and Helen Butterworth of your office on 4 May 2011.

In summary:

- The studies which Magellan Metals has done to date have not shown it would be cost effective to construct a processing plant to smelt or refine Magellan Metals' concentrate at Wiluna.
- Since your letter, Magellan Metals has commissioned Hatch Engineering to conduct a comprehensive "Lead Metal Production Process Selection Study", with the final report expected November 2011. On the basis of this Study, Magellan Metals expects to be in a position to make a decision on whether to proceed to a feasibility study into a downstream processing plant and associated environmental impact assessment in quarter one 2012.
- Due to the significant cost of a feasibility study and associated environmental impact assessment, it would not be viable for Magellan to proceed unless the mine life was sufficient to provide an adequate return on investment.
- A key consideration for the viability of proceeding with the construction of a lead smelter and refinery is the environmental impact assessment and approval process. The process timeline can be significant and can result in environmental conditions that are unrealistic for the associated environmental risks, or worse unachievable.
- The project will need significant Government support to succeed.

Introduction

Since the project's inception in 1999 there have been a number of studies and pilot plant trials looking at the option of smelting and refining Magellan Metals' concentrate. To date these studies have failed to justify proceeding with smelting and refining. Several changes have occurred recently that justify a further review of downstream processing as a viable option, including a significant increase in the Magellan Ore Reserve, higher lead metal prices and increasing business risk associated with the transportation of Magellan Metals' lead carbonate concentrate.

The key factors affecting the viability of a smelting and refining development at Magellan are:

- Feed characteristics
- Site selection
- Project life and economics
- Project context
- Smelting process and technology
- Operational risks
- Environmental factors
- Financial analysis

As a result of possible changes in these key factors, Magellan Metals approached Hatch Engineering in March 2011 to conduct a comprehensive "Lead Metal Production Process Selection Study". A proposal was received from Hatch Engineering on 2 May and the study process will commence in June with an expected final report to be delivered by November 2011. The study will develop engineering concepts and cost estimates for various available smelting and refining technologies to allow an optimal selection to be made. If no optimal selection exists then the Study will outline the reasons for this outcome. Magellan Metals would expect to be in a position to make a decision on whether to proceed to a Feasibility Study and associated environmental impact assessments in quarter one 2012.

Other key considerations to any decision over proceeding with considerations of downstream processing would include project mine life; the environmental conditions that may be placed on the project; the environmental (and other) approval time line; and the potential for Magellan Metals to generate cash flow, and hence project funding, from its existing approved concentrate shipping operations during the downstream processing plant, feasibility study, design, regulatory approval and construction phase.

Background

Ivernia owns and operates the Magellan lead mine near Wiluna in Western Australia, some 1,000 km from Perth. The site is quite isolated so is managed as a Fly-in Fly-out operation as is the case with many Western Australian mining operations.

The Magellan ore is a fairly unique lead carbonate which is concentrated to a concentrate product containing about 65% lead. This high grade concentrate at current lead prices can support the cost of transportation over long distances.

The Magellan Mine is the only operating asset of Ivernia. The Magellan ore does not contain commercial quantities of metals other than lead, and so it produces no by-product revenue unlike most of its competitors.

The original proposal to develop Magellan in the late 1990's centred on a mutually beneficial arrangement with a potential partner company to conduct smelting off-site. Options that were considered and thoroughly investigated at the time were:

- A mutual arrangement with MRI in Malaysia to treat exported Magellan concentrate
- The treatment of a significant proportion (~ 20%) at BHAS, Port Pirie
- Treatment of all the product at MIM's Northfleet refinery in the UK
- Dedicated off take agreements with traders such as Glencore and Transamine
- Input of some product to ARA (Melbourne) for inclusion in battery recycling processing

Previous smelter and refinery study work

From the time Ivernia acquired the Magellan project in 2000, Ivernia expressed an interest in constructing a lead smelter and refinery at the Magellan mine site. Metallurgical test work was conducted at BJ Industries in France in 2003 and 2005. J R Roche Pty Ltd was retained in 2005 to prepare an engineering study for a smelter, with capital and operating cost estimates based on then current Australian parameters.

A review of the studies undertaken between 2003 and 2005 was conducted by an industry expert in 2008. The review showed that in general the studies were appropriate for the purpose intended.

Specific studies undertaken into smelting of Magellan concentrate include:

- B J Industries, France, Preliminary Report of the first industrial tests of lead carbonate concentrate reducing in the Metal-Blanc 1.8 m^3 rotary furnace, June 2005
- B J Industries, France, Final Report of the first industrial tests of lead carbonate concentrate reducing in the Metal-Blanc 1.8 m^3 and 3 m^3 rotary furnace, June 2005
- J R Roche Pty Ltd., Perth, Australia. Magellan Project – Refinery Engineering Update Study, October 2005
- Air Liquide Engineering, Budgetary Offer, 2 Compact VSA on site O_2 generator, August 2005
- Expert Consultants:
    - Lindegger, P. C., Magellan Project – Phase 2 Refinery, Handover Report, December 2005
    - Ramus, K., Part 1, Review of the BJ Industries Final Report Data of Concentrate Smelting Tests, November 2005
    - idem, Part 2, Review of Roche Mining Magellan Project Refinery Engineering Study, November 2005
    - idem, Part 3, Review of BJ Industries Final Report (2006) Data of Concentrate Smelting Tests, April 2006.
    - the 2008 review by Michael Agnew who was formerly Executive Vice-President, Technical with Noranda in Canada and was well qualified to conduct the review.

As the project has developed through the various reports, several of the strategic strengths and vulnerabilities identified were associated with siting a smelter at the Magellan mine site. Other sites were considered and discounted for various reasons including:

- Geraldton (Narngulu) industrial area
- Mount Magnet
- Windimurra
- Wiluna gold operations

Magellan concentrate does not require the aggressive reactions that the more common sulphide and low grade concentrates need. Ausmelt smelting technology was considered briefly but discounted due to its proportionally high capital cost. A relatively simple furnace process was identified as the most appropriate smelting process in previous studies. The preferred option is similar to the furnaces and refining commonly found in battery recycling plants all around the world.

Pilot testing

Generally it can be concluded that the pilot plant test work carried out to date was adequate to confirm the process selection, and to provide costing data at the scoping study stage.

More work is required to optimize the consumables usage, in particular, carbon and soda ash. Approximately 20,000 tonnes each of coking coal and soda ash will be needed for a 100,000 tonne lead smelter, an appropriate size for the Magellan mine production. These consumables will likely need to be sourced from outside Western Australia and transported to the smelter site at considerably higher costs than other smelters.

Factors affecting existing or smelting project viability

Feed characteristics

The characteristics of the Magellan concentrate are seen as a fundamental strength for downstream processing compared to other lead mining projects. Previous test work has shown that lead metal of a high quality can be produced from Magellan concentrates using conventional smelting and refining processes.

The concentrate is almost free of sulphur. This eliminates the need for sulphur capture at a green field lead smelter that treats only concentrate feed from the Magellan mine. The capital and operating cost savings by avoiding the construction of a sulphuric acid plant to capture the sulphur are substantial.

As well, there is no need to include the marketing and transportation of sulphuric acid as part of the feasibility studies. The marketing and transportation over long distances of large tonnages of liquid sulphuric acid could have impacted the site selection and other aspects of the design criteria of the project.

Site selection

The lead smelter design criteria calls for it to be located at the Magellan Mine site. This is driven by the desire to reduce the concentrate transportation costs and the risk of environmental impacts during transportation. There would also be some advantages in sharing infrastructure costs with the mine.

The selection of the isolated Magellan site presents many disadvantages for a metallurgical operation. Low labour availability and high labour turnover are the consequences of selecting an isolated site. Fly-in Fly-out operations are very common in the mining industry today but not so common for smelting and refining. Although it is expensive, the technical experts and experienced operators and tradesmen are very mobile and working under the conditions of a camp life at an isolated site is to some extent accepted. Invariably the experienced personnel are not available for hire, and process metallurgical plant management spend a lot of effort in internally developing personnel expertise. This approach is inconsistent with the Fly-in Fly-out mentality. Maintaining the numerous essential core competencies for a single and small metallurgical operation at an isolated site will be a daunting task.

A metallurgical plant draws on a wide range of technical expertise during normal operation, similar to a mining and concentrator operation, but more so. Some examples of these technical expert support services are: refractory, physical metallurgy, instrumentation and control, health and safety, gas sampling, burners, gas cleaning, and so on. This expertise may reside with the equipment suppliers, engineering consultants, universities, or specialized service companies, and for lead smelting expertise this is generally not available in Western Australia. Bringing these experts to an isolated site increases costs and shutdown delays. It would not be possible for the metallurgical plant to be fully autonomous in all of the trades and skills required for safe metallurgical plant operation, and so it will regularly call upon specialized contractors.

Offsetting the cost benefits from reduced concentrate transportation is the cost of transportation of the operating supplies (particularly coking coal and soda ash) and the cost of shipping the metal to market.

The cost of generating electricity for a very small load at an isolated site is of course more expensive than when a metallurgical operation can be connected to the utility grid.

Drawing on the experience of other major capital projects, the site selection has a significant impact on capital costs. Equipment transportation costs and contractor mobilization costs are generally well covered in the engineering studies. More difficult to estimate is the impact on the schedule of levelling the site manpower curve due to site infrastructure limitations and schedule delays due to logistics constraints. Construction delays are expensive because site costs and project management and supervision costs must be supported over an extended time without any offsetting cost benefits.

Project life

The combined effect of the process selection and the site election together with the expected life of the Magellan mine determines the Smelter and Refinery Project Life. Recent exploration work at Magellan has increased its Ore Reserves to 19.9 million tonnes of 5.7% lead and a measured and indicated Mineral Resource of 40.4 million tonnes at 4.5% lead. This Reserve and Resource would give the Magellan project an expected life of 10-20 years dependent on future metal prices. The current "Size of ore body" in the key characteristics table of the Interim Implementation Conditions approved by the Minister for Environment is 8.2 million tonnes of which 3.2 million tonnes have been previously mined. This gives a mine life of approximately three years, and clearly insufficient to recover the capital costs of building a smelter. Designing the process to take advantage of the particular characteristics of the Magellan concentrate becomes a disadvantage at the end of the Magellan mine. There are other elements in the key characteristics table that limit the mine life such as, Life of the project, Area of disturbance, Tailings storage facility, Ore mining rate, Solid waste materials and Fuel storage.

There are currently no potential alternate sources of feed within a reasonable distance of Wiluna to suite a smelter designed to treat Magellan concentrate. All of the potential advantages resulting from the elimination of the transportation costs of the Magellan concentrate become disadvantages as one considers the possibility of bringing other feeds from elsewhere to the Magellan plant site.

Operating the lead smelter after the closure of the mine would result in a different cost structure for the lead smelter as all of the infrastructure cost must be supported by the lead smelter alone, in a remote location. For this reason the project life is considered to end with the Magellan mine life. This is a remarkable disadvantage for the project feasibility. All of the development, design, construction,

start-up and decommissioning costs must be amortized over only a few years of operation.

Typically smelter/refinery plants are evaluated on the basis of at least a 25 year life and usually in fact have indefinite life expectancies. This allows for the depreciation of the development, construction, start-up and shut-down costs over a longer time.

Project context

Since the completion of the engineering studies, capital and operating costs have been escalating at a level that threaten the economic viability of the project.

There are many examples in Western Australia of projects where capital costs have blown out substantially from feasibility to construction. These are the effects of the so called `Super cycle' of economic conditions. A long period of low investment in production capacity follow by a period of high demand, primarily in China, has resulted in extreme pressures on costs and schedules as producers attempt to respond to supply shortages.

The capital cost estimate in 2008 for the refinery was estimated in the range of $130 million to $150 million based on 10% for the insufficient contingency.

The same factors affecting construction costs are reflected in operating costs. All of the components of the Magellan lead smelter and refinery project are experiencing high escalation rates since the initial engineering estimates were prepared in 2005. They are: coking coal, labour, reagents, natural gas, electricity, supplies, services and administration, inbound freight and metal to market transportation. Given this operating cost structure, the proposed Magellan lead smelter and refinery would not enjoy any strategic operating cost advantage versus other lead smelters except local feed supply. In 2008 it was estimated that operating costs had increased to approximately $300 per tonne of concentrate driven mainly by the higher coking costs and labour costs, this compares to treatment charges for smelting by Chinese smelters at that time of $150 to $200 per tonne of concentrate.

Environmental factors

Whilst one of the smelter/refinery project drivers is the avoidance of the risk of environmental impacts related to the transportation of the lead concentrate, there are additional environmental risks introduced with a lead smelter and refinery that need to be considered.

The smelting and refining process will produce small quantities of sulphur dioxide and other gases which will need to meet the relevant environmental standards for emissions. The smelter slag containing unrecovered lead will need to be disposed of in the mines tailings storage facility and sealed as part of the mine closure plan.

The end product will be lead in metal form and relatively benign. There is no apparent risk to the environment or the community from transporting this product therefore there is no reason to continue the transport route monitoring that is required for the current concentrate transport regime.

A key consideration for the viability of proceeding with the construction of a lead smelter and refinery is the environmental impact assessment and approval process. The process timeline can be significant. The process can also result in environmental conditions that are unrealistic for the associated environmental risks, or worse unachievable. The cost of preparing an environmental assessment, a feasibility study and various engineering studies is significant ($5-$10 million) and an assessment of these issues will need to be made before committing to this expense.

Legal issues

Magellan Metals understands that there are potential legal impediments to a condition being imposed on the current Proposal which would require it to construct or investigate a smelter or refinery – these have always clearly been dealt with separately. Magellan Metals understands it would need to formally refer this for assessment. As noted above, Magellan will not be in a position to do this until first half of 2012 at the earliest, if at all.

Financial analysis

The three key drivers to the economic viability of the refinery project are the capital costs, operating costs and project life.

The 2008 analysis found that for capital costs in the range of $130 million to $150 million for a refinery located at the Magellan Mine coupled with a short mine life of 7 years based on then current Ore Reserves did not provide adequate time to recover the investment. There was no economically viable scenario that would make the on-site dedicated concentrate smelter and refinery project work due to the short mine life and the limited time to recover the capital investment and earn a reasonable return. All scenarios gave a negative net present value for the project (i.e. they destroyed shareholder value).

2008 independent expert analysis conclusions

The variables affecting the project viability which would favour the construction of a lead smelter and refinery at the Magellan Mine site are: the historically high lead prices, the rising treatment charges, the local concentrate supply and the pure concentrate.

The variables affecting project viability which would not favour the construction of the proposed lead smelter and refinery at the Magellan site are: the economic environment which is causing escalating construction and operating costs and extending construction schedules, the short project life, the lack of by-product credits, and the isolated site.

Generally speaking the project does not enjoy any strategic advantages compared to other lead smelters other than the local supply of pure concentrate. The economics of an onsite smelter/refinery does not justify proceeding with the project.

Despite these 2008 conclusions, Magellan Metals believes that there is good reason today to review downstream processing given the increase in the Magellan Ore Reserve, higher lead metal prices and increasing business risk associated with the transportation of lead carbonate concentrate. The viability of downstream processing will be highly sensitive to approval and construction timing, environmental conditions, prevailing metal prices as well as mine life. Magellan Metals may need assistance from the Western Australian Government in addressing these issues as the project evolves.

If you require any further information regarding this matter, please do not hesitate to contact me.

Yours faithfully

Rob Scargill
Managing Director
Magellan Metals Pty Ltd

Appendix 5

Identified Decision-making Authorities
and
Draft Recommended Conditions

Identified Decision-making Authorities

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
1. Minister for Mines and Petroleum	*Mining Act 1978*
2. Minister for Water	*Rights in Water and Irrigation Act 1914*
3. Minister for Health	*Public Health Act 1997*
4. Minister for Transport	*Port Authorities Act 1999*
5. Director General for Mines and Petroleum	*Dangerous Goods Safety Act 2004* *Mines Safety Inspection Act 1994*
6. Department of Environment and Conservation	*Works Approval and licence under EP Act 1986*
7. Fremantle Ports	*Port Authorities Act 1999* *Fremantle Port Authorities Act 1902*

Note: In this instance, agreement is only required with DMA #1-4 since these DMAs are Ministers.

Statement No.

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE *ENVIRONMENTAL PROTECTION ACT 1986)*

MAGELLAN LEAD CARBONATE PROJECT, WILUNA

Proposal: The proposal includes an open-cut lead carbonate mine and processing facilities 30 kilometres west of the Wiluna townsite. The lead carbonate concentrate produced at the mine-site is transported in sealed bags within locked shipping containers by road from the mine-site to Leonora and then by rail to the Port of Fremantle where it is exported.

Proponent: Magellan Metals Pty Ltd (ACN 075 523 661)

Proponent Address: 96 Welshpool Road, WELSHPOOL WA 6106

Assessment Number: 1868

Previous Assessment Numbers: 1262, 1690 and 1773

Report of the Environmental Protection Authority: Report 1415

Previous Report of the Environmental Protection Authority: Report 996, 1276 and 1314

Previous Statement Numbers: 559 (Published on 28 November 2000) and 783 (Published on 2 February 2009)

The implementation of the proposal to which the above reports of the Environmental Protection Authority relate is subject to the following conditions and procedures, which replace all previous conditions and procedures of Statement 559, Statement 783, and the Interim Implementation Conditions (Published on 23 February 2011):

1 Proposal Implementation

1-1 The proponent shall implement the proposal as documented and described in Schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for Environment under section 38(6) or (7) of the Environmental Protection Act 1986 is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer of the Office of the Environmental Protection Authority of any change of the name and address of the proponent for the serving of notices or other correspondence within 20 business days of such change.

3 Compliance Reporting

3-1 The proponent shall maintain the Compliance Assessment Plan (Ivernia Magellan Metals Pty Ltd, July 2009) approved by the Chief Executive Officer of the Department of Environment and Conservation on 31 July 2009.

3-2 The proponent shall assess compliance with conditions contained in this Statement in accordance with the Compliance Assessment Plan referred to in Condition 3-1.

3-3 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by Condition 3-1 and shall make those reports available when requested by the Chief Executive Officer of the Office of the Environmental Protection Authority.

3-4 The proponent shall advise the Chief Executive Officer of the Office of the Environmental Protection Authority of any potential non-compliance within five business days of that potential non-compliance being known to the Proponent.

3-5 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority a compliance assessment report no later than 31 March annually addressing the previous twelve month period from 1 January to 31 December inclusive or other period as agreed by the Chief Executive Officer of the Office of the Environmental Protection Authority. The compliance assessment report shall:

1 be endorsed by the proponent's Managing Director or in his absence the company secretary, or other person approved by the Chief Executive Officer of the Office of the Environmental Protection Authority;

2 include a statement as to whether the proponent has complied with the conditions;

3 identify all potential non-compliances and describe corrective and preventative actions taken;

4 be made publicly available in accordance with the approved compliance assessment plan; and

5 indicate any proposed changes to the compliance assessment plan required by Condition 3-1.

3-6 The proponent shall ensure that the Minister for Environment and the reference group referred to in condition 17-1 is notified that the compliance assessment report required by condition 3-5 is available.

4 Bagging and Shipping Container Management

4-1 The proponent shall ensure that lead carbonate concentrate (other than quantities of less than 30 kilos removed for product testing purposes) which is to be removed from the mine-site is dealt with only in accordance with the following procedures:

1 Prior to being removed from the mine-site, lead carbonate concentrate shall be:

a. Placed into double laminated water-proof and sieve proof bags which are sealed so as to prevent the release of lead carbonate concentrate from the bag; and

b. All visible dust shall be removed from the exterior of the bags immediately before they are placed in a clean shipping container which when loaded is locked, so that the only material containing lead carbonate concentrate is in sealed bags within the container when the container leaves the mine-site.

2 The locked shipping containers shall be transported by road to a designated area in Leonora and then by rail from Leonora to Fremantle Port on the road/rail transport route identified generally in Figure 1 to 16, unless a change in route is approved by the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Transport and Department of Health. The locked shipping containers shall be stored in a secure manner at Leonora and at Fremantle Port prior to being loaded onto vessels for export;

3 Unless required by a public official or public authority acting with lawful authority or the Independent Inspector engaged under condition 16-1 (3), the shipping containers shall be kept locked and the seals on the bags shall not be broken between the time when the shipping container leaves the mine-site and the time it is removed from the State;

4 The moisture content of the lead carbonate concentrate in the sealed bags shall be at least 7.5% at the time the shipping container leaves the mine-site;

5 The shipping containers shall only be lifted by top-lifting equipment at all times after being loaded with sealed bags of lead carbonate concentrate and locked;

6 All bags shall be inspected by the Independent Inspector engaged under condition 16 after they are sealed and immediately before they are loaded into a shipping container and all containers shall be inspected by the Independent Inspector engaged under condition 16 before being removed from the mine site;

7 No damaged double laminated water-proof and sieve proof bags which could compromise the containment of lead carbonate concentrate, shall be used for bagging lead carbonate concentrate;

8 The weight of the sealed double laminated water-proof and sieve proof bags loaded with lead carbonate concentrate shall not be above 2000 kilograms prior to loading into shipping container; and

9 No damaged shipping containers, which could compromise the containment of lead carbonate, shall be used to transport sealed double laminated water-proof and sieve proof bags containing lead carbonate concentrate from the mine-site.

4-2 Prior to removing shipping containers containing lead carbonate concentrate from the mine-site at any time from the date of publication of this Statement, the proponent shall prepare and submit to the Chief Executive Officer of the Office of the Environmental Protection Authority, for approval and on the advice of the Department of Mines and Petroleum, an Environmental Management Program which makes provision for the following matters in a manner which is consistent with the requirements of condition 4-1 and 5:

1 document standards, guidelines and codes of practice relating to the management of lead carbonate concentrate;

2 detail procedures to be applied in the mining, processing and storage areas at Wiluna mine-site to minimise disturbance of lead carbonate concentrate and to ensure that the release to the environment is minimised;

3 detail procedures to be applied for the packaging and transport of the lead carbonate concentrate from the mine-site through to export from Fremantle Port, including the use of top-lifting equipment for the lifting of the shipping containers;

4 detail the process which will be applied to ensure ongoing assessment of the risk of lead carbonate contamination, including environmental biological monitoring to evaluate the environmental risks and determine appropriate control measures; and

5 detail the existing storage and ship loading facilities at Fremantle Port which are being used for lead carbonate concentrate, including:

a. equipment to be used;

b. procedures and monitoring programs in place to identify potential pathways for lead carbonate concentrate to enter the environment; and

c. where equipment, management or revised procedures are found to pose a risk to the safe storage and ship loading of the lead carbonate concentrate, additional equipment, management or revised procedures are to be identified and acquired or implemented.

4-3 The proponent shall implement the Environmental Management Program required by condition 4-2.

4-4 Revisions to the Environmental Management Program may be approved by the Chief Executive Officer of the Office of the Environmental Protection Authority on the advice of the Department of Mines and Petroleum.

4-5 The proponent shall implement revisions of the Environmental Management Program approved under condition 4-4.

5 Prevention of Discharge of Lead Carbonate

5-1 The proponent shall ensure that no lead carbonate which is transported from the mine-site to Fremantle port is discharged from within the shipping containers and causes environmental harm as identified at monitoring sites detailed in Schedule 2.

6 Downstream Processing Report

6-1 The proponent shall provide by 31 July 2012 to the Chief Executive Officer of the Office of the Environmental Protection Authority a report detailing options for downstream processing of lead carbonate concentrate. The report shall:

1. detail and benchmark the available options against best environmental practice;

2. detail all point and fugitive emission sources from a selected technology;

3. identify applicable emission limits for point and fugitive emissions sources identified in 6-1(2); and

4. provide potential locations for the downstream processing plant.

6-2 The proponent shall ensure that the report required by 6-1 is peer reviewed by an independent expert acceptable to the Chief Executive Officer of the Office of the Environmental Protection Authority prior to it being provided to the Chief Executive Officer of the Environmental Protection Authority.

7 Shipping Container Cleanliness

7-1 Shipping containers shall be free of all visible mud containing lead carbonate prior to being removed from the mine site and prior to being loaded onto the train at Leonora.

8 Sampling Program

8-1 The proponent shall conduct a sampling program to determine total lead in air, dust, soil and sediment. The description of the sampling, the location and frequency of sampling, the sampling method and reporting units are to be done in accordance with the table below:

Description	Locations of sampling (as shown in Figures 2 to 16)	Frequency of sampling	Units of reporting	Sampling Method
Rainwater tank sampling	WATTRS01 – WATTRS19	Six-monthly, during January/February and July/August	mg/L	A/NZS 5667.1:1998 (or its updates)
Static dust sampling	SDMTRS01 - SDMTRS07, SDMTRS20 and SDMTRS21	Monthly	mg/m^2/ month	AS/NZS 3580.10.1: 2003 (or its updates)
Static dust sampling	SDMTRS08 - SDMTRS19	Six-monthly, during March/April and September/October	mg/m^2/ month	AS/NZS 3580.10.1: 2003 (or its updates)
High volume air sampling	Passenger Terminal and Berth 12	One continuous 24 hour period every six days, plus one extra continuous 24 hours period within the six days during unloading or loading of Magellan shipping containers	$\mu g/m^3$	AS/NZS 3580.1.1:2 007 (or its updates) AS/NZS 3580.9.3:2 003 (or its updates)
Soil sampling	DMTRS01 – DMTRS251	Annually, during July/August	mg/kg	AS4874-2000 (or its updates)
Drainage sump sampling	SUMPTRS01, SUMPTRS02, SUMPTRS03(A), SUMPTRS03(B), SUMPTRS04(A), SUMPTRS04(B), SUMPTRS05 - SUMPTRS13	Six-monthly, during March/April and September/October	mg/kg	If sufficient material is available, three samples will be taken from the top 20 mm of sediment and then combined into a composite sample for analysis.

Description	Locations of sampling (as shown in Figures 2 to 16)	Frequency of sampling	Units of reporting	Sampling Method
Benthic sediment sampling	P1-P12, DP1 – DP7 and CO2	Six-monthly, during January/February and July/August	mg/kg (dry weight)	Manual of Standard Operating Procedures for Environmental Monitoring against the Cockburn Sound Environmental Quality Criteria (2003 – 2004) Environmental Protection Authority Report 20, January 2005 (or its updates)

8-2 The proponent shall ensure that samples taken in accordance with condition 8-1 are analysed by a NATA accredited analytical laboratory for each specific analyte.

8-3 The Chief Executive Officer of the Office of the Environmental Protection Authority may approve the ceasing of the sampling program, or parts thereof, referred to in condition 8-1 in the event that the transportation of lead carbonate concentrate ceases.

8-4 The Chief Executive Officer of the Office of the Environmental Protection Authority may approve changes to the sampling program, or parts thereof, referred to in condition 8-1 in response to the proponent demonstrating positive monitoring results for a given time period, as approved by the Chief Executive Officer of the Environmental Protection Authority.

9 Sampling analysis and reporting timing obligations

9-1 The proponent shall ensure that all monitoring samples collected pursuant to condition 8 are dispatched to a NATA accredited analytical laboratory in accordance with 8-2 within the timeframe specified below:

1 no later than the next business day following collection for samples collected within the Perth Metropolitan Region; and

2 no later than five business days of being collected for samples collected outside of the Perth Metropolitan Region.

9-2 Where analysis of a sample undertaken in accordance with condition 8 indicates a result above the baseline trigger level for the relevant site (as detailed in Schedule 2), the proponent shall ensure the relevant sample is dispatched to a NATA accredited laboratory to be isotopically tested no later than the next business day after the proponent receives the certificate of

analysis confirming that the relevant sample result is above the lead baseline trigger level for the sample site, detailed in Schedule 2.

9-3 The Managing Director of the proponent, or in his absence the company secretary, or other person approved by the Chief Executive Officer of the Office of the Environmental Protection Authority, shall ensure that a copy of the certificates of analysis of all monitoring results which are above the lead baseline trigger level for a site are reported to the Office of the Environmental Protection Authority, Department of Environment and Conservation, Department of Health, Department of Mines and Petroleum, Department of Transport, Fremantle Port Authority and the relevant local authority, no later than the next business day following receipt of the results by the proponent.

9-4 The Managing Director of the proponent, or in his absence the company secretary, or other person approved by the Chief Executive Officer of the Office of the Environmental Protection Authority, shall ensure that a copy of the certificates of analysis for isotopic testing showing that the lead is not Magellan lead is provided to the Office of the Environmental Protection Authority, Department of Environment and Conservation, Department of Health, Department of Mines and Petroleum, Department of Transport, Fremantle Port Authority and the relevant local authority, no later than the next business day following receipt by the proponent.

9-5 Where isotopic testing confirms that monitoring results for a site are above baseline trigger levels and show the presence of Magellan lead the Managing Director of the proponent, or a member of the board authorised by the board to do so, shall ensure that a copy of the certificates of analysis for isotopic testing is provided to the Office of the Environmental Protection Authority, Department of Environment and Conservation, Department of Health, Department of Mines and Petroleum, Department of Transport, Fremantle Port Authority and the relevant local authority, no later than the next business day following receipt by the proponent.

9-6 The proponent shall provide the Office of the Environmental Protection Authority with a report, in a format approved by the Chief Executive Officer of the Office of the Environmental Protection Authority, within the first five business days following the end of every quarter from recommencement of operations, which includes:

1 details of all monitoring samples collected in the preceding three months;

2 a record of dates when ship loading of Magellan lead has occurred and the number of containers loaded;

3 copies of certificates of analysis and chains of custody for all monitoring results received in the preceding three months; and

4 a comparison of all results against the lead baseline trigger levels detailed in Schedule 2 for the preceding three months.

9-7 The proponent shall ensure that a summary of the results obtained from the sampling program detailed in condition 8-1 and isotopic testing detailed in condition 9-2 are made publicly available within five business days of receipt of the results or as required by the Chief Executive Officer of the Office of the Environmental Protection Authority.

9-8 The proponent shall report all results of the Sampling Program as required by condition 8-1 to the reference group referred to in condition 17-1 at least once every calendar year.

9-9 The proponent shall revise the lead baseline trigger levels at any of the sites, outlined in Schedule 2, on the advice of the Chief Executive Officer of the Office of the Environmental Protection Authority where monitoring results show that the lead baseline trigger level has been exceeded and isotopic testing of the site samples demonstrate that Magellan lead is not present at the sample site. The latest monitoring result may become the new lead baseline trigger level for these sites providing that the new lead baseline trigger level does not exceed the baseline trigger level defined in point b in Condition 20 for the particular sampling type (that is, benthic sediment sampling, soil sampling etc).

9-10 The Chief Executive Officer of the Office of the Environmental Protection Authority may approve changes to the sampling analysis and reporting timelines, referred to in condition 9 in response to the proponent demonstrating positive monitoring results for a given time period, as approved by the Chief Executive Officer of the Environmental Protection Authority.

10 Monitoring triggers, contingency measures and ceasing transport

10-1 The proponent shall report against the baseline trigger levels outlined in Schedule 2 (or any revised baseline trigger level approved in accordance with condition 9-9) and where monitoring shows that the results are above the baseline trigger level the proponent shall carry out isotopic testing required by condition 9-2.

10-2 The proponent shall immediately cease transport of any further lead carbonate concentrate if the results of the isotopic testing undertaken in accordance with condition 9-2 show the presence of Magellan lead at a sample site.

10-3 Where isotopic testing shows that the result of monitoring samples above the baseline trigger level for a sample show the presence of Magellan lead, the proponent shall design an investigation in consultation with the Department of Mines and Petroleum and the Department of Environment and Conservation, on the advice of the Department of Health to determine the

source and extent of the lead and initiate a review of the packing and transport procedures.

10-4 If the proponent ceases transport of lead carbonate concentrate in accordance with condition 10-2, it may only recommence transport in accordance with a Re-commencement Plan approved by the Chief Executive Officer of the Office of the Environmental Protection Authority.

10-5 The Re-commencement Plan, to be prepared by the proponent, must include the following:

1 the reasons for the ceasing of transport;

2 the source of, and the extent of, the Magellan lead detected;

3 the results of a review of packaging and transport procedures;

4 the plans of any clean-up required pursuant to Condition 11-1 or results thereof if completed; and

5 management and monitoring measures for the re-commencement of transport.

11 Emergency Response Plan

11-1 In the event that lead carbonate concentrate is discharged into the environment at any point between the mine-site and the shipping containers being removed from the State, the proponent shall implement the Emergency Response Plan (Strategen, June 2009) approved on 13 August 2009.

11-2 Revisions to the Emergency Response Plan may be approved by the Chief Executive Officer of the Office of the Environmental Protection Authority, on advice of the Fire and Emergency Service Authority, the Port Authority and relevant Local Governments.

11-3 The proponent shall implement revisions of the Emergency Response Plan approved pursuant to Condition 11-1.

12 Quality Control for Sampling and Analysis

12-1 Prior to removing shipping containers containing lead carbonate concentrate from the mine-site at any time from the date of publication of this Statement, the proponent shall engage a third party expert approved by the Chief Executive Officer of the Office of the Environmental Protection Authority to carry out an evaluation of the sampling methodology and analysis methodology for all sample types required by condition 8.

12-2 The proponent shall demonstrate that the recommendations listed in the sampling and analysis evaluation required by condition 12-1 have been

implemented or reasons provided why the recommendations cannot be implemented to the Chief Executive Officer of the Office of the Environmental Protection Authority prior to removing shipping containers containing lead carbonate concentrate from the mine-site at any time from the date of publication.

13 Ongoing audits of the Environmental Management Program

13-1 The proponent shall appoint an independent third party approved by the Chief Executive Officer of the Office of the Environmental Protection Authority to undertake a compliance/assurance audit in accordance with an audit scope approved by the Chief Executive Officer of the Office of the Environmental Protection Authority, and provide a report on, the implementation of, or parts thereof, the Environmental Management Program as required by condition 4-2 and recommend changes to practices, processes and infrastructure.

13-2 The proponent shall demonstrate that the recommendations listed in the compliance/assurance audit required by condition 13-1 have been implemented or reasons provided why the recommendations cannot be implemented to the Chief Executive Officer of the Office of the Environmental Protection Authority within six months of the date of the compliance/assurance audit.

13-3 The proponent shall ensure that the audits will be undertaken at three monthly intervals and the reports provided to the Chief Executive Officer of the Office of the Environmental Protection Authority within 20 business days of the end of the three monthly periods, with the first report to be submitted within four months from the recommencement of operations, unless otherwise approved by the Chief Executive Officer of the Office of the Environmental Protection Authority.

14 Ongoing audits of the Sampling Program

14-1 The proponent shall appoint an independent third party approved by the Chief Executive Officer of the Office of the Environmental Protection Authority to undertake a compliance/assurance audit in accordance with an audit scope approved by the Chief Executive Officer of the Office of the Environmental Protection Authority, and provide a report on, the implementation of the Sampling Program as required by condition 8, the sampling analysis and reporting timing obligations as required by condition 9 and the monitoring triggers, contingency measures and the ceasing of transport required by condition 10 and recommend any changes.

14-2 The proponent shall demonstrate that the recommendations listed in the compliance/assurance audit required by condition 14-1 have been implemented or reasons provided why the recommendations cannot be implemented to the Chief Executive Officer of the Office of the Environmental Protection Authority within six months of the date of the compliance/assurance audit.

.

14-3 The proponent shall ensure that the audits will be undertaken at three monthly intervals and the reports provided to the Chief Executive Officer of the Office of the Environmental Protection Authority within 20 business days of the end of the three monthly periods, with the first report to be submitted within four months from the recommencement of removing shipping containers containing lead carbonate concentrate from the mine site, unless otherwise approved by the Chief Executive Officer of the Office of the Environmental Protection Authority.

15 Audit reports to be made publicly available

15-1 The proponent shall ensure that all reports received from the independent third parties engaged under Conditions 13 and 14 are made publicly available on the proponent's website within 30 business days of the end of the three monthly period.

16 Independent Inspector

16-1 Prior to removing shipping containers containing lead carbonate concentrate from the mine-site at any time from the date of publication of this Statement, the proponent is to engage the services of, and provide necessary funding for, an independent inspector, to be approved by the Chief Executive Officer of the Office of the Environmental Protection Authority. The inspector is to be engaged and funded to undertake the following in an independent manner:

1 Visually inspect all bags of lead carbonate concentrate, after they are sealed, immediately prior to loading into shipping containers, for the presence of material containing lead carbonate outside the sealed bags. Where material containing lead carbonate is visible on the bag, it shall be revacuumed and rechecked prior to being loaded into the shipping container;

2 Visually inspect all shipping containers, after they are loaded and locked and immediately prior to their removal from the mine-site, for material containing lead carbonate on the outside of the shipping containers;

3 Carry out random dust monitoring inside shipping containers, by:

1. randomly selecting at least 1% of containers averaged over a quarter of a calendar year, without the knowledge of the proponent;

2. placing dust monitors inside the selected containers prior to their removal from the mine-site; and

3. removing the dust monitors at the Port of Fremantle, and making available the samples obtained for analysis to test for the presence of lead carbonate dust.

4 Carry out quality assurance procedures as per the recommendations in the '*Review of Analytical Procedures Used and Data Produced by SGS Australia Pty Ltd for the Magellan Metals Pty Ltd 'Lead in Shipping Container Monitoring'* (Laboratory Quality Management Services, 2011) for all random dust monitoring inside shipping containers; and

5 Recording observations of:

1. any visible lead carbonate mud on the outside of containers pursuant to condition 16-1 (2); and

2. any visible lead carbonate concentrate inside the shipping container and outside of the bags in those containers opened at Fremantle ports pursuant to 16-1 (3);

and report immediately to the proponent.

16-2 Prior to removing shipping containers of lead carbonate concentrate from the mine-site at any time from the date of publication of this Statement, the proponent shall establish and document the detailed roles and responsibilities of the inspector engaged under condition 16, to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority, in consultation with the Department of Environment and Conservation and the Department of Mines and Petroleum.

17 Reporting of inspections and monitoring

17-1 The proponent shall ensure that all reports received from the Independent Inspector engaged under condition 16-1 are provided no later than the next business day to the Chief Executive Officer of the Office of the Environmental Protection Authority and to an appropriate reference group with relevant community representation, as determined by the Minister for Environment, and made publicly available on the proponent's website within five business days. Until otherwise determined by the Minister, the reference group shall be the Fremantle Ports Inner Harbour Community Liaison Group, established by the Fremantle Port Authority.

18 Financial Assurance

18-1 As security for the due and punctual observance and performance by the proponent of the requirements on conditions 11-1, the proponent shall, prior to removing shipping containers of lead carbonate concentrate from the mine-site at any time from the date of publication of this Statement, provide to the Chief Executive Officer of the Office of the Environmental Protection Authority, to be replaced every five years in accordance with 18-2, a financial assurance for the benefit of both the Minister and the Chief Executive Officer of the Office of the Environmental Protection Authority and which is in the form of an unconditional and irrevocable bank guarantee, from a guarantor acceptable to the Chief Executive Officer of the Office of the Environmental Protection Authority and in a form acceptable to the Chief Executive Officer

of the Office of the Environmental Protection Authority, in the amount specified in condition 18-2.

18-2 The financial assurance shall be for an initial amount of AU$5 million and shall be substituted every five years after the provision of the first guarantee with the fixed initial amount of each successive guarantee being indexed to inflation (being the Consumer Price Index, Perth).

18-3 In the event that the guarantor referred to in condition 18-1 terminates its liability under the bank guarantee by paying to the Minister or the Chief Executive Officer of the Office of the Environmental Protection Authority the balance of the financial assurance remaining unpaid, the Chief Executive Officer of the Office of the Environmental Protection Authority will hold the financial assurance (being the amount paid by the guarantor upon termination), as security for the due and punctual observance and performance by the proponent of the requirements of condition 11-1, in an interest bearing account nominated by the Chief Executive Officer of the Office of the Environmental Protection Authority, with the interest accruing for the benefit of the Minister or the Chief Executive Officer of the Office of the Environmental Protection Authority.

18-4 The financial assurance may be called on or used in accordance with section 86E of the *Environmental Protection Act 1986* if the proponent fails to implement the proposal in accordance with conditions 11-1.

18-5 The financial assurance shall be discharged by the Chief Executive Officer of the Office of the Environmental Protection Authority and the Minister when the Chief Executive Officer of the Office of the Environmental Protection Authority has given the proponent written notice pursuant to section 86F(1) of the *Environmental Protection Act 1986*.

19 Environmental Risk Assessment

19-1 Prior to removing shipping containers containing lead carbonate concentrate from the mine site at any time from the date of publication of this Statement, and then annually thereafter, the proponent shall carry out a risk assessment following methodology detailed in AS/NZS 4360:2004, of all key aspects of the project regarding the potential pathways for lead carbonate contamination including:

1. mining and processing;
2. storage;
3. bagging and loading;
4. transport; and
5. port operations

and report on the findings to the Chief Executive Officer of the Environmental Protection Authority.

20 Definitions

In this Statement, unless the contrary intention appears:

"baseline trigger levels" means as described in the following table:

Type of sampling	Baseline Trigger Level (Total Lead)
Benthic Sediment Sampling	a. As described in 'Lead Baseline Trigger Level' in Schedule 2; or any revision approved by the Minister for Environment on advice of the Chief Executive Officer of the Office of the Environmental Protection Authority; or b. 50 mg/kg (dry weight), whichever is lower.
Drainage Sump Sampling	a. As described in 'Lead Baseline Trigger Level' in Schedule 2; or any revision approved by the Minister for Environment on advice of the Chief Executive Officer of the Office of the Environmental Protection Authority; or b. 1500 mg/kg (dry weight), whichever is lower
Soil Sampling	a. As described in 'Lead Baseline Trigger Level' in Schedule 2; or any revision approved by the Minister for Environment on advice of the Chief Executive Officer of the Office of the Environmental Protection Authority; or b. 1500 mg/kg (dry weight), whichever is lower.
Rainwater Tank Sampling	a. As described in 'Lead Baseline Trigger Level' in Schedule 2; or any revision approved by the Minister for Environment on advice of the Chief Executive Officer of the Office of the Environmental Protection Authority; or b. 0.01 mg/L, whichever is lower.
High Volume Air Sampling	a. As described in 'Lead Baseline Trigger Level' in Schedule 2; or any revision approved by the Minister for Environment on advice of the Chief Executive Officer of the Office of the Environmental Protection Authority; or b. 0.5 $\mu g/m^3$ whichever is lower.

Static Dust Sampling	a.	As described in 'Lead Baseline Trigger Level' in Schedule 2; or any revision approved by the Minister for Environment on advice of the Chief Executive Officer of the Office of the Environmental Protection Authority.
Shipping Container air sampling	20 $\mu g/m^3$	

"business day" means a day that is not a Saturday, a Sunday or a public holiday in Western Australia.

"$\mu g/m^3$" means micrograms per cubic metre for normal conditions of 0 degrees and 21kpa.

"Magellan lead" means lead that originates from the mine-site.

"mg/kg" means milligrams per kilogram.

"mg/L" means milligrams per litre.

"mg/m^2/month" means milligrams per square metre per month.

"mine-site" means the boundaries of mining tenement numbers M53/502, M53/503 and M53/504.

NATA means the National Association of Testing Authorities, Australia

"A/NZS 5667.1:1998" means *Australian/New Zealand Standard AS/NZS 5667.1:1998 Water quality—Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.*

"AS/NZS 3580.10.1:2003" means *Australian/New Zealand Standard AS/NZS 3580.10.1:2003 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposition matter – Gravimetric method.*

"AS/NZS 3580.9.3:2003" means *Australian/New Zealand Standard AS/NZS 3580.9.3:2003 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High-volume sampler gravimetric method.*

"AS/NZS 4360:2004" means *Australian/New Zealand Standard* AS/NZS 4360:2004 *Risk management.*

"AS 3580.1.1 – 2007" means *Australian Standard AS 3580.1.1 – 2007 Methods for sampling and analysis of ambient air Part 1.1: Guide to siting air monitoring equipment.*

AS/NZS 3580.1.1:2007 means *Australian/New Zealand Standard AS/NZS 3580.1.1:2007 Methods for sampling and analysis of ambient air - Guide to siting air monitoring equipment*.

"AS4874-2000" means *Australian Standard AS 4874 - 2000 Guide to investigation of potentially contaminated soil.*

"Perth Metropolitan Region" means the area defined by the Perth Metropolitan Region Scheme map (Western Australian Planning Commission), as amended from time to time.

"Immediately" means at once; instantly:

"Mine-site" means the open-cut lead carbonate mine and processing facilities 30 kilometres west of the Wiluna townsite, as shown on figure 1.

ISO14001 means the International Organization for Standardization – *ISO14001:2004 Environmental Management Systems -- Requirements with guidance for use* or its updates.

Notes

1. Where a condition states “on advice of the Office of the Environmental Protection Authority”, the Office of the Environmental Protection Authority will provide that advice to the proponent.

2. The Office of the Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.

3. The Minister for Environment will determine any dispute between the proponent and the Office of the Environmental Protection Authority over the fulfilment of the requirements of the conditions.

4. The proponent is required to conduct the project subject to requirements of a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposal (Assessment No. 1262, 1690 and 1773)

The development of an open-cut mine, waste rock dump, tailings storage facilities, associated infrastructure, and processing facilities approximately 30 kilometres west of Wiluna.

Lead carbonate concentrate produced at the mine will be contained in sealed bulk bags with a double-laminated wall within locked steel shipping containers and transported by road to Leonora and then by rail to the Port of Fremantle, where it will be exported.

A gas-fired power station and accommodation camp are constructed to service the mine-site.

The mining operations are being supplied with water from a borefield south-east of the mine.

The proposal location is shown in Figure 1, the sampling sites are shown in Figures 2 to 16 and the general arrangement of the mine and process facilities are shown in Figures 17 and 18.

The key proposal characteristics are presented in Table 1.

Table 1: Key Proposal Characteristics Table.

Project characteristic	Quantities/Description
Life of the project (mine production)	Up to 10 years
Size of ore body	Not more than 8.2 million tonnes
Depth of mine pit	Not more than 50 metres
Area of disturbance (including access)	Not more than 320 hectares
Major components: • Open pit • Waste dumps • Infrastructure (plant site water supply, roads, accommodation camp, etc) • Tailings storage facilities TOTAL AREA	 55 hectares 138 hectares 57 hectares 70 hectares 320 hectares
Tailings storage facility (2 cells)	Combined total capacity of 4 million tonnes
Ore mining rate	1 million tonnes per year (maximum)
Solid waste materials	2.4 million tonnes per year (maximum)
Water supply: • Source • Maximum hourly requirement • Maximum annual requirement	 Calcrete and chert aquifers southeast of the mine site 170 kilolitres per hour 1.5 million kilolitres per annum
Lead concentrate transport	Road to Leonora and then rail to the Port of Fremantle in sealed bulk bags within locked steel shipping containers (Figure 1).
Power generation	Natural gas – up to 139 terajoules per annum
Fuel storage: • Capacity • Quantity used	 50 kilolitres of storage 1.8 million litres per year (approximately)

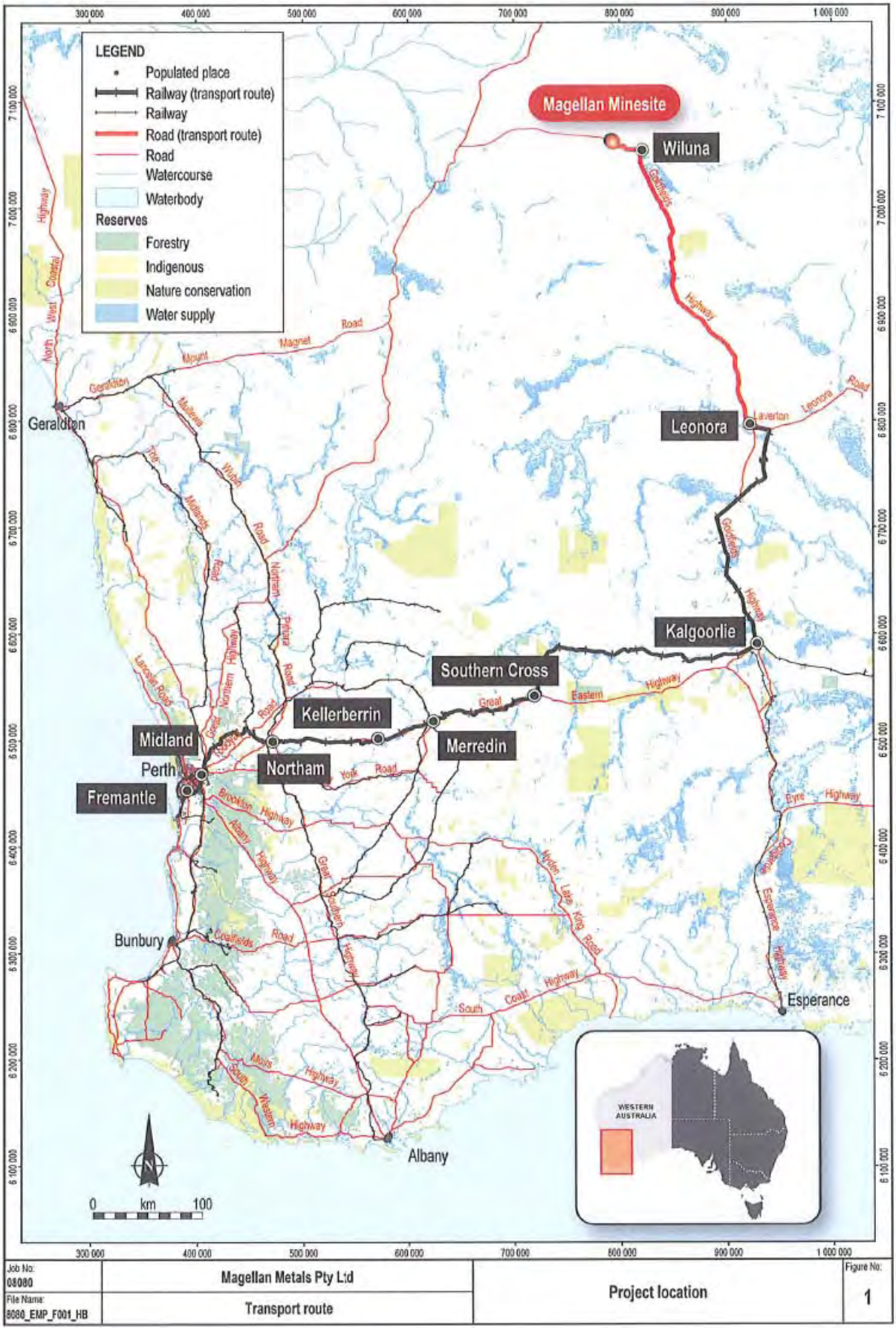

Figure 1. Location of the Magellan Lead Carbonate Project, including the transport route (specific details of the transport route are identified in Figures 2-16).

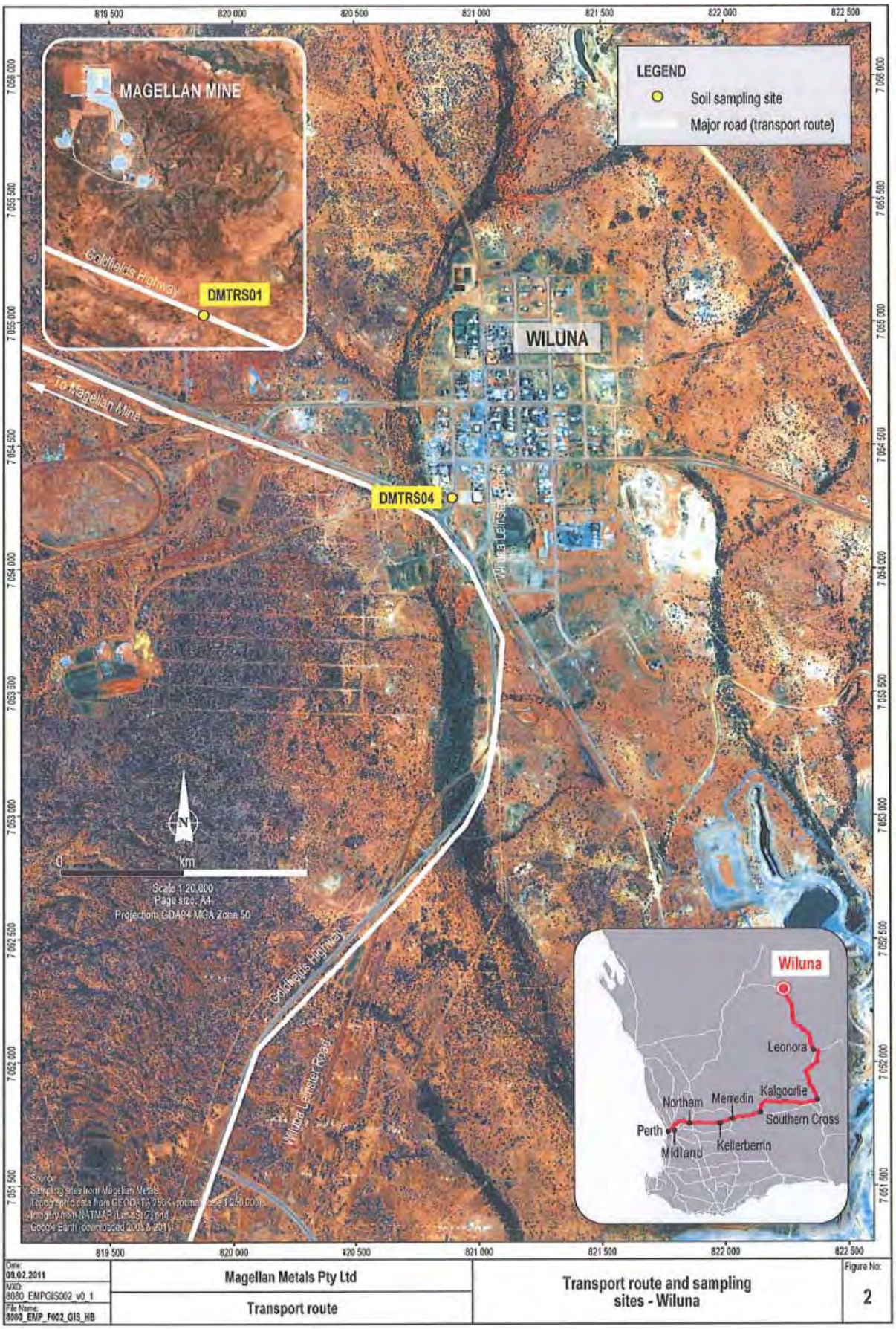

Figure 2. Transport route and sampling sites – Mine-site to Wiluna.

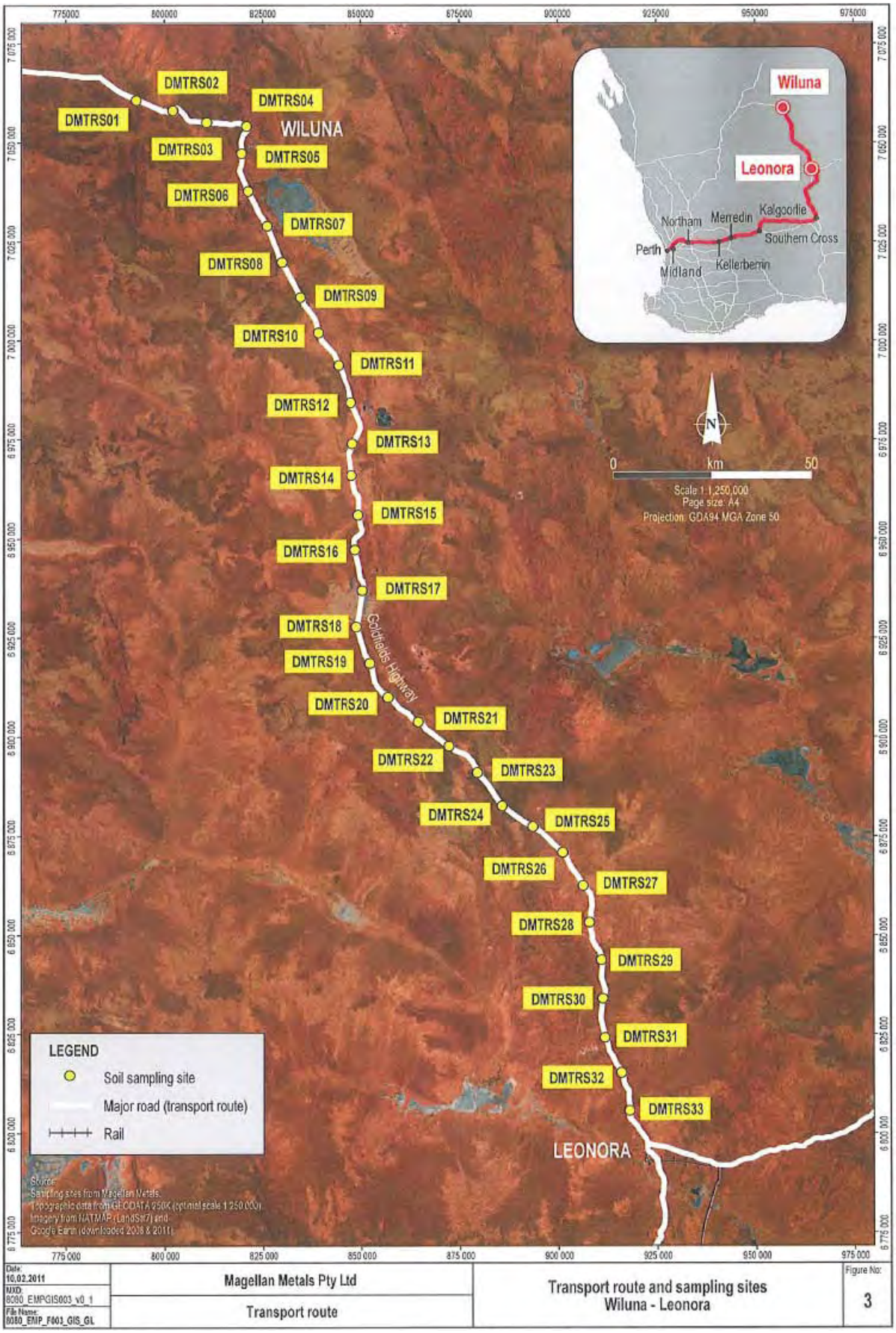

Figure 3. Transport route and sampling sites – Wiluna to Leonora.

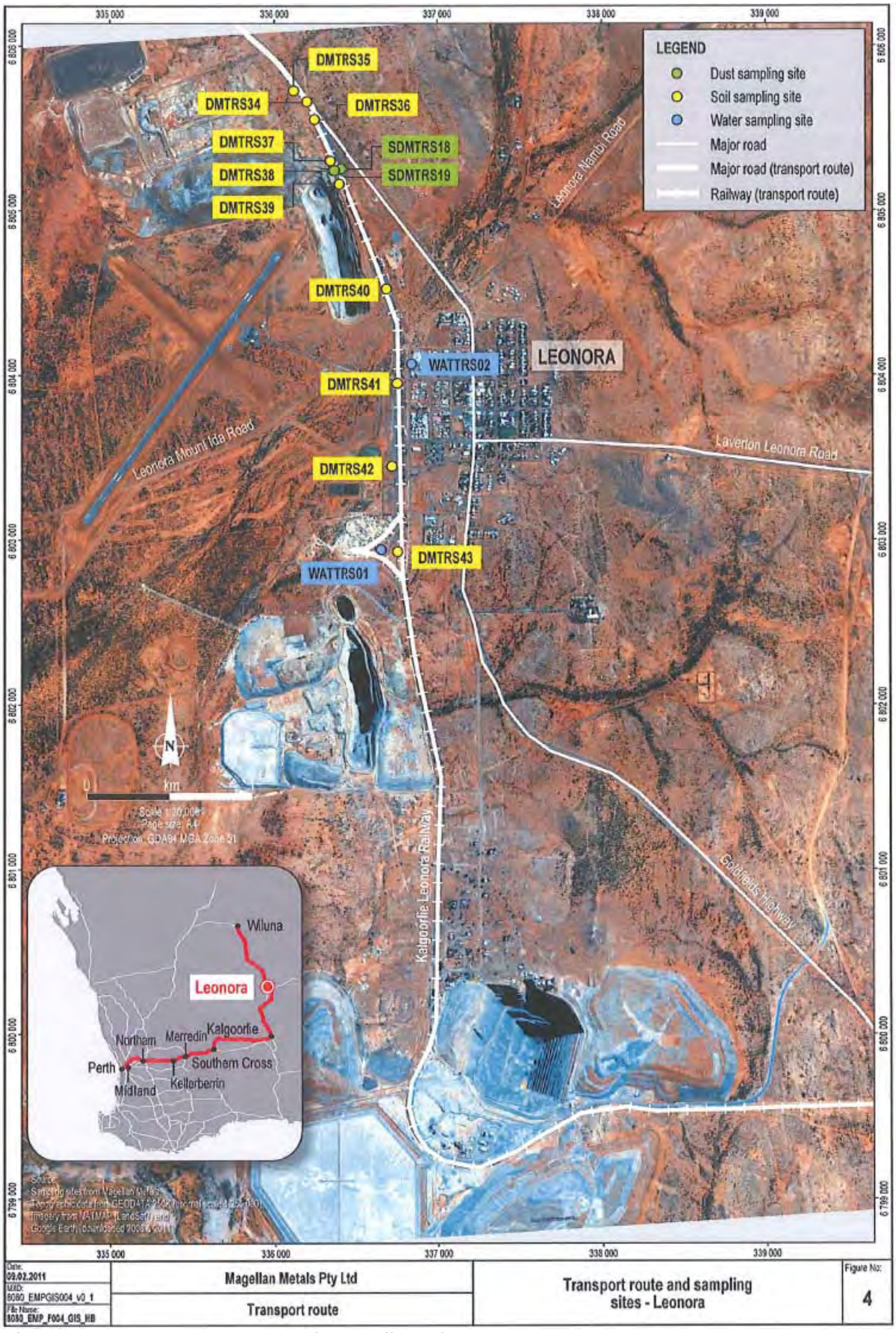

Figure 4. Transport route and sampling sites – Leonora.

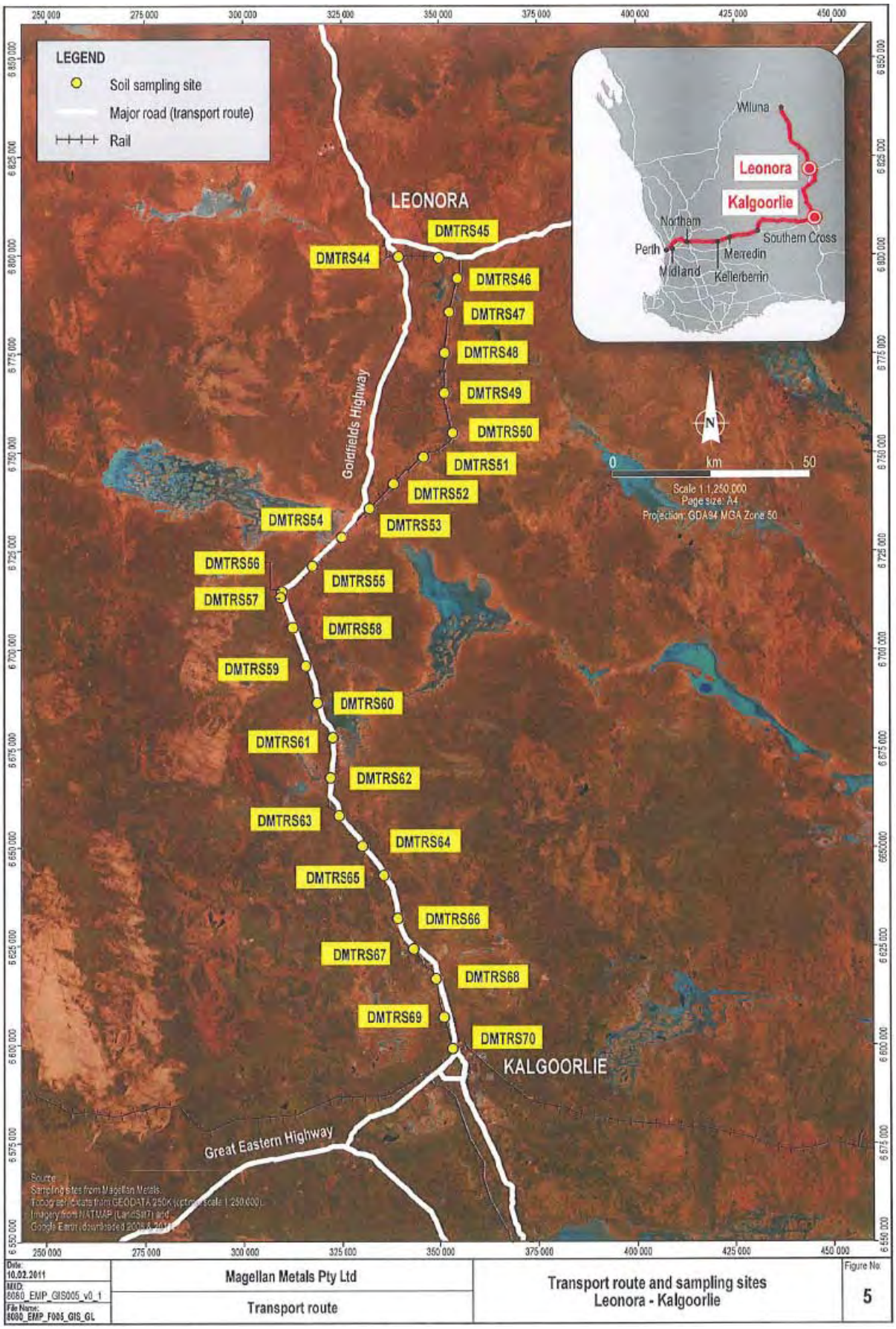

Figure 5. Transport route and sampling sites – Leonora to Kalgoorlie.

Figure 6. Transport route and sampling sites – Kalgoorlie.

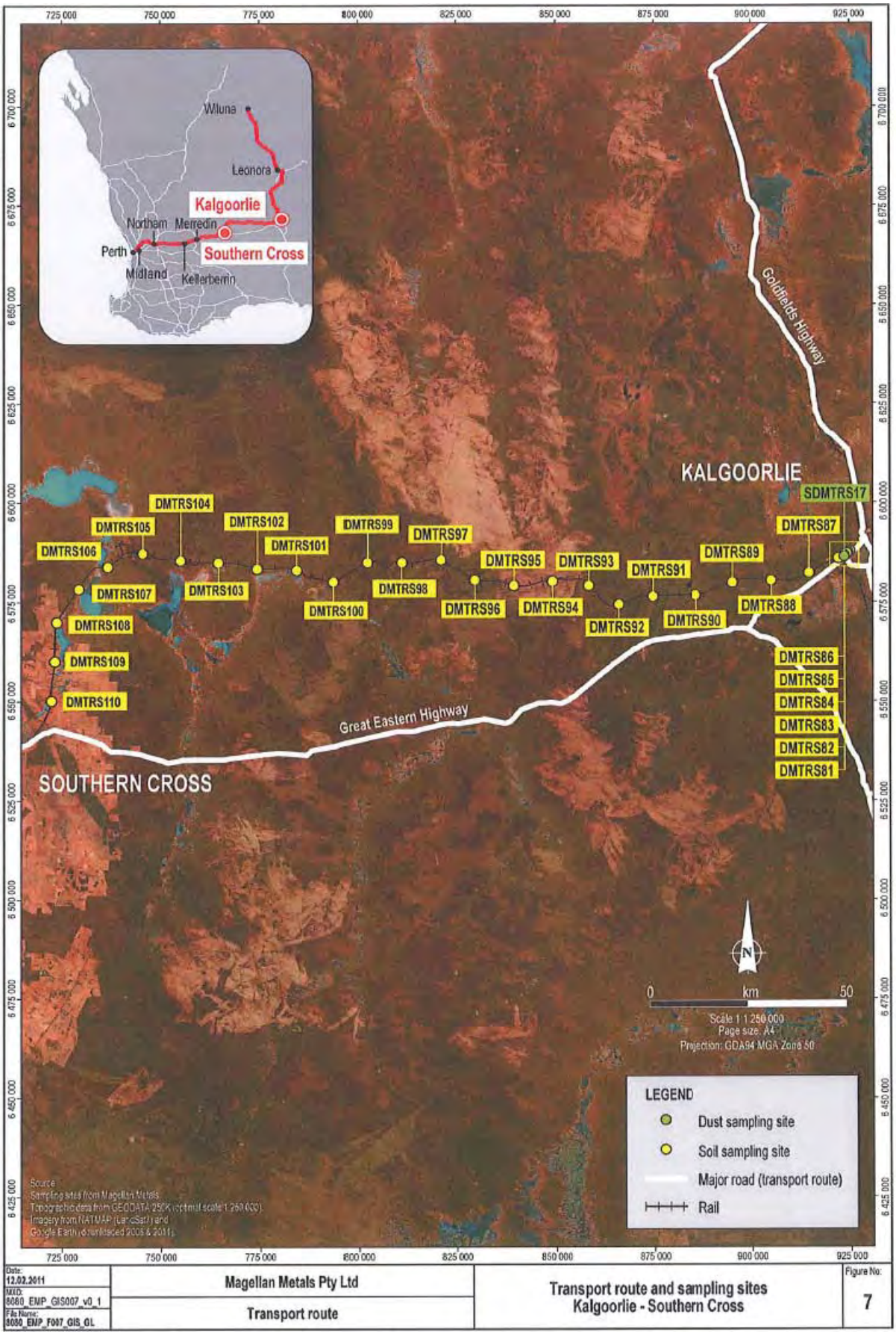

Figure 7. Transport route and sampling sites – Kalgoorlie to Southern Cross.

Figure 8. Transport route and sampling sites – Southern Cross.

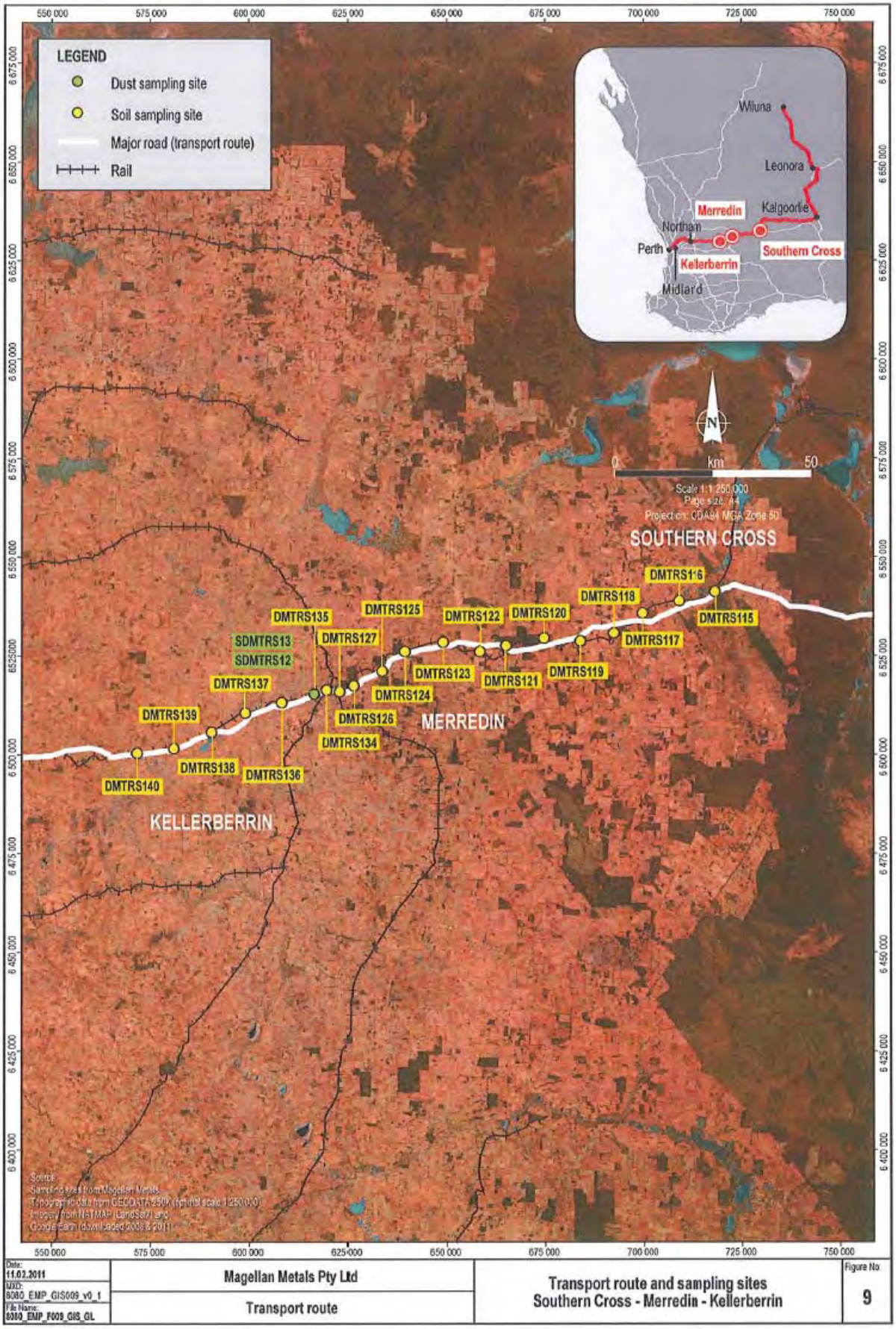

Figure 9. Transport route and sampling sites – Southern Cross to Kellerberrin

Figure 10. Transport route and sampling sites – Merredin.

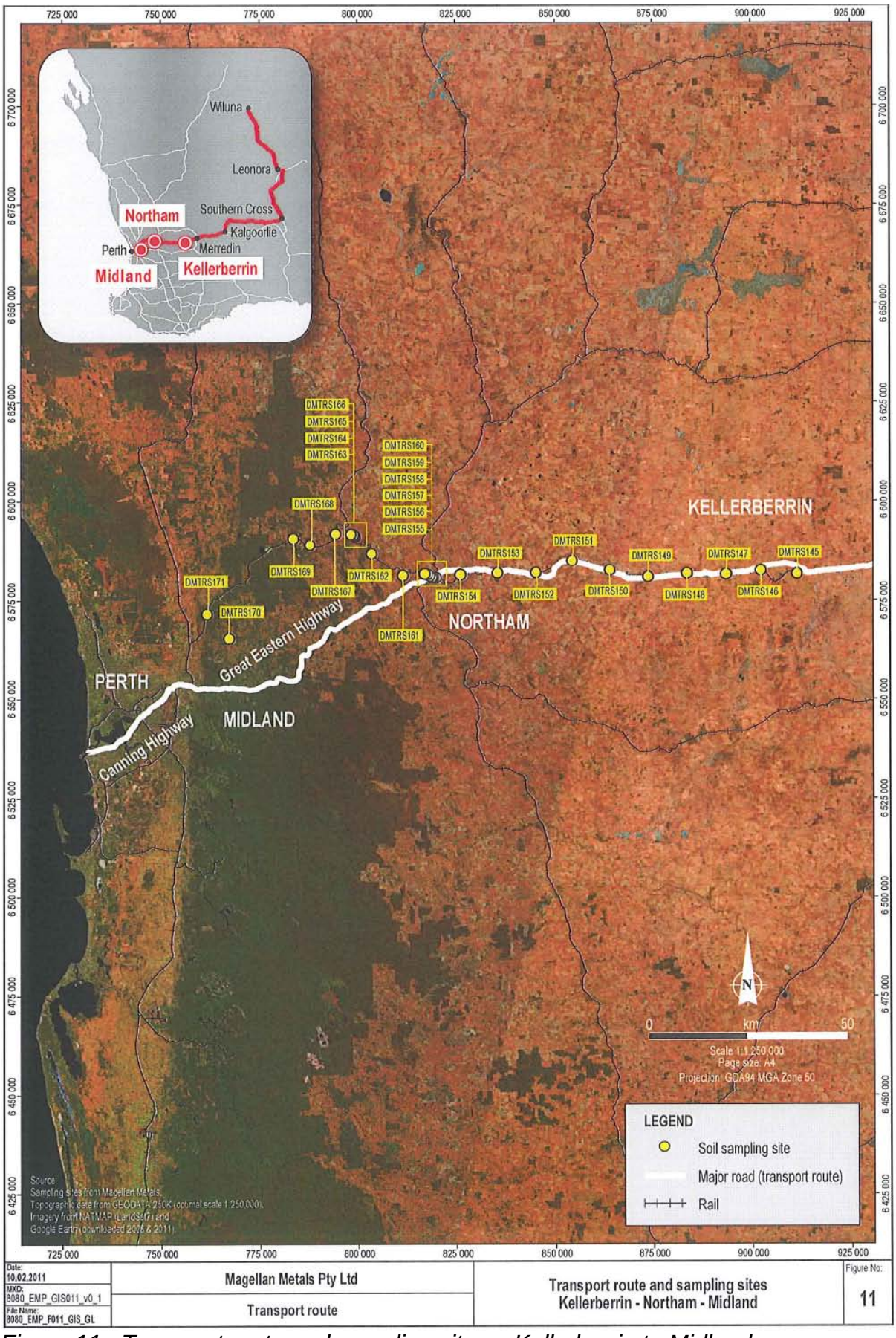

Figure 11. Transport route and sampling sites – Kellerberrin to Midland.

Figure 12. Transport route and sampling sites – Kellerberrin.

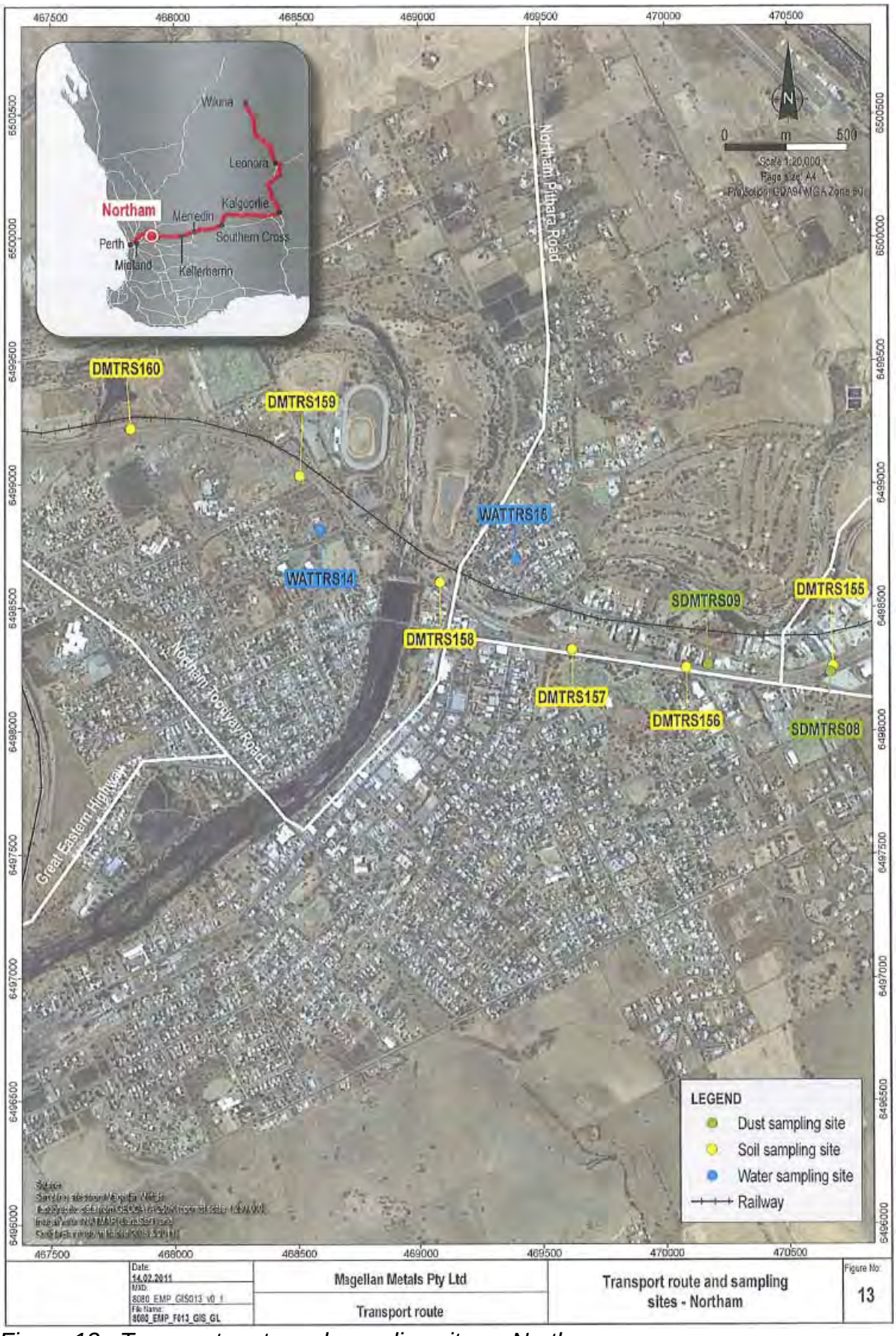

Figure 13. Transport route and sampling sites – Northam.

Figure 14. Transport route and sampling sites – Midland.

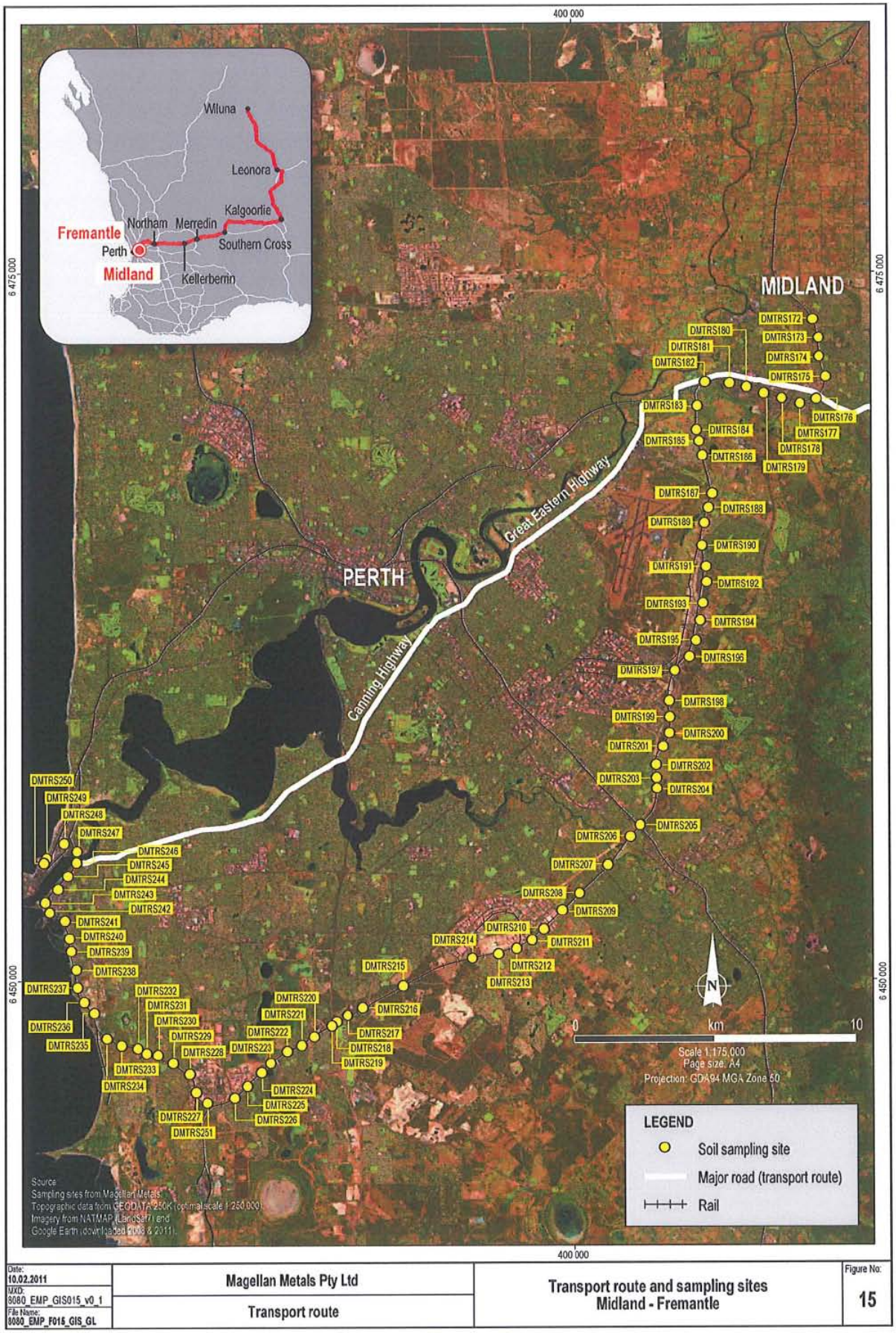

Figure 15. Transport route and sampling sites – Midland to Fremantle.

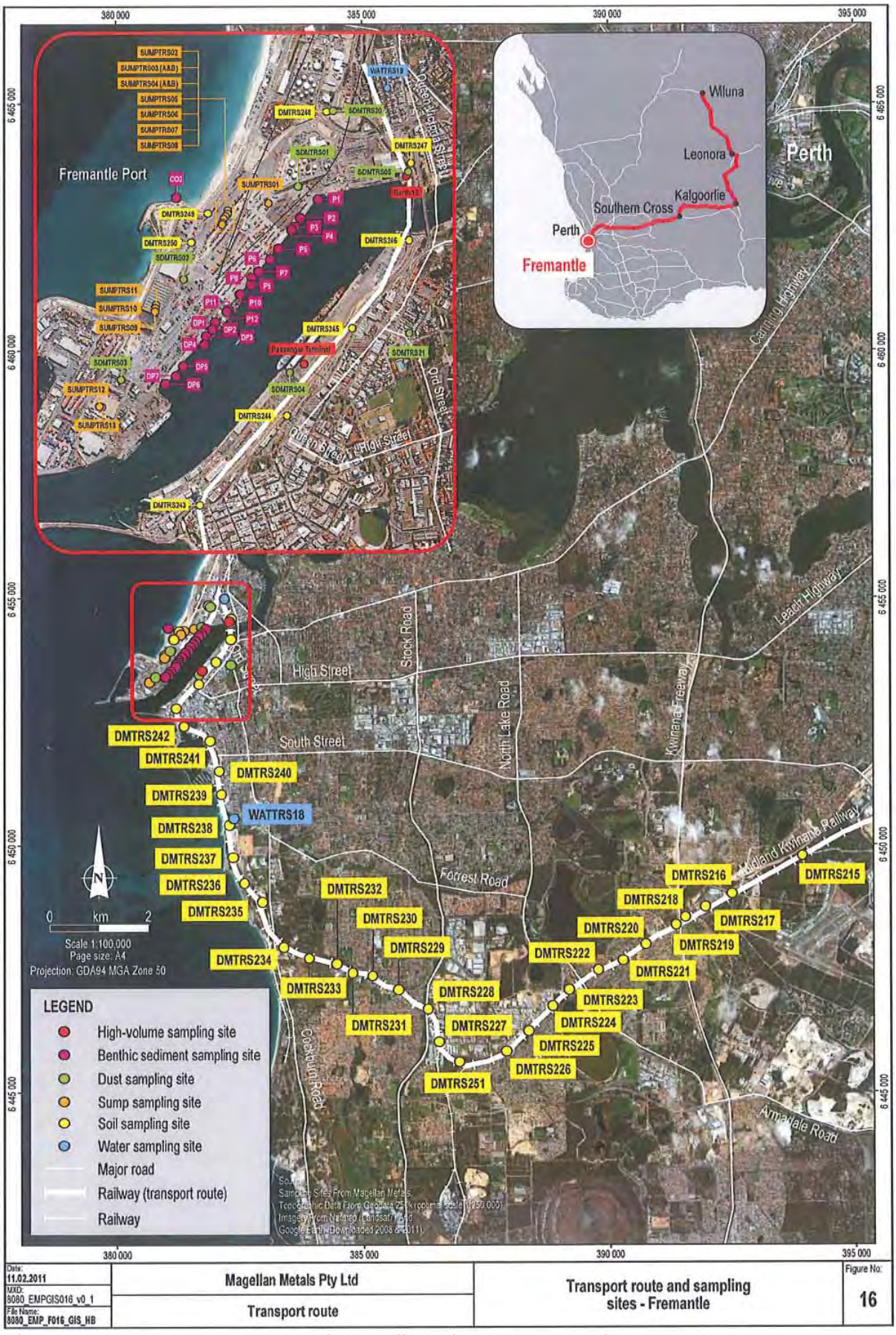

Figure 16. Transport route and sampling sites – Fremantle.

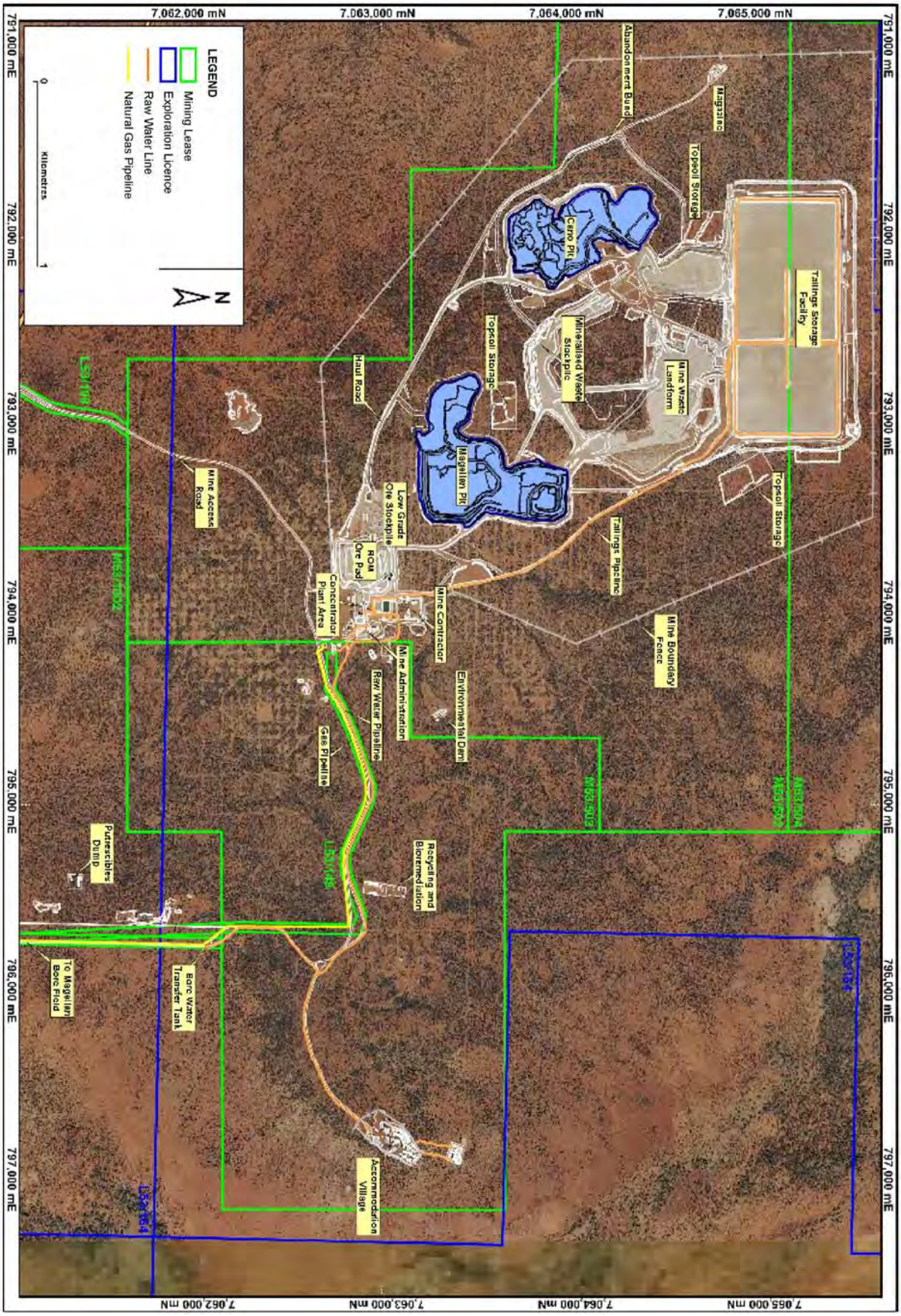

Figure 17. General arrangement of the Magellan Lead Carbonate Project

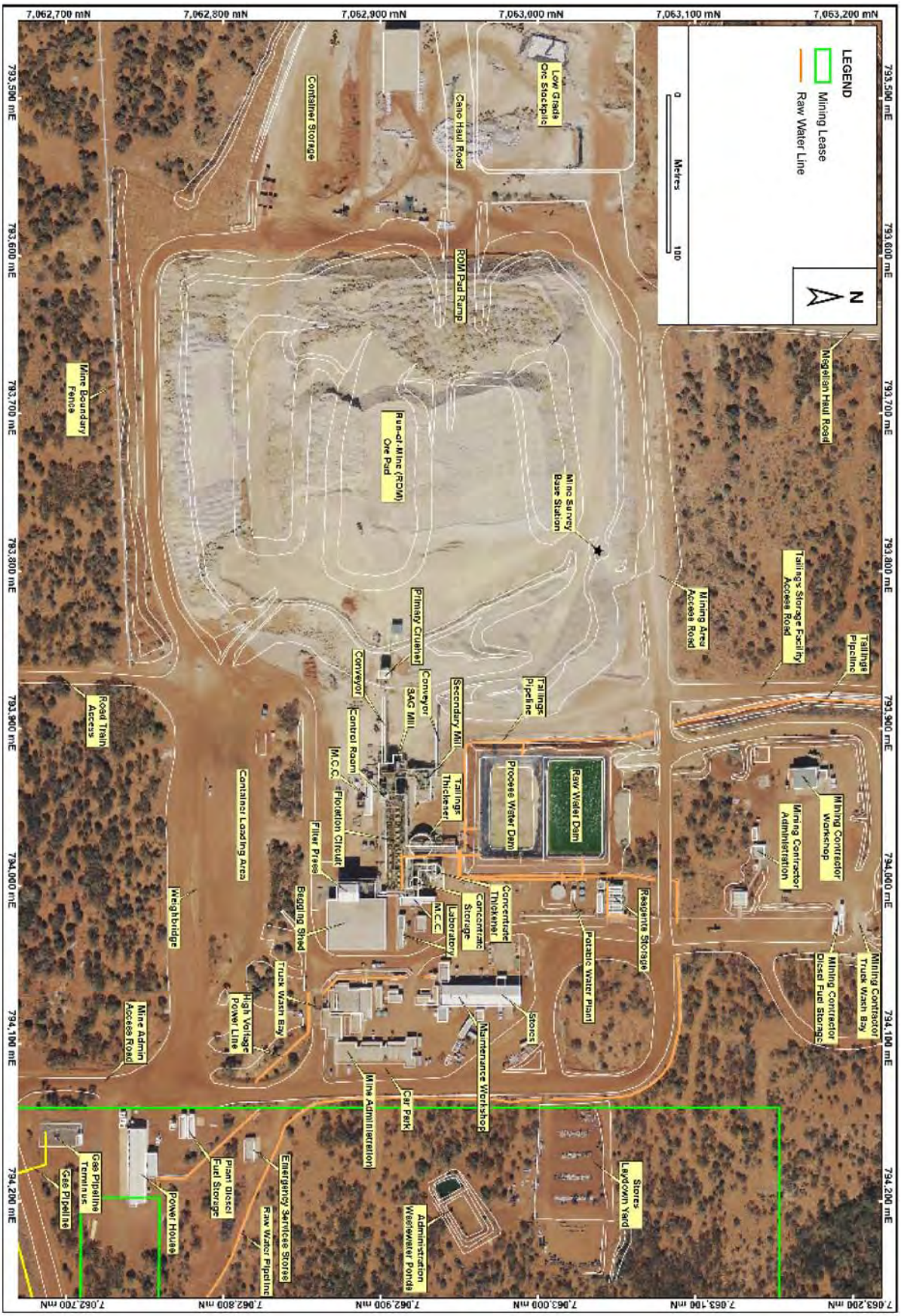

Figure 18. Magellan Lead Carbonate Project plant layout

Schedule 2

Soil Sampling

Soil Site	WGS84 East	WGS84 North	Site Location	Lead Baseline Trigger Level
Unit of Measurement				**mg/kg**
DMTRS01	792743	7060941	Mine to Wiluna	**69**
DMTRS02	204474	7058310	Mine to Wiluna	**80**
DMTRS03	213120	7055743	Mine to Wiluna	**33**
DMTRS04	223327	7055326	Mine to Wiluna	**36**
DMTRS05	222387	7048207	Wiluna to Leonora	**27**
DMTRS06	224583	7038858	Wiluna to Leonora	**24**
DMTRS07	229681	7030283	Wiluna to Leonora	**20**
DMTRS08	233941	7021241	Wiluna to Leonora	**7**
DMTRS09	238904	7012571	Wiluna to Leonora	**12**
DMTRS10	243982	7004011	Wiluna to Leonora	**13**
DMTRS11	249473	6995954	Wiluna to Leonora	**22**
DMTRS12	253330	6986739	Wiluna to Leonora	**10**
DMTRS13	254139	6976372	Wiluna to Leonora	**13**
DMTRS14	254305	6968324	Wiluna to Leonora	**17**
DMTRS15	256456	6958563	Wiluna to Leonora	**15**
DMTRS16	256016	6949717	Wiluna to Leonora	**15**
DMTRS17	258394	6939549	Wiluna to Leonora	**13**
DMTRS18	257418	6930393	Wiluna to Leonora	**10**
DMTRS19	261192	6921246	Wiluna to Leonora	**15**
DMTRS20	266271	6913106	Wiluna to Leonora	**17**
DMTRS21	274079	6907225	Wiluna to Leonora	**16**
DMTRS22	282203	6901419	Wiluna to Leonora	**11**
DMTRS23	289582	6895196	Wiluna to Leonora	**11**
DMTRS24	296184	6887142	Wiluna to Leonora	**16**
DMTRS25	304282	6882275	Wiluna to Leonora	**22**
DMTRS26	312125	6876130	Wiluna to Leonora	**13**
DMTRS27	317790	6868001	Wiluna to Leonora	**9**
DMTRS28	319897	6858772	Wiluna to Leonora	**10**

DMTRS29	323269	6849590	Wiluna to Leonora	**16**
DMTRS30	324162	6839884	Wiluna to Leonora	**17**
DMTRS31	325049	6830127	Wiluna to Leonora	**16**
DMTRS32	329720	6821420	Wiluna to Leonora	**30**
DMTRS33	332200	6811960	Wiluna to Leonora	**19**
DMTRS34	336121	6805728	Leonora	**42**
DMTRS35	336194	6805661	Leonora	**82**
DMTRS36	336247	6805555	Leonora	**205**
DMTRS37	336343	6805300	Leonora	**245**
DMTRS38	336369	6805237	Leonora	**178**
DMTRS39	336393	6805163	Leonora	**72**
DMTRS40	336688	6804526	Leonora	**38**
DMTRS41	336754	6803953	Leonora	**40**
DMTRS42	336722	6803448	Leonora	**239**
DMTRS43	336742	6802929	Leonora	**60**
DMTRS44	339882	6799578	Leonora	**35**
DMTRS45	350134	6799194	Leonora to Menzies	**23**
DMTRS46	354893	6794056	Leonora to Menzies	**20**
DMTRS47	352712	6785422	Leonora to Menzies	**44**
DMTRS48	351580	6775052	Leonora to Menzies	**23**
DMTRS49	351510	6764892	Leonora to Menzies	**14**
DMTRS50	353618	6754862	Leonora to Menzies	**20**
DMTRS51	346211	6748748	Leonora to Menzies	**23**
DMTRS52	338605	6741938	Leonora to Menzies	**15**
DMTRS53	332395	6735705	Leonora to Menzies	**13**
DMTRS54	325051	6728418	Leonora to Menzies	**24**
DMTRS55	317647	6721114	Leonora to Menzies	**26**
DMTRS56	309805	6714665	Menzies	**75**
DMTRS57	309474	6713190	Menzies	**150**
DMTRS58	312484	6705560	Menzies	**25**
DMTRS59	315825	6695884	Menzies to Kalgoorlie	**10**
DMTRS60	318756	6686513	Menzies to Kalgoorlie	**19**
DMTRS61	322672	6677746	Menzies to Kalgoorlie	**8**
DMTRS62	322008	6667654	Menzies to Kalgoorlie	**19**
DMTRS63	324272	6657937	Menzies to Kalgoorlie	**14**
DMTRS64	330561	6650207	Menzies to Kalgoorlie	**14**
DMTRS65	335966	6642835	Menzies to Kalgoorlie	**18**
DMTRS66	339444	6631974	Menzies to Kalgoorlie	**40**

DMTRS67	343381	6624181	Menzies to Kalgoorlie	**37**
DMTRS68	349023	6616577	Menzies to Kalgoorlie	**14**
DMTRS69	351037	6606863	Menzies to Kalgoorlie	**19**
DMTRS70	353084	6599778	Kalgoorlie	**32**
DMTRS71	353294	6599238	Kalgoorlie	**45**
DMTRS72	353430	6598765	Kalgoorlie	**24**
DMTRS73	353717	6598341	Kalgoorlie	**126**
DMTRS74	353597	6597960	Kalgoorlie	**89**
DMTRS75	353193	6597467	Kalgoorlie	**431**
DMTRS76	352622	6597027	Kalgoorlie	**31**
DMTRS77	352150	6596451	Kalgoorlie	**44**
DMTRS78	351867	6596116	Kalgoorlie	**25**
DMTRS79	351545	6595761	Kalgoorlie	**16**
DMTRS80	351189	6595385	Kalgoorlie	**62**
DMTRS81	350666	6595044	Kalgoorlie	**26**
DMTRS82	350167	6594767	Kalgoorlie	**26**
DMTRS83	349805	6594437	Kalgoorlie	**25**
DMTRS84	349107	6593984	Kalgoorlie	**23**
DMTRS85	348287	6593467	Kalgoorlie	**14**
DMTRS86	347841	6593182	Kalgoorlie	**61**
DMTRS87	340488	6589047	Kalgoorlie to Southern Cross	**22**
DMTRS88	331028	6586674	Kalgoorlie to Southern Cross	**34**
DMTRS89	321210	6585574	Kalgoorlie to Southern Cross	**22**
DMTRS90	311962	6581892	Kalgoorlie to Southern Cross	**12**
DMTRS91	300999	6581064	Kalgoorlie to Southern Cross	**18**
DMTRS92	292455	6578582	Kalgoorlie to Southern Cross	**14**
DMTRS93	284611	6582902	Kalgoorlie to Southern Cross	**7**
DMTRS94	275439	6583501	Kalgoorlie to Southern Cross	**7**
DMTRS95	265756	6581875	Kalgoorlie to Southern Cross	**8**
DMTRS96	255884	6582759	Kalgoorlie to Southern Cross	**6**
DMTRS97	247014	6587303	Kalgoorlie to Southern Cross	**18**

DMTRS98	237184	6586140	Kalgoorlie to Southern Cross	**28**
DMTRS99	228409	6585694	Kalgoorlie to Southern Cross	**25**
DMTRS100	220001	6580399	Kalgoorlie to Southern Cross	**15**
DMTRS101	784345	6582934	Kalgoorlie to Southern Cross	**19**
DMTRS102	774403	6583272	Kalgoorlie to Southern Cross	**11**
DMTRS103	764580	6584877	Kalgoorlie to Southern Cross	**15**
DMTRS104	754966	6585420	Kalgoorlie to Southern Cross	**21**
DMTRS105	745369	6587219	Kalgoorlie to Southern Cross	**21**
DMTRS106	736580	6583871	Kalgoorlie to Southern Cross	**11**
DMTRS107	729295	6578215	Kalgoorlie to Southern Cross	**16**
DMTRS108	723722	6569863	Kalgoorlie to Southern Cross	**11**
DMTRS109	723156	6559976	Kalgoorlie to Southern Cross	**19**
DMTRS110	722316	6550108	Kalgoorlie to Southern Cross	**11**
DMTRS111	720462	6544748	Southern Cross	**46**
DMTRS112	720212	6544399	Southern Cross	**16**
DMTRS113	719761	6543765	Southern Cross	**23**
DMTRS114	719489	6543442	Southern Cross	**19**
DMTRS115	718139	6541218	Southern Cross to Merredin	**11**
DMTRS116	708848	6538876	Southern Cross to Merredin	**21**
DMTRS117	699535	6535795	Southern Cross to Merredin	**24**
DMTRS118	692371	6530755	Southern Cross to Merredin	**13**
DMTRS119	683876	6528650	Southern Cross to Merredin	**5**
DMTRS120	674687	6529421	Southern Cross to Merredin	**30**
DMTRS121	664992	6527526	Southern Cross to Merredin	**6**
DMTRS122	658258	6526090	Southern Cross to Merredin	**5**
DMTRS123	648985	6528448	Southern Cross to Merredin	**11**
DMTRS124	639379	6526010	Southern Cross to Merredin	**21**
DMTRS125	633618	6521095	Southern Cross to Merredin	**24**
DMTRS126	626490	6517373	Southern Cross to Merredin	**13**
DMTRS127	622867	6516024	Merredin	**145**

DMTRS128	622310	6516069	Merredin	**87**
DMTRS129	621767	6516114	Merredin	**81**
DMTRS130	621189	6516158	Merredin	**249**
DMTRS131	620715	6516262	Merredin	**144**
DMTRS132	620166	6516335	Merredin	**34**
DMTRS133	619603	6516399	Merredin	**37**
DMTRS134	619111	6516184	Merredin	**35**
DMTRS135	616523	6515220	Merredin	**35**
DMTRS136	608214	6513169	Merredin to Kellerberrin	**30**
DMTRS137	599092	6510549	Merredin to Kellerberrin	**33**
DMTRS138	590453	6505613	Merredin to Kellerberrin	**52**
DMTRS139	580807	6501530	Merredin to Kellerberrin	**620**
DMTRS140	571404	6500370	Merredin to Kellerberrin	**48**
DMTRS141	568994	6500101	Kellerberrin	**103**
DMTRS142	568441	6500035	Kellerberrin	**92**
DMTRS143	567874	6499947	Kellerberrin	**66**
DMTRS144	567342	6499855	Kellerberrin	**42**
DMTRS145	561828	6498743	Kellerberrin	**21**
DMTRS146	553238	6500021	Kellerberrin to Northam	**19**
DMTRS147	544431	6499028	Kellerberrin to Northam	**196**
DMTRS148	534616	6499244	Kellerberrin to Northam	**197**
DMTRS149	524657	6498417	Kellerberrin to Northam	**29**
DMTRS150	514868	6500082	Kellerberrin to Northam	**28**
DMTRS151	505161	6502440	Kellerberrin to Northam	**42**
DMTRS152	496031	6499439	Kellerberrin to Northam	**16**
DMTRS153	486318	6499411	Kellerberrin to Northam	**23**
DMTRS154	476965	6498924	Northam	**18**
DMTRS155	470684	6498261	Northam	**852**
DMTRS156	470085	6498256	Northam	**43**
DMTRS157	469620	6498330	Northam	**180**
DMTRS158	469086	6498602	Northam	**623**
DMTRS159	468509	6499035	Northam	**25**
DMTRS160	467822	6499226	Northam	**51**
DMTRS161	462225	6498732	Northam	**17**
DMTRS162	454352	6504256	Toodyay	**27**
DMTRS163	450191	6508480	Toodyay	**13**
DMTRS164	450070	6508751	Toodyay	**45**
DMTRS165	449725	6509018	Toodyay	**31**

DMTRS166	449177	6509142	Toodyay	**34**
DMTRS167	445253	6509265	Toodyay to Midland	**26**
DMTRS168	438675	6506482	Toodyay to Midland	**18**
DMTRS169	434452	6508113	Toodyay to Midland	**20**
DMTRS170	412403	6488969	Toodyay to Midland	**17**
DMTRS171	408005	6482857	Toodyay to Midland	**85**
DMTRS172	408583	6473315	Toodyay to Midland	**19**
DMTRS173	408785	6472667	Toodyay to Midland	**58**
DMTRS174	408806	6471996	Toodyay to Midland	**28**
DMTRS175	409045	6471284	Toodyay to Midland	**37**
DMTRS176	408698	6470505	Toodyay to Midland	**30**
DMTRS177	408118	6470341	Toodyay to Midland	**30**
DMTRS178	407475	6470525	Toodyay to Midland	**212**
DMTRS179	406831	6470708	Toodyay to Midland	**100**
DMTRS180	405613	6471060	Toodyay to Midland	**62**
DMTRS181	406225	6470936	Midland to Hazelmere	**273**
DMTRS182	404765	6471113	Midland to Hazelmere	**103**
DMTRS183	404476	6470259	Midland to Hazelmere	**25**
DMTRS184	404447	6469422	Midland to Hazelmere	**12**
DMTRS185	404529	6468997	Midland to Hazelmere	**45**
DMTRS186	404651	6468518	Midland to Hazelmere	**7**
DMTRS187	405001	6467167	Hazelmere to Welshpool	**23**
DMTRS188	404871	6466673	Hazelmere to Welshpool	**13**
DMTRS189	404709	6466140	Hazelmere to Welshpool	**15**
DMTRS190	404624	6465332	Hazelmere to Welshpool	**31**
DMTRS191	404769	6464586	Hazelmere to Welshpool	**30**
DMTRS192	404783	6464043	Hazelmere to Welshpool	**14**
DMTRS193	404661	6463302	Hazelmere to Welshpool	**61**
DMTRS194	404549	6462699	Hazelmere to Welshpool	**54**
DMTRS195	404398	6461992	Hazelmere to Welshpool	**50**
DMTRS196	404171	6461411	Hazelmere to Welshpool	**41**
DMTRS197	403648	6460923	Welshpool to Canning Vale	**20**
DMTRS198	403449	6459850	Welshpool to Canning Vale	**416**
DMTRS199	403459	6459274	Welshpool to Canning Vale	**14**
DMTRS200	403448	6458713	Welshpool to Canning Vale	**1500**
DMTRS201	403215	6458240	Welshpool to Canning Vale	**11**
DMTRS202	402975	6457603	Welshpool to Canning Vale	**8**
DMTRS203	402988	6457124	Welshpool to Canning Vale	**11**
DMTRS204	402993	6456753	Welshpool to Canning Vale	**16**

DMTRS205	402391	6455462	Welshpool to Canning Vale	**29**
DMTRS206	402037	6455049	Welshpool to Canning Vale	**13**
DMTRS207	401241	6454065	Welshpool to Canning Vale	**15**
DMTRS208	400224	6453058	Welshpool to Canning Vale	**21**
DMTRS209	399608	6452462	Welshpool to Canning Vale	**43**
DMTRS210	398959	6451791	Canning Vale	**16**
DMTRS211	398528	6451407	Canning Vale	**11**
DMTRS212	397957	6451133	Canning Vale	**115**
DMTRS213	397358	6451000	Canning Vale	**9**
DMTRS214	396385	6450780	Canning Vale	**14**
DMTRS215	393937	6449791	Jandakot	**58**
DMTRS216	392497	6449033	Jandakot	**20**
DMTRS217	391951	6448761	Jandakot	**5**
DMTRS218	391555	6448543	Jandakot	**7**
DMTRS219	391366	6448392	South Lake	**9**
DMTRS220	390742	6448007	South Lake	**18**
DMTRS221	390285	6447690	South Lake	**9**
DMTRS222	389788	6447483	South Lake	**7**
DMTRS223	389186	6447076	South Lake	**9**
DMTRS224	388860	6446747	Yangebup	**10**
DMTRS225	388362	6446249	Yangebup	**11**
DMTRS226	387897	6445838	Yangebup	**18**
DMTRS227	386547	6446042	Yangebup	**216**
DMTRS228	386313	6446706	Yangebup	**31**
DMTRS229	385733	6447090	Spearwood	**39**
DMTRS230	385193	6447366	Spearwood	**58**
DMTRS231	384787	6447428	Spearwood	**18**
DMTRS232	384471	6447609	Spearwood	**18**
DMTRS233	383901	6447712	Spearwood	**60**
DMTRS234	383380	6447952	Coogee	**11**
DMTRS235	382939	6448869	Coogee	**86**
DMTRS236	382593	6449247	Coogee	**18**
DMTRS237	382355	6449767	Coogee	**1500**
DMTRS238	382301	6450404	Fremantle	**47**
DMTRS239	382130	6451052	Fremantle	**810**
DMTRS240	382074	6451506	Fremantle	**150**
DMTRS241	381907	6452126	Fremantle	**219**
DMTRS242	381375	6452414	Fremantle	**81**
DMTRS243	381204	6452777	Fremantle	**139**
DMTRS244	381667	6453251	Fremantle	**99**
DMTRS245	382015	6453711	Fremantle	**157**
DMTRS246	382320	6454174	Fremantle	**747**

DMTRS247	382331	6454585	Fremantle	**75**
DMTRS248	381880	6454855	Fremantle	**38**
DMTRS249	381249	6454321	Fremantle	**114**
DMTRS250	381162	6454166	Fremantle	**53**
DMTRS251	386967	6445619	Fremantle	**10**

Rainwater Tank Sampling

Water Site	WGS84 East	WGS84 North	Location	Lead Baseline Trigger Level
Unit of Measurement				**mg/L**
WATTRS01	336655	6802942	Leonora	**0.008**
WATTRS02	336843	6804068	Leonora	**0.01***
WATTRS03^	352034	6596278	Kalgoorlie	**0.01***
WATTRS04^	352157	6596128	Kalgoorlie	**0.01***
WATTRS05	352754	6597236	Kalgoorlie	**<0.005**
WATTRS06	351950	6595879	Kalgoorlie	**<0.005**
WATTRS07	720719	6543688	Southern Cross	**<0.005**
WATTRS08	720938	6543075	Southern Cross	**<0.005**
WATTRS09	719963	6544548	Southern Cross	**<0.005**
WATTRS10	621748	6516043	Merredin	**0.01***
WATTRS11	621619	6516566	Merredin	**0.01***
WATTRS12	567121	6499734	Kellerberrin	**<0.005**
WATTRS13	567853	6500062	Kellerberrin	**0.01***
WATTRS14	468592	6498816	Northam	**0.01***
WATTRS15	469392	6498694	Northam	**<0.005**
WATTRS16	406243	6471016	Midland	**0.009**
WATTRS17	404494	6470844	Midland	**0.01***
WATTRS18	382375	6450549	South Fremantle	**0.01***
WATTRS19	382203	6454981	North Fremantle	**0.01***

Static Dust Sampling

Site Number	AGD84 Easting	AGD84 Northing	Site Location	Lead Baseline Trigger Level
Unit of Measurement				**mg lead /m^2/mth"**
SDMTRS01	381591	6454322	Fremantle Port	**1.07**
SDMTRS02	380982	6453828	Fremantle Port	**2.74**
SDMTRS03	380654	6453299	Fremantle Port	**2.66**
SDMTRS04	381543	6453336	Fremantle Port	**3.37**
SDMTRS05	382178	6454397	Fremantle Port	**1.51**
SDMTRS06	405452	6470914	Midland	**0.62**
SDMTRS07	406993	6470568	Midland	**0.73**
SDMTRS08	470535	6498088	Northam	**2.70**
SDMTRS09	470035	6498119	Northam	**0.74**
SDMTRS10	567496	6499779	Kellerberrin	**0.47**
SDMTRS11	568471	6499812	Kellerberrin	**4.34**
SDMTRS12	616399	6515069	Merredin	**0.50**
SDMTRS13	616365	6515108	Merredin	**0.87**
SDMTRS14	720172	6544365	Southern Cross	**0.53**
SDMTRS15	720130	6544381	Southern Cross	**0.89**
SDMTRS16	352008	6596301	Kalgoorlie	**0.52**
SDMTRS17	348972	6593826	Kalgoorlie	**4.06**
SDMTRS18	336266	6805106	Leonora	**3.34**
SDMTRS19	336227	6805096	Leonora	**1.56**
SDMTRS20	381777	6454719	Fremantle	**1.11**
SDMTRS21	382184	6453541	Fremantle	**1.47**

High-volume Air Sampling

Site Reference	AGD84 Easting	AGD84 Northing	Lead Baseline Trigger Level µg/m^3
Passenger Terminal	381755	6453509	0.500
Berth 12	382306	6454502	

Benthic Sediment Sampling

Site Number	AGD84 Easting	AGD84 Northing	Lead Baseline Trigger Level
Unit of Measurement			**mg/kg (dry weight)**
P1	381834	6454392	**19**
P2	381739	6454292	**14**
P3	381710	6454249	**11**
P4	381692	6454234	**10**
P5	381620	6454134	**9**
P6	381578	6454075	**3**
P7	381517	6454014	**8**
P8	381481	6453980	**7**
P9	381478	6453942	**18**
P10	381416	6453892	**21**
P11	381357	6453810	**16**
P12	381350	6453802	**16**
DP1	381285	6453743	**29**
DP2	381271	6453707	**44**
DP3	381237	6453671	**24**
DP4	381228	6453626	**19**
DP5	381115	6453515	**17**
DP6	381021	6453418	**20**
DP7	381076	6453460	**16**
CO2	381078	6454402	**2**

Drainage Sump Sampling

Site Number	AGD84 Easting	AGD84 Northing	Lead Baseline Trigger Level
Unit of Measurement			**mg/kg**
SUMPTRS01	381362	6454316	**43**
SUMPTRS02	381356	6454306	**42**
SUMPTRS03(A)	381345	6454291	**51**
SUMPTRS03(B)	381345	6454291	**100**
SUMPTRS04(A)	381334	6454278	**55**
SUMPTRS04(B)	381334	6454278	**102**
SUMPTRS05	381329	6454255	**35**
SUMPTRS06	381346	6454300	**559**
SUMPTRS07	381356	6454322	**128**
SUMPTRS08	381326	6454251	**403**
SUMPTRS09	380965	6453790	**128**
SUMPTRS10	380967	6453805	**234**
SUMPTRS11	380973	6453823	**96**
SUMPTRS12	380682	6453285	**262**
SUMPTRS13	380671	6453286	**165**

Air Quality in Container Sampling

Lead Baseline Trigger Level is 20 µg/m^3.

Note: The baseline trigger levels are likely to change as further monitoring is carried out